

**CERTIFICATE AUTHORIZING THE
TRANSFER OF 23.0 MGD OF WATER FROM THE YADKIN RIVER BASIN (18-1)
TO THE ROCKY RIVER BASIN (18-4)
UNDER THE PROVISIONS OF N.C.G.S. §143-215.22L**

On August 12, 2013, Union County filed a notice of intent with the Environmental Management Commission (EMC or Commission) to request an interbasin transfer (IBT) certificate.

On August 31, 2015, Union County's draft Environmental Impact Statement (EIS) was submitted to the State Clearinghouse for review and comment. A public hearing was held regarding the draft EIS on September 16, 2015 in the Town of Norwood [Yadkin River Basin (18-1)]. The final EIS was submitted to the State Clearinghouse for review and comment on January 13, 2016. The Secretary of the Department of Environmental Quality (DEQ or Department), to whom the EMC delegated their approval authority in this instance, found the environmental document to be adequate. A Record of Decision was signed by the Secretary on April 12, 2016.

On April 29, 2016, Union County and the Town of Wingate (Applicants) submitted the petition for an IBT certificate to the EMC. The requested IBT certificate is for a transfer of up to 23.0 million gallons per day (mgd), calculated as a daily average of a calendar month, from the Yadkin River Basin (18-1) to the Rocky River Basin (18-4). This transfer amount is based on water use projections to 2050.

The EMC considered the Applicants' request and made a draft determination to grant the IBT certificate at its meeting on July 14, 2016. Three public hearings were held concerning the draft determination. The first public hearing was held on August 23, 2016 in the Town of Norwood [Yadkin River Basin (18-1)]; the second public hearing was held on August 24, 2016 in the Town of Wadesboro [Yadkin River Basin (18-1)]; the final public hearing was held on September 1, 2016 in the City of Monroe [Rocky River Basin (18-4)]. A total of 21 oral comments were received. The three most commonly received comments related to (1) concerns that the proposed transfer would lead to lower water levels for Lake Tillery, (2) the perceived negative economic impact on future growth in the Yadkin River Basin (18-1) if water is sent away to support the growth of Union County in the Rocky River Basin (18-4), and (3) concerns that public hearings and the proposed water transfer project were not properly noticed. There were 87 individuals who submitted written comments. A record of all public comments received and responses from the hearing officer are provided in Part 2.

Having reviewed and considered the entire record, including the Applicants' notice of intent to request an interbasin transfer certificate, the petition, the environmental impact statement (EIS), the draft certificate, and all other sources of information required by N.C.G.S. §143-215.22L in making its decision, the Environmental Management Commission has considered the following factors in making its findings of fact.

Factors Considered

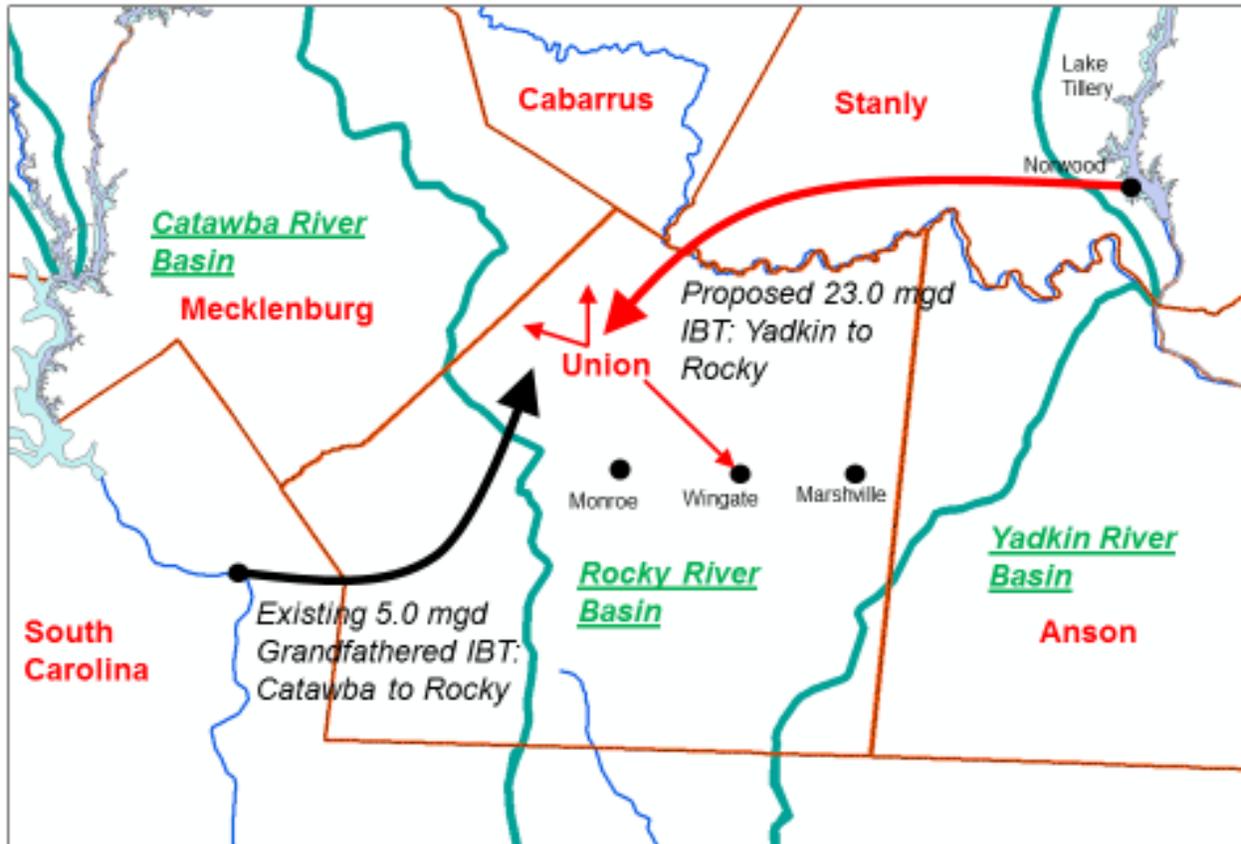
(1) The Necessity, Reasonableness, and Uses of the Proposed Transfer.

Based on the record and in accordance with requirements of G.S. § 143-215.22L(k)(1), the Commission finds that Union County's current water supply sources are insufficient to supply Union County's service area and wholesale customers over a 30-year planning horizon beginning in the year 2020 through the year 2050. Providing water for the anticipated population growth that is expected to occur based on past and projected future growth is necessary to support the anticipated continued growth and development of the county. Thus, the Commission concludes that the requested IBT certificate for the transfer of 23.0 mgd daily average for a calendar month is a necessary and reasonable amount to support the growing residential, commercial, and industrial needs of this area.

