

APPENDIX C: LOW INFLOW PROTOCOL (LIP) FOR THE CATAWBA-WATEREE PROJECT

PURPOSE

The purpose of this Low Inflow Protocol (LIP) is to establish procedures for reductions in water use during periods of low inflow to the Catawba-Wateree Project (the Project). The LIP was developed on the basis that all parties with interests in water quantity will share the responsibility to establish priorities and to conserve the limited water supply.

OVERVIEW

This LIP provides trigger points and procedures for how the Project will be operated by the Licensee, as well as water withdrawal reduction measures and goals for other water users during periods of low inflow (i.e., periods when there is not enough water flowing into the Project reservoirs to meet the normal water demands while maintaining Remaining Usable Storage in the reservoir system at or above a seasonal target level).

The Licensee will provide flow from hydro generation and other means to support electric customer needs and the instream flow needs of the Project. During periods of normal inflow, reservoir levels will be maintained within prescribed Normal Operating Ranges. During times that inflow is not adequate to meet all normal demands for water and maintain reservoir levels as normally targeted, the Licensee will progressively reduce hydro generation. If hydrologic conditions worsen until trigger points outlined herein are reached, the Licensee will declare a Stage 0 - Low Inflow Watch and begin meeting with the applicable agencies and water users to discuss this LIP. If hydrologic conditions continue to worsen, the Licensee will declare various stages of a Low Inflow Condition (LIC) as defined in the Procedure section of this document. Each progressive stage of the LIC will call for greater reductions in hydro station water releases and water withdrawals and allow additional use of the available water storage inventory.

The goal of this staged LIP is to take the actions needed in the Catawba-Wateree River Basin to delay the point at which the Project's usable water storage inventory is fully depleted. While there are no human actions that can guarantee the Catawba-Wateree River Basin will never experience operability limitations at water intake structures due to low reservoir levels or low streamflows, this LIP is intended to provide additional time to allow precipitation to restore streamflow, reservoir levels, and groundwater levels to normal ranges. The amount of additional time gained during the LIP depends primarily on the diagnostic accuracy of the trigger points, the amount of regulatory flexibility the Licensee has to operate the Project, and the effectiveness of the Licensee and other water users in working together to implement their required actions and achieve significant water use reductions in a timely manner.

To ensure continuous improvement regarding the LIP and its implementation throughout the term of the New License, the LIP will be re-evaluated and modified periodically. These re-evaluations and modifications will be as determined by the Catawba-Wateree Drought Management Advisory Group (CW-DMAG).

KEY FACTS AND DEFINITIONS

1. Human Health and Safety and the Integrity of the Public Water Supply and Electric Systems are of Utmost Importance – Nothing in this protocol will limit the Licensee’s ability to take any and all lawful actions necessary at the Project to protect human health and safety, protect its equipment from major damage, protect the equipment of the Large Water Intake Owners from major damage, and ensure the stability of the regional electric grid and public water supply systems. It is recognized that the Licensee may take the steps that are necessary to protect these things without prior consultation or notification. Likewise, nothing in this LIP will limit the States of North Carolina and South Carolina from taking any and all lawful actions necessary within their jurisdictions to protect human health and safety. It is recognized that North Carolina and South Carolina may also take the steps necessary to protect these things without prior consultation or notification.
2. No Abrogation of Statutory Authority – It is understood the South Carolina Department of Natural Resources (SCDNR) must operate under the statutory authority of its drought response statutes, and nothing in this LIP will require SCDNR to take any action that exceeds its authority under the South Carolina drought response statute.
3. Normal Full Pond Elevation – Also referred to simply as “full pond”, this is the level of a reservoir that corresponds to the point at which water would first begin to spill from the reservoir’s dam(s) if the Licensee took no action. This level corresponds to the lowest point along the top of the spillway (including flashboards) for reservoirs without floodgates and to the lowest point along the top of the floodgates for reservoirs with floodgates. To avoid confusion among the many reservoirs the Licensee operates, it has adopted the practice of referring to the Normal Full Pond Elevation for all its reservoirs as equal to 100.0 ft. relative. The Normal Full Pond Elevations for the Project reservoirs are as follows:

Project Reservoir	Normal Full Pond Elevation (ft. above Mean Sea Level, National Geodetic Vertical Datum of 1929)
Lake James	1200.0
Lake Rhodhiss	995.1
Lake Hickory	935.0
Lookout Shoals Lake	838.1
Lake Norman	760.0
Mountain Island Lake	647.5
Lake Wylie	569.4
Fishing Creek Reservoir	417.2
Great Falls Reservoir	355.8
Cedar Creek Reservoir	284.4
Lake Wateree	225.5

4. Net Inflow – The cumulative inflow into a reservoir, expressed in acre-feet (ac-ft) per month. Net inflow is the sum of tributary stream flow, inflow from upstream hydro development flow releases (where applicable), groundwater inflow, precipitation falling on the reservoir surface, land surface runoff, and on-reservoir point-source return flows less the sum of on-reservoir water withdrawals, groundwater recharge, hydro development flow releases, evaporation, and other factors.
5. Normal Minimum Elevation – The level of a reservoir (measured in feet above Mean Sea Level (MSL) or feet relative to the full pond contour with 100.0 ft. corresponding to full pond) that defines the bottom of the reservoir's Normal Operating Range for a given day of the year. If inflows and outflows to the reservoir are kept within some reasonable range of the average or expected amounts, hydroelectric project equipment is operating properly and no protocols for abnormal conditions have been implemented, reservoir level excursions below the Normal Minimum Elevation should not occur.
6. Normal Maximum Elevation – The level of a reservoir (measured in feet above MSL or feet relative to the full pond contour with 100.0 ft. corresponding to full pond) that defines the top of the reservoir's Normal Operating Range for a given day of the year. If inflows and outflows to the reservoir are kept within some reasonable range of the average or expected amounts, hydroelectric project equipment is operating properly, and no protocols for abnormal conditions have been implemented, reservoir level excursions above the Normal Maximum Elevation should not occur.
7. Normal Target Elevation – The level of a reservoir (measured in feet above MSL or feet relative to the full pond contour with 100.0 ft corresponding to full pond) the Licensee will endeavor in good faith to achieve, unless operating in this LIP, the Maintenance and Emergency Protocol (MEP), the Spring Reservoir Level Stabilization Program (Lakes James, Norman, Wylie, and Wateree only), a Spring Stable Flow Period (Lake Wateree only), or a Floodplain Inundation Period (Lake Wateree only). Since inflows vary significantly and outflow demands also vary, the Licensee will not always be able to maintain actual reservoir level at the Normal Target Elevation. The Normal Target Elevation falls within the Normal Operating Range, but it is not always the average of the Normal Minimum and Normal Maximum Elevations.
8. Normal Operating Range for Reservoir Levels – The band of reservoir levels within which the Licensee normally attempts to maintain a given reservoir it operates on a given day. Each reservoir has its own specific Normal Operating Range, and that range is bounded by a Normal Maximum Elevation and a Normal Minimum Elevation. If inflows and outflows to the reservoir are kept within a reasonable range of the average or expected amounts, hydro project equipment is operating properly, and no protocols for abnormal conditions have been implemented, reservoir level excursions outside of the Normal Operating