Analysis:

Union County currently serves unincorporated portions of the county, along with the following jurisdictions: The Town of Waxhaw, the Town of Mineral Springs, the Town of Weddington, the Town of Indian Trail, the Town of Stallings, the Town of Hemby Bridge, the Town of Fairview, the Town of Unionville, the Village of Wesley Chapel, and the Village of Lake Park. The Town of Wingate currently purchases water wholesale from the county, and is a co-applicant to the IBT Petition. The Union County water system does not currently serve the City of Monroe or the Town of Marshville; however, since 2014, Union County has a contract agreement to supply the City of Monroe up to 1.99 mgd of treated water on an as-needed wholesale basis. Union County provides the City of Monroe with water from its Catawba River Water Treatment Plant source to an interconnection point located within the Catawba River Basin (3-1). The City of Monroe owns the water transmission infrastructure from the interconnection point to its distribution system in the Rocky River Basin (18-4). Because the amount transferred is not greater than 2.0 mgd, it is below the statutory threshold requiring an IBT certificate, for which Monroe would be the applicant since it owns the transmission infrastructure which crosses the basin boundary. The water provided to the City of Monroe is not part of the proposed transfer from the Yadkin River Basin (18-1). To be eligible to receive water transferred from the Yadkin River Basin (18-1), the City of Monroe would have to be a co-applicant on the IBT certificate. Figure 1 outlines the county and river basin boundaries, and illustrates the proposed transfer of water from Lake Tillery in Stanly County in the Yadkin River Basin (18-1) to Union County in the Rocky River Basin (18-4).

Figure 1. Union County with River Basin Boundaries



The projected increase in the county's water demand is attributed to anticipated county population growth and Union County water system service area growth in the Rocky River Basin (18-4), extending to the northeastern and eastern portions of the county not currently served. In 2013, the population served in the Rocky River Basin (18-4) by the Union County Water System was 52,550 with an average day maximum month demand (MMD) of 7.7 mgd; by 2050 the population is projected to grow to 179,450 with a MMD of 28.9 mgd. An increase in per capita water consumption is expected, and is largely driven by the demographic shift in the county from predominantly rural to a greater percentage of suburban residential customers. Along with this shift, Union County's service area will expand to serve new communities (residential) including other water use sectors such as commercial, institutional, industrial, etc., which will inherently increase total per capita use across the service area.

Union County recently updated its water use ordinance, which the Union County Board of Commissioners officially adopted in May 2015. The Water Use Ordinance and associated Water Shortage Response Plan limits customer use of spray irrigation systems to a maximum of 3 days per week at all times, not just during times of drought or water shortage. Additionally, customers are encouraged to adhere to a list of recommended voluntary water conservation measures at all times. Since 2009, Union County has remained in a Stage 2 Water Shortage Condition, as defined by the previous Water Conservation Ordinance. During this time, Union

County has imposed mandatory water use restrictions, which among other things limits lawn irrigation to no more than two days per week per customer. Such restrictions have been effective in reducing the County's peak day water demands.

In addition to its own local ordinance, Union County is a party to the 2006 Comprehensive Relicensing Agreement with Duke Energy Progress and the Federal Energy Regulatory Commission (FERC) which requires adherence to the Low Inflow Protocol (LIP) for the Catawba-Wateree Hydroelectric Project by owners of large public water supply intakes located in the reservoirs and main stem of the Catawba River. Upon granting of this IBT certificate, Union County will also be required to follow the low inflow protocol (LIP) requirements established through the 2007 Relicensing Settlement Agreement for the Yadkin Hydroelectric Project. The LIP establishes procedures for reductions in water use during periods of low inflow to help conserve the limited water supply, and includes five different stages with associated water use reduction goals and water use restrictions for customers. The LIP is activated when conditions go below specified triggers, including surface water levels (gage and lake elevations), nearby groundwater levels, and designation by the Drought Management Advisory Council (DMAC). More specifically, those criteria for activating or changing stage designations for the LIP include: reservoir storage as percent of target, percent of six-month long-term average stream flow, three-month average of U.S. Drought Monitor, and groundwater levels. Reaching the specified trigger points for each of these four criteria warrants usage reductions to help ensure that the projects are able to meet required minimum instream flows while also maintaining reservoir water elevations within normal operating ranges.

Table 1 presents the projected population and water demand growth through 2050 for the Rocky River Basin (18-4) service area of Union County. The current water supply for Union County is provided by a 5 mgd grandfathered surface water transfer from the Catawba River Basin (3-1) to the Rocky River Basin (18-4), as well as a 4 mgd water purchase agreement with Anson County, which will be up for renewal in 2017.

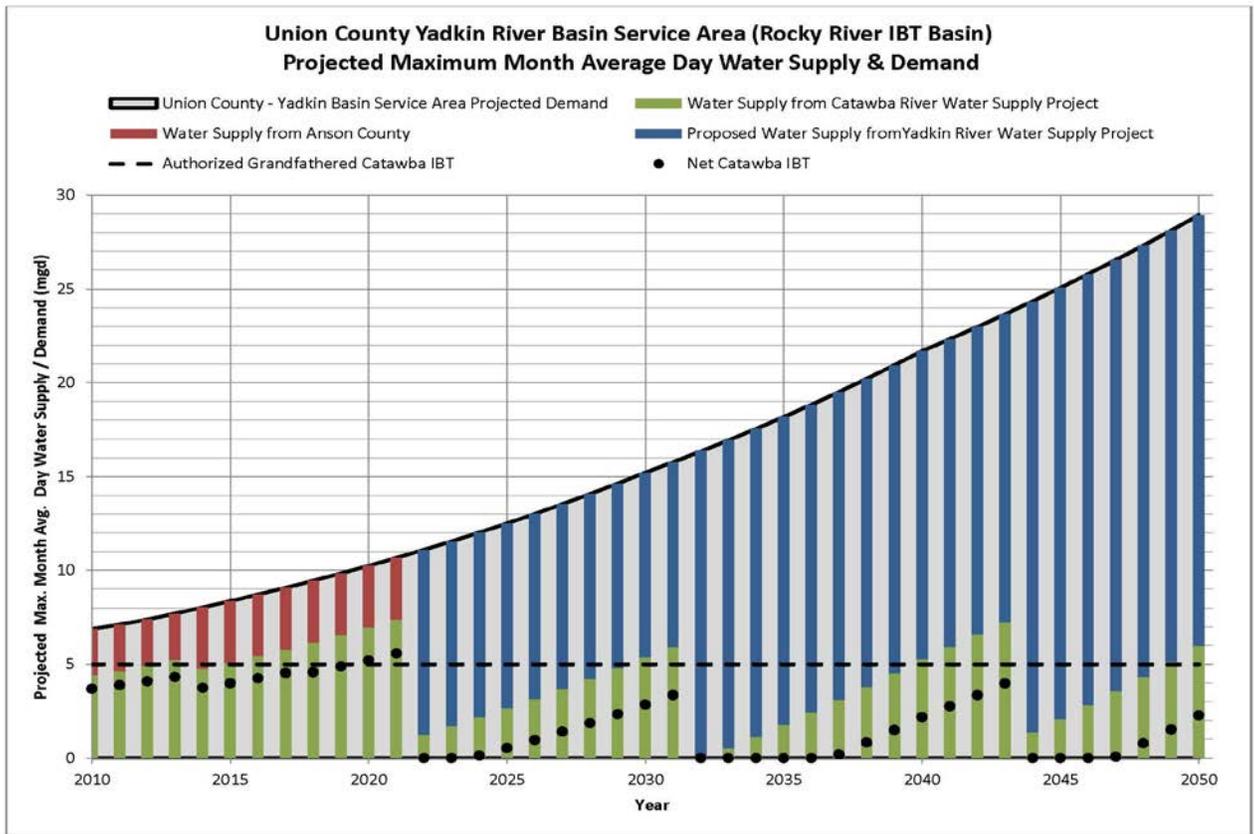
Table 1. Rocky River IBT Basin Service Area Population and Water Demand Growth

Year	Service Population Rocky River IBT Basin	Water Demand (MGD, max. month avg.) for Rocky River IBT Basin
2013	52,550	7.7
2020	67,767	10.2
2030	97,456	15.2
2040	136,149	21.7
2050	179,450	28.9

In accordance with the requirements of G.S. § 143-215.22L(k)(1) the necessity and reasonableness of the amount of the proposed transfer and its proposed uses were considered, and the county’s existing water supply was found to be insufficient to meet projected near term and long term future water demands; needs are projected to exceed supply limits by the year 2020.

Figure 2 illustrates the county’s recent, current, and projected future water use, including grandfathered and the current requested IBT amounts within the Rocky River Basin (18-4).

Figure 2. Projected Water Supply and Demand in Union County’s Rocky River IBT Basin



More information about the future population growth and water demand projections may be found in Section 2.3 of the Environmental Impact Statement (EIS).

The proposed certificate will allow for the transfer of up to 23.0 mgd daily average for a calendar month, for the month in which IBT is expected to be the highest. This increase is needed in order to support the projected population growth and expanded area serviced by Union County through the year 2050.

(2) Present and Reasonably Foreseeable Future Detrimental Effects on the Source River Basin.

Based on the record, the Commission finds and concludes that the detrimental effects on the source river basin described in N.C.G.S. § 143-215.22L(k)(2) will be minimal. Additionally, the Commission finds that it is advisable to minimize the impacts of secondary effects caused by growth in Union County through the continued implementation of Union County's Development Ordinance, as well as continued implementation of other local ordinances for jurisdictions within Union County.

Analysis:

To evaluate the direct impacts on the source river basin resulting from the proposed IBT, the primary tool used was the CHEOPS™ (Computerized Hydro Electric Operations Planning Software) model. CHEOPS™ is designed to evaluate the effects of operational changes and physical modifications at multi-development hydroelectric projects. The model was originally developed to support the Federal Energy Regulatory Commission (FERC) relicensing process for the Yadkin-Pee Dee Hydroelectric Project. CHEOPS™ incorporates the Duke Energy Progress-owned Yadkin-Pee Dee Hydroelectric Project (FERC No. 2206), which includes the Tillery and Blewett Falls Developments. The model also incorporates the upstream Yadkin Hydroelectric Project (FERC No. 2197) owned by Alcoa Power Generating, Inc., which includes the High Rock, Tuckertown, Narrows, and Falls Developments. The model was updated as part of the Union County IBT Environmental Impact Statement to include the most-upstream reservoir, W. Kerr Scott, owned by the U.S. Army Corps of Engineers (USACE).

The CHEOPS™ model evaluates water quantity distribution between reservoirs in the Yadkin-Pee Dee River system due to changes in model inputs, including possible interbasin transfers. The model was updated in 2013 to include the most recent drought during 2006-2009, basin-wide water withdrawals and return flow projections for all users through 2060, and to include the Low Inflow Protocol (LIP) for the Yadkin and Yadkin-Pee Dee River Hydroelectric Projects. The LIP provides the procedures for how the system will be operated when inflow into the reservoirs is not enough to meet normal water demands, while still maintaining lake levels within their normal ranges. Current and projected water use and water transfer data were used in developing the model and forecasting future water demands.

In accordance with the requirements of N.C.G.S. § 143-215.22L(k)(2), four different model scenarios were run in order to evaluate any detrimental effects of the proposed IBT on the source river basin under both current (2012) and future (2050) conditions. The modeling was performed by a reputable, global engineering firm, HDR Engineering, Inc. of the Carolinas, under the direction of a North Carolina licensed professional engineer, Mr. Kevin Mosteller. The model scenarios were:

- Baseline Conditions-Year 2012: No IBT, and current (2012) basin-wide water demands (withdrawals/returns)
- Baseline Conditions-Year 2050: No IBT, future (2050) basin-wide water demands, and includes potential future impact of an increased temperature of 2.3 degrees Fahrenheit and lake surface evaporation increases of 7.8%
- Alternative 1-Year 2012: 23.0 mgd IBT, and current (2012) basin-wide water demands (withdrawals/returns)

- Alternative 1-Year 2050: 23.0 mgd IBT, future (2050) basin-wide water demands, and includes potential future impact of an increased temperature of 2.3 degrees Fahrenheit and lake surface evaporation increases of 7.8%

Additionally, three distinct hydrologic periods were analyzed for each of the model scenarios described above:

- Full Period of Record (59-year hydrology, 1955-2013)
- Drought 1 (5-year low inflow period (Drought of Record), 1999-2003)
- Drought 2 (4-year low inflow period (most recent significant drought), 2006-2009)

Under these parameters, the results of the modeling are summarized in a set of Performance Measure Sheets (Appendix C of the Petition document) for comparison purposes to assess the impacts of an IBT on the system and its reservoirs, as compared to “baseline” conditions under both current and future water demands throughout the Yadkin River Basin (18-1). Complete results of the modeling are presented in Appendix E of the Environmental Impact Statement.

The effect of the proposed IBT on the water level of Lake Tillery was evaluated by HDR using the CHEOPS™ model. The specific criteria evaluated include the percent of time the end of day reservoir level was within a given range of the full pond (278.2 ft. mean sea level), normal winter minimum (273.2 ft. msl), and normal summer minimum elevations (275.7 ft. msl), for the Period of Record (POR), Drought 1 and Drought 2 time periods, as defined above.

During normal hydrologic (non-drought) conditions, the summer or winter minimum elevations are the lowest Duke Energy Progress is allowed by their operating license to take the lake elevation. The lake operates within a normal summer operating range and a normal winter operating range, which is between the minimum elevation for either summer or winter and the full pond elevation. The summer and winter minimum elevations are required by FERC as part of the permit and operating rules for the lake. Those elevations were established through the relicensing process and included stakeholder input regarding a number of criteria such as usability of boat ramps, docks, and water supply intakes. The period during which the normal winter minimum is applicable is December 16th through February 28th. The period during which the normal summer minimum is applicable is March 1st through December 15th.

Modeling results indicated no impact from the Applicants’ proposed IBT to meeting modeled reservoir levels under current (2012) basin-wide water demands for the POR, Drought 1 or Drought 2 periods. Model results further indicated that under projected future (2050) water demand conditions with the proposed IBT, the three modeled reservoir levels for Lake Tillery (full pond, normal winter minimum, and normal summer minimum) were all met for both the POR and Drought 2 periods.

The only scenario where modeled reservoir levels were not met was under projected future (2050) demands with the proposed IBT during the Drought 1 period, where the full pond and normal summer minimum elevations could not be maintained (though winter minimum elevations were maintained for these criteria). More specifically, under Drought 1 conditions and future basin-wide water demands with the proposed IBT, the modeled level of Lake Tillery was up to 1 foot lower (277.2 ft. msl) than full pond elevation for 2% of the time over the Drought 1 period (or 36 days over 5 years), and up to 1 foot higher (276.7 ft. msl) than the

minimum summer elevation for 1% of the time during the Drought 1 period (or 15 days over the five-year, summer period drought conditions), when compared to the future baseline scenario with no IBT.

In addition to looking at the percent of time during which target lake elevations were achieved, monthly average elevations for Lake Tillery were also modeled for current (2012) and future (2050) water demands, including the proposed IBT, under the three defined hydrologic periods (POR, Drought 1, and Drought 2). When the proposed IBT was added to current basin-wide water demands, there was no detectable impact to average monthly lake elevations throughout the POR, Drought 1, or Drought 2 when compared to current conditions without the IBT. Likewise, throughout the modeled Drought 2 conditions under projected future basin-wide water demands, there were no detectable impacts to average monthly lake elevations due to the proposed Union County IBT. However, under projected future basin-wide water demands with the proposed IBT included, there was a single detectable impact to average monthly lake elevations for the POR and Drought 1, when compared to future baseline conditions without the IBT. This event occurred in August 2002, where a maximum impact of 9 inches was modeled. This modeled 9-inch drop in elevation for Lake Tillery occurred during the most intense part of the drought when the system was most stressed and under future basin-wide water demands. This impact also factors in the potential future power generating facilities. It should be noted that even with the 9-inch drop, the modeled lake elevation remained 1 foot 3 inches above the average minimum summer elevation, and well within the summer operating rules for Lake Tillery.

The public boat ramp access area on Lake Tillery for which there is current survey data from Duke Energy Progress becomes unusable 3 feet 5 inches below full pond elevation, which is nearly 11 inches below the normal summer minimum lake operating level. Since the lowest modeled lake elevation was 1 foot 3 inches above the average minimum summer elevation, and over 2 feet above the usable level for boat ramp access, no impacts to public boat access areas on Lake Tillery are expected as a result of the Applicants' proposed IBT.

Blewett Falls Lake, the impoundment downstream from Lake Tillery, was modeled to determine the impacts from the proposed IBT to its surface elevation, following the same criteria and scenarios described above for Lake Tillery. There was no detectable impact due to the proposed IBT to average monthly lake elevations throughout the POR, Drought 1, or Drought 2 conditions with current (2012) basin-wide water demands, when compared to baseline conditions without the IBT. There were several small, but detectable, impacts to monthly elevations for Blewett Falls Lake throughout the POR, Drought 1, and Drought 2 conditions due to the proposed IBT when added to projected future (2050) basin-wide water demands. At the lowest modeled lake elevation for Drought 1 (172.1 ft. msl), which occurred in August 2002, impacts from the proposed IBT were approximately 3 inches during the POR and Drought 1 conditions, as compared to baseline future conditions without the IBT. Despite this impact, the minimum modeled elevation during drought conditions of August 2002 was equal to the Blewett Falls normal minimum elevation, and within normal operating rules for the lake. For the Drought 2 conditions modeled under future water demands with the proposed IBT included, two small but detectable impacts were noted. There was an approximate 4-inch drop in elevation which occurred from August to October 2007 and an approximate 2-inch drop in elevation which occurred in August 2008. It is important to note that for the lowest modeled lake elevation

(174.1 ft. msl) during this Drought 2 period, which occurred in March 2009, there was no difference between the baseline and proposed IBT scenarios, and the lake remained 2 feet above its normal minimum level (172.1 ft. msl).

There are two public boat ramp access areas on Blewett Falls Lake, and while there are not specific usable elevations available for these facilities, Duke Energy Progress indicates all boat ramps remain accessible down to the normal minimum lake operating level of 172.1 ft. msl or below during the recreation season. As indicated in the modeling results discussed above, the lowest modeled lake elevation was 172.1 ft. msl, which is equal to the Blewett Falls Lake normal minimum elevation, and within the normal operating rules for the lake. Since all ramps are accessible down to the normal minimum lake elevation or below, no impacts to public boat access areas on Blewett Falls Lake are expected as a result of the proposed Union County IBT.

Potential lake level impacts were evaluated for all upstream reservoirs in the Yadkin River Basin (18-1) (High Rock Lake, Tuckertown Reservoir, Badin Lake, and Falls Reservoir). Modeling results indicated negligible impacts to lake elevations for all upstream reservoirs as a result of the proposed IBT over the POR, Drought 1, and Drought 2 conditions, even with future (year 2050) basin-wide water demands taken into account. Lake levels throughout the Yadkin River Basin (18-1) were also evaluated to determine whether surface water intakes in any of the reservoirs would be in jeopardy as a result of the proposed IBT. Modeling results indicated there were no impacts to water supply intakes for Yadkin River Basin (18-1) reservoirs due to the Applicants' proposed IBT, as compared to the baseline scenarios for both current and future projected basin-wide water use. There were not any days in which modeled lake elevations were low enough to restrict water supply intake operation on any reservoir; minimum modeled lake elevations remained well above all existing lake intakes.

Reservoir releases were modeled and evaluated for Lake Tillery and Blewett Falls Lake for the POR, Drought 1, and Drought 2 periods. Table 2 summarizes the modeled impacts to flow releases from Lake Tillery as a result of the proposed IBT. Under both current (Year 2012) and projected future (year 2050) basin-wide water demands, some impacts on downstream releases from Lake Tillery were observed under the proposed Union County IBT during the POR, Drought 1 and Drought 2 periods, as more days were spent below the water elevation needed to supply the flow releases required for spring spawning and continuous minimum flow release targets, compared to the baseline. However, in no case does the lowest modeled daily average

Table 2. Modeled Impacts to Flow Release from Lake Tillery

Criterion ¹	Modeled Period ²	Scenario Result Comparison ³			
		Baseline 2012	2012 with Union IBT	Baseline 2050	2050 with Union IBT
# days ≤ 725 cfs continuous min.flow (8 consecutive weeks) for fish spawning (Mar. 15 to May 15)	POR	2,141	2,156	2,164	2,161
	D1	218	218	220	221
	D2	205	207	210	210
# days ≤ 330 cfs continuous min.flow (Jan. 1 to Dec. 31)	POR	14,000	14,023	14,122	14,133
	D1	1,326	1,327	1,326	1,326
	D2	1,072	1,073	1,074	1,076
Lowest daily average flow (cfs) (Jan. 1 to Dec. 31)	POR	708	679	380	330
	D1	751	725	380	330
	D2	927	906	866	845

Notes:

¹ For criterion that measure on an hourly or daily basis, unless stated otherwise: a) If hourly criteria occur during the average of four contiguous 15-minute periods, then it counts as 1 hour; b) If a daily criterion occurs for 5 contiguous 1-hour periods, then it counts as 1 day. To the extent possible, each criterion is defined in terms of percentages and averages/yr so that the same criterion is useful regardless of the length of the hydrology period (i.e., 1-yr, 3-yr, full period of record, etc.)

² POR = Period of Record (1955-2013); D1 = Drought 1 (1999-2003); D2 = Drought 2 (2006-2009)

³ For scenario results comparison, black values indicate no modeled change/impact for the Applicants' IBT as compared to baseline scenario; red values indicate modeled negative impact for the Applicants' IBT as compared to the baseline scenario; green values indicate modeled positive impact for the Applicants' IBT as compared to the baseline scenario.

flow drop below the 330 cubic feet per second (cfs) minimum flow level for the reservoir. As reflected in Table 2, impacts to modeled reservoir releases were generally found to be several

days more for the continuous minimum flows and several cfs less for the lowest daily average flow with the Applicants' proposed IBT, when compared to 2050 baseline conditions.

Impacts from the proposed IBT on hydropower generation were also modeled and evaluated. Impacts to APCI's Yadkin Hydroelectric Project, consisting of hydroelectric generating stations on High Rock Lake, Tuckertown Reservoir, Narrows Reservoir and Falls Reservoir, and Duke Energy Progress' Yadkin-Pee Dee Hydroelectric Project, consisting of hydroelectric generating stations on Lake Tillery and Blewett Falls Lake were evaluated through the CHEOPS™ model. Impacts to average hydropower megawatts produced per year and the average equivalent number of homes per year that could be powered by each hydro project were evaluated. Increases in system water withdrawals can reduce the available water storage which APCI and Duke Energy Progress are able to access from the reservoirs they operate, in order to produce hydropower. Such reductions to hydropower production would result in slight increases in fossil-based power generation to continue meeting energy demands.

Under both current (Year 2012) and projected future (Year 2050) basin-wide water demands, some impacts on hydropower generation in Duke Energy Progress's Yadkin-Pee Dee Hydroelectric Project were noted in the model analysis, for the Applicants' proposed IBT withdrawal from Lake Tillery. Modeling indicated that the proposed IBT results in decreased hydropower generation for the Yadkin-Pee Dee Hydroelectric Project, as compared to baseline conditions, by approximately 0.5% under both the current and future basin-wide water demands for the Period of Record and slightly higher, but still under 1% during Drought 1 and Drought 2 periods.

(3) Cumulative Effects on the Source Major River Basin of Any Current or Projected Water Transfer or Consumptive Water Use.

Based on the record, the Commission finds and concludes that the proposed IBT represents a small water transfer within a large river system. The cumulative effects of this proposed water transfer and consumptive water uses as described in N.C.G.S. § 143-215.22L(k)(3) will not have a noticeable effect on the source river basin. The provisions for drought management, water conservation, and monitoring and compliance reporting required by N.C.G.S. § 143-215.22L(n) will provide additional protection to the source river basin and, therefore, those conditions are incorporated into this certificate.

Analysis:

Current and projected water use and water transfer data were used to develop the input data sets for the CHEOPS™ (Computerized Hydro Electric Operations Planning Software) model. The model was used to evaluate both current and future scenarios of basin water use, including the proposed interbasin transfer. Complete results of the modeling are presented in Appendix E of the Environmental Impact Statement.

Modeling results indicated that under projected future basin-wide water demands with the proposed IBT included, there was a single detectable impact to average monthly lake elevations for Lake Tillery for the period of record (POR) and Drought 1, when compared to future baseline conditions without the IBT. This event occurred in August 2002, where a maximum impact of 9

inches was modeled. Even with the 9-inch drop, the modeled lake elevation remained 1 foot 3 inches above the average minimum summer elevation, and well within the summer operating rules for Lake Tillery. Throughout the modeled Drought 2 conditions, there were no detectable impacts to average monthly lake elevations due to the Applicants' proposed IBT, when added to projected future basin-wide water demands. No modeled impacts to public boat access areas on Lake Tillery are expected as a result of the proposed IBT because the lowest modeled lake elevation was 1 foot 3 inches above the average minimum summer elevation, and over 2 feet above the usable level for boat ramp access.

The total amount of water leaving the Yadkin River Basin (18-1) is considered as part of the cumulative impacts analysis for the proposed interbasin transfer. Currently, there is one existing IBT certificate issued by North Carolina to regulate water transfers from the Yadkin River Basin (18-1). The Cities of Concord and Kannapolis have an IBT certificate allowing the transfer of up to 10 mgd from the Yadkin River Basin (18-1) to the Rocky River Basin (18-4). Additional water uses from the Yadkin River Basin (18-1) include many public water systems and registered water withdrawals (industrial, thermal electric power, etc.) along with other uses such as agriculture. The registered North Carolina municipal public water systems and registered water withdrawals are listed in Section 7.0 of the Petition document. In accordance with the requirements of G.S. § 143-215.22L(k)(3), registered North Carolina municipal public water systems were considered and included in the CHEOPS™ model to evaluate water resource impacts.

Within the Yadkin River Basin (18-1), the potential secondary effects associated with the proposed transfer would primarily be attributed to withdrawals from Lake Tillery, potentially reducing flows in the Pee Dee River downstream. However, hydrologic modeling has shown that any downstream flow impacts would be minimal due to the management of the lake and inputs from the Rocky River, which empties into the Pee Dee River approximately 5.0 miles downstream of the Lake Tillery Dam. Of the 23.0 mgd maximum month daily average transfer proposed by the year 2050, approximately 40% is projected to be discharged into the Rocky River Basin (18-4) through treated wastewater returns, thereby further reducing any potential downstream impacts to water users and aquatic wildlife and habitat in the Pee Dee River. The other 60% will remain in the Rocky River Basin (18-4) through consumptive loss, primarily through on-site septic and outdoor water uses.

(4) Present and Reasonably Foreseeable Future Beneficial and Detrimental Effects on the Receiving River Basin.

Based on the record, the Commission finds and concludes that present and reasonably foreseeable future detrimental effects on the receiving river basin will be mitigated or avoided with existing federal, state, and local regulations and protection programs which require implementation of mitigation measures throughout the process. The transfer will support continued population growth and thus will result in reasonably foreseeable future indirect and cumulative impacts from that growth. These impacts include effects on wastewater assimilation, fish and wildlife habitat, and water quality similar to the secondary growth effects described in factor (k)(2). However, these secondary impacts are also projected to be mitigated as a result of federal, state, and local protection programs.

The Commission further finds and concludes that present and reasonably foreseeable future beneficial effects on the receiving river basin will include supporting the projected population growth and associated development. The transfer will also enable Union County's water system service area to extend to the northeastern and eastern portions of the county not currently served.

Analysis:

The Rocky River Basin (18-4) is the receiving river basin to which water is proposed to be transferred from the Yadkin River Basin (18-1) via both consumptive use and wastewater discharge. In accordance with the requirements of N.C.G.S. § 143-215.22L(k)(4), the present and reasonably foreseeable future beneficial and detrimental effects on the receiving basin were considered. See factor (k)(1) for reasonably foreseeable future beneficial effects on the Rocky River Basin (18-4), which includes supporting the projected population growth and associated development, as well as anticipated expansion of the area serviced by Union County through the year 2050.

There would be no detrimental effects to public water supply in the Rocky River Basin (18-4) because the Rocky River is currently not classified for water supply by the state of North Carolina. The Rocky River is currently a Class C water resource and would need to be re-classified to Water Supply (WS) status before being utilized as a municipal water source.

The primary detrimental effects to water quality from the IBT would originate from the operation of wastewater treatment plants (WWTPs). Any new WWTP or expansion of existing wastewater treatment facilities discharging into the Rocky River Basin (18-4) resulting from this proposed transfer will be permitted through the National Pollutant Discharge Elimination System (NPDES) and therefore will mitigate any detrimental impacts on the receiving basin.

Future infrastructure and facility construction needed in order to facilitate the proposed transfer of water to meet projected 2050 water demands will undergo a separate environmental permitting process and assessment of potential environmental impacts which will also address specific measures necessary to mitigate or avoid detrimental impacts on the receiving basin.

Potential Secondary and Cumulative Impacts

Within the receiving river basin, the potential secondary and cumulative impacts associated with the proposed IBT would primarily be attributed to Union County's projected urban growth and land use changes associated with population increases in the service area, entirely within the receiving basin. Due to the current growth patterns observed in Union County it is anticipated that population increases and the associated secondary and cumulative impacts will occur. Mitigation for secondary and cumulative impacts related to stormwater, floodplains, riparian buffers, surface waters, wetlands, open spaces and parks, water usage, land management, historic preservation, tree preservation, endangered species protection, wastewater treatment, and regional transportation planning measures will be provided, as directed by the state and federal programs and local ordinances for each community impacted by the proposed project, where applicable.

According to the United States Fish and Wildlife Service, an existing population of the federally endangered freshwater mussel Carolina heelsplitter (*Lasmigona decorata*) is known to exist in three watersheds of Union County's Rocky River Basin (18-4): Goose Creek, Duck Creek, and Waxhaw Creek. Concerns over indirect and cumulative impacts to this protected species have led Union County to enact stringent stormwater controls, buffer rules, and other mitigation measures to reduce sediment pollution into these waters. Additionally, a rule-making process was undertaken by the Department of Environmental Quality and adopted by the Environmental Management Commission in 2009 in order to develop a site-specific management strategy for the maintenance and recovery of the water quality conditions required to sustain and recover the Carolina heelsplitter species. The rules 15A NCAC 2B .0600-.0609, also known as the *Site Specific Water Quality Management Plan for the Goose Creek Watershed*, were created and implemented to reduce surface water impacts within the Goose Creek watershed from development pressures. Though there are long-term concerns over continued development throughout the service area, these mitigation measures have been deemed sufficient protection measures by the Department of Environmental Quality to allow for continued development activities within the watersheds.

(5) Reasonable Alternatives to the Proposed Transfer.

Based on the record and in accordance with the requirements of N.C.G.S. § 143-215.22L(k)(5), the Commission finds and concludes that reasonable alternatives to the proposed IBT were considered. Based on a review of the project information, the Commission finds and concludes the recommended alternative (Alternative 1A) to be the most feasible for meeting the Applicants' water supply needs while minimizing detrimental environmental impacts. The Commission further finds and concludes that the other alternatives considered either did not meet the projected water supply needs for the Applicants through 2050, had greater environmental impacts, and/or were costlier than the recommended alternative.

Analysis:

In accordance with the requirements of G.S. § 143-215.22L(k)(5), the availability of reasonable alternatives to the proposed transfer was considered. The following 12 water supply alternatives were defined and evaluated for their ability to meet the Applicants' water supply needs through 2050. The following information regarding water supply alternatives is from Section 3.2 of the

Environmental Impact Statement (EIS) document. The EIS provides a full discussion; a brief summary of the alternatives is provided below:

Alternative 1: Pee Dee River raw water supply from Lake Tillery [IBT from Yadkin River Basin (18-1) to Rocky River Basin (18-4)] with a new water treatment plant in Union County. A new raw water intake and pump station is proposed as part of an agreement between Union County and the Town of Norwood. This alternative also includes the construction of a new water treatment plant; three potential site areas have been identified within the northeastern portion of Union County.

Alternative 1A (preferred alternative): Raw water transmission line placement from Lake Tillery, near the existing Norwood intake, to new water treatment plant in northern Union County primarily following existing roadway right-of-way corridors through Stanly County into Union County.

Alternative 1B: Raw water transmission line placement from Lake Tillery near the existing Norwood intake, to new water treatment plant in northern Union County primarily following existing power utility easements.

Alternative 2A: Yadkin River raw water supply from Narrows Reservoir (Badin Lake) [IBT from Yadkin River Basin (18-1) to Rocky River Basin (18-4)] with a new water treatment plant in northern Union County. A new intake and pumping station would need to be constructed, adjacent to the City of Albemarle's existing raw water intake facility on Narrows Reservoir (Badin Lake).

Alternative 2B: Yadkin River raw water supply from Tuckertown Reservoir [IBT from Yadkin River Basin (18-1) to Rocky River Basin (18-4)] with a new water treatment plant in northern Union County. A new intake and pumping station would need to be constructed, adjacent to the City of Albemarle's existing raw water intake facility on Tuckertown Reservoir.

Alternative 3: Pee Dee River raw water supply from Blewett Falls Lake [IBT from Yadkin River Basin (18-1) to Rocky River Basin (18-4)] with a new water treatment plant in Union County. Major improvements to the existing water supply infrastructure between Anson and Union Counties would be required to meet projected future water demands for Union County.

Alternative 3A: Raw water transmission line placement from Blewett Falls Lake to a new water treatment plant in northern Union County primarily following power and natural gas utility easements.

Alternative 3B: Raw water transmission line placement from Blewett Falls Lake to a new water treatment plant in eastern Union County primarily following US-74 right-of-way.

Alternative 4: Raw water supply from the main stem of the Pee Dee River [IBT from Yadkin River Basin (18-1) to Rocky River Basin (18-4)] with a new water treatment plant in Union County. This alternative proposes the installation of a new raw water intake located just downstream of the confluence of the Rocky River with the Pee Dee River, south of Lake Tillery.

Reclassification of this section of the Pee Dee River would be required for the proposed intake location for this alternative, in order for it to be used for public water supply.

Alternative 5: Raw water supply from the Rocky River within Union County (non-IBT alternative) with a new water treatment plant in Union County. The Rocky River is currently not classified for water supply by the State of North Carolina and would therefore need to be re-classified before being utilized as a municipal water source.

Alternative 6: Expansion of the Catawba River Water Supply Project [new IBT certificate to replace the existing grandfathered transfer to allow for a greater transfer from the Catawba River Basin (3-1) to the Rocky River Basin (18-4)]. Increasing the transfer of water from the Catawba River Basin (3-1) to meet the Applicants' 2050 demands would exceed the combined IBT limit of 20 mgd, shared between Union County, NC and Lancaster County, SC, as imposed by South Carolina through the surface water withdrawal permit for the Catawba River Water Supply Project.

Alternative 7: Interconnection with Charlotte Water [IBT from Catawba River Basin (3-1) to the Rocky River Basin (18-4)]. This water sale would require an IBT certificate. The additional water demand from sales to Union County would increase Charlotte Water's projected demand as a percent of water supply to 97% by 2050. This could require expansion of Charlotte Water's intake(s), water treatment facilities and distribution system in order to meet the increased system demand by adding Union County as a wholesale customer.

Alternative 8: Raw water supply through groundwater withdrawal within Union County with a new water treatment plant in Union County. Concerns with groundwater yield, groundwater quality, and development costs and logistics for a large-scale well network within the county severely limit the potential viability of this water supply alternative.

Alternative 9: Water demand management/conservation. There are three existing water conservation and demand management ordinances and protocols that are applicable to Union County, including a new Water Use Ordinance adopted in May 2015. Conservation achieved through these measures is not expected to significantly reduce the overall future water demand for Union County, but it is expected to reduce maximum day and maximum month peaking factors that may be experienced during future droughts.

Alternative 10: Direct potable reuse. Currently, direct potable reuse as would be implemented by Union County, is not permitted for potable water supply in North Carolina. Therefore, direct potable reuse is not a viable alternative water source at this time for Union County to serve its current existing and future customers.

Alternative 11: Evaluation of water returns (wastewater) from the Rocky River Basin (18-4) back to the Yadkin River Basin (18-1). Consideration of this alternative would serve as an IBT minimization strategy for Alternative 1. Alternative 11 is based on an assumed new NPDES (National Pollution Discharge Elimination System) discharge into the Pee Dee River at Lake Tillery. It is estimated that the IBT under Alternative 1 could be reduced by approximately 29% to 35% depending on projection year and actual future wastewater flows generated. However,

any benefits gained from increased water quantity in Lake Tillery may be outweighed by water quality and environmental impacts associated with a new wastewater discharge and the associated sanitary sewer transmission infrastructure.

Alternative 12: No Action Alternative. This alternative would not involve additional water supply service by Union County to new development in the Rocky River Basin (18-4), even though the county's population within the service area is projected to increase. Without a reliable water supply source, future water supply within this area would have to be supplied either from the existing Catawba River Water Supply Project (will not be possible to meet future demand since the county is currently approaching the existing IBT limit), through groundwater wells (would require a large number of wells and low yields would not provide a reliable or sustainable water supply source, and some parts of Union County have elevated concentrations of groundwater contaminants), or service inter-connections to other water systems within the Rocky River Basin (18-4) (current and potential connections have not demonstrated the ability to meet Union County's projected future demand).

(6) Applicants' Use of Impoundment Storage Capacity.

In accordance with the requirements of N.C.G.S. § 143-215.22L(k)(6) and based on the record, the Commission finds and concludes that the water proposed to be transferred would be withdrawn from Lake Tillery, part of the Duke Energy Progress-owned Yadkin-Pee Dee Hydroelectric Project, FERC No. 2206. The proposed withdrawal of water for this IBT, for purposes other than hydropower generation, as well as the construction of a new water intake and pump station, will require additional authorization by FERC and Duke Energy Progress.

Analysis:

The proposed transfer involves withdrawal of water from Lake Tillery, part of the Duke Energy Progress-owned Yadkin-Pee Dee Hydroelectric Project. Lake Tillery is operated under FERC license No. 2206. When this interbasin transfer certificate is issued, it will have no effect on Duke Energy Progress' obligation to comply with FERC operating rules and requirements for Lake Tillery. Additionally, Union County will be required to request authorization from Duke Energy Progress for a new water intake and pump station, as well as approval to withdraw water for purposes other than hydropower generation. As the license holder, Duke Energy Progress is expected to seek, on behalf of Union County, authorization from FERC for these activities provided the appropriate water intake owner submits a complete and acceptable Lake Use Permit application to Duke Energy Progress.

(7) Purposes of Any US Army Corps of Engineers Multipurpose Reservoir Relevant to the Petition.

In accordance with the requirements of G.S. § 143-215.22L(k)(7) and based on the record, the Commission finds and concludes that this item is not applicable.

(8) Whether Union County’s Service Area is Located in Both the Source and Receiving River Basins.

In accordance with the requirements of G.S. § 143-215.22L(k)(8), the Commission finds and concludes that Union County’s service area population is located within both the source and receiving basins, thereby avoiding the removal or receipt of water in a basin not contained within the existing service area.

Analysis:

The Union County Water System currently serves customers in both the Catawba River Basin (3-1) and the Rocky River Basin (18-4). One intention of the Applicants’ proposed IBT is to more closely align the county’s Catawba River Basin (3-1)/Rocky River Basin (18-4) service boundary with the geographic boundary separating the two river basins. The 5 mgd supply from the existing Catawba River Basin (3-1) surface water transfer will focus on serving the western portion of Union County within the Catawba River Basin (3-1). The water transferred to the county via the proposed IBT would serve the eastern two-thirds of the county, with most of the service area in the Rocky River Basin (18-4) (the receiving river basin) and the southeastern tip of the county in the Yadkin River Basin (18-1) (the source river basin). Therefore, Union County’s service area is found to be located in both the source river basin and the receiving river basin.

(9) Any Other Facts or Circumstances Reasonably Necessary to Carry Out the Purposes of the Statute.

In accordance with the requirements of G.S. § 143-215.22L(k)(9), the Commission finds and concludes that to protect the source river basin during drought conditions, and to mitigate the future need for allocations of the limited resources of this basin, a drought management plan is appropriate. The plan shall describe the actions that Union County’s Water System will take to protect the Yadkin River Basin (18-1) during drought conditions. The provisions for drought management, water conservation, and monitoring and compliance reporting as required in N.C.G.S. §143-215.22L(n) and specifically incorporated into this certificate will provide additional protection to the source basin.

Decision

In granting this Certificate the North Carolina Environmental Management Commission (the Commission) has specifically considered each of the factors set forth in N.C.G.S. § 143-215.22L(k), the Petition for Interbasin Transfer (IBT), the Environmental Impact Statement, the Record of Decision, all oral and written comments and all accompanying materials or evidence submitted during the relevant comment periods, information on the water quality of the source river basin and the receiving river basin, the Hearing Officer's Report, and all supporting materials. The Commission finds that Union County, North Carolina and the Town of Wingate, North Carolina (the Applicants or Certificate Holders) have established by a preponderance of the evidence all of the following as required by N.C.G.S. § 143-215.22L(m): (1) the benefits of the proposed transfer outweigh the detriments of the proposed transfer; (2) the detriments have been or will be mitigated to the maximum degree practicable; (3) after taking into account all other sources of water available to the Applicants, the amount of the transfer does not exceed the amount of the projected shortfall under the Applicants' water supply plan; and (4) that there are no reasonable alternatives to the proposed transfer.

Therefore, and by duly made motion, the Commission grants the Applicants' request to transfer water from the Yadkin River Basin (18-1) to the Rocky River Basin (18-4), as defined in N.C.G.S. § 143-215.22G(1b). The permitted transfer amount shall not exceed a maximum of 23.0 million gallons per day (mgd), calculated as a daily average of a calendar month.

This IBT Certificate is subject to the conditions below, which are imposed pursuant to N.C.G.S. § 143-215.22L(n). The Applicants shall comply with all of the plans required below that are approved by the Division of Water Resources (Division) pursuant to this Certificate and any approved amendments to such plans. A violation of any plan approved pursuant to this Certificate will be considered a violation of the terms and conditions of this Certificate.

1. Pursuant to N.C.G.S. § 143-215.22L(n)(1), within 90 days of receipt of this IBT Certificate, each Applicant shall prepare and submit a water conservation plan, subject to approval by the Division, that specifies the water conservation measures, including a rate pricing structure that will be implemented by the Applicant in the receiving river basin [Rocky River Basin (18-4)] to ensure the efficient use of the transferred water. The Applicants are encouraged to consult with reservoir operators and other water users in the Yadkin River Basin (18-1) and to incorporate appropriate input from these operators and users during development of the water conservation plans prior to submittal to the Division. Except in circumstances of technical or economic infeasibility or adverse environmental impact, each water conservation plan shall provide for the mandatory implementation of water conservation measures by each Applicant that equal or exceed the most stringent water conservation plan implemented by a public water system that withdraws water from the source river basin [Yadkin River Basin (18-1)].
2. Pursuant to N.C.G.S. § 143-215.22L(n)(2), within 90 days of receipt of this IBT Certificate, each Applicant shall prepare and submit a drought management plan, subject to approval by the Division, that specifies how the water transfer shall be managed to protect the source river basin [Yadkin River Basin (18-1)] during drought conditions or other emergencies that occur within the source river basin. The Applicants are

encouraged to consult with reservoir operators and other water users in the Yadkin River Basin (18-1) and to incorporate appropriate input from these operators and users during development of the drought management plan prior to submittal to the Division. Except in circumstances of technical or economic infeasibility or adverse environmental impact, this drought management plan shall include mandatory reductions in the permitted amount of the transfer based on the severity and duration of a drought occurring within the source river basin [Yadkin River Basin (18-1)] and shall provide for the mandatory implementation of a drought management plan by each Applicant that equals or exceeds the most stringent drought management plan implemented by a public water system that withdraws water from the source river basin [Yadkin River Basin (18-1)].

3. Pursuant to N.C.G.S. § 143-215.22L(n)(3) and (6), within 90 days of receipt of the IBT Certificate, the Certificate Holders shall submit a quarterly compliance and monitoring plan subject to approval by the Division. The plan shall include methodologies and reporting schedules for reporting the following information: daily transfer amount, calculated as the daily average of the calendar month; compliance with Certificate conditions; progress on mitigation measures; drought management; and reporting. A copy of the approved plan shall be kept on file with the Division for public inspection. The Division shall have the authority to make modifications to the compliance and monitoring plan as necessary to assess compliance with this Certificate. The Division will monitor the transfer from the Yadkin River Basin (18-1) to the Rocky River Basin (18-4), as regulated by the IBT Certificate, as well as the transfer from the Catawba River Basin (3-1) to the Rocky River Basin (18-4), as allowed by the existing grandfathered transfer of 5.0 mgd on a maximum day basis. Each quarterly compliance and monitoring report shall be submitted to the Commission no later than 30 days after the end of the quarter. Union County shall employ any methods or install and operate any devices needed to measure the amount of water that is transferred during each calendar quarter, calculated as a daily average of a calendar month.
4. Pursuant to N.C.G.S. § 143-215.22L(n)(4), the Commission may amend this IBT Certificate to reduce the maximum amount of water authorized to be transferred whenever it appears that an alternative source of water is available to the Certificate holders from within the receiving river basin [Rocky River Basin (18-4)], including, but not limited to, the purchase of water from another water supplier within the receiving river basin [Rocky River Basin (18-4)] or the transfer of water from another sub-basin within the receiving river basin [Rocky River Basin (18-4)].
5. Pursuant to N.C.G.S. § 143-215.22L(n)(5), the Commission shall amend this IBT Certificate to reduce the maximum amount of water authorized to be transferred if the Commission finds that the Applicants' current projected water needs are significantly less than the Applicants' projected water needs at the time the IBT Certificate was granted.
6. Pursuant to N.C.G.S. § 143-215.22L(n)(7), the Applicants will not resell the water that would be transferred pursuant to the Certificate to another public water system. Even though the City of Monroe owns water transmission infrastructure in the Rocky River Basin (18-4), any water provided by Union County to the City of Monroe will be transferred as part of an existing contract agreement to provide no more than 2.0 mgd of water from Union County's Catawba River Water Treatment Plant to an interconnection point located within the Catawba River Basin (3-1). This IBT Certificate does not

authorize Union County to sell to the City of Monroe water that is transferred from the Yadkin River Basin (18-1).

7. Pursuant to N.C.G.S. § 143-215.22L(n), the Commission may reopen and modify or revoke this Certificate to ensure continued compliance with N.C.G.S. Chapter 143, Article 21, Part 2A if the Commission determines that information in the record relied upon in making its Findings of Fact, pursuant to N.C.G.S. § 143-215.22L(k), was erroneous, incomplete, or otherwise contained material misrepresentations, misstatements, or misinterpretations.

NOTICE: The holders of this Certificate are jointly and severally responsible for compliance with the terms, conditions and requirements stated herein, and are therefore jointly and severally liable for all penalties assessed to enforce such terms, conditions and requirements as provided in N.C.G.S. §143-215.6A.

This the 25th day of May, 2017.



J.D. Solomon, Chairman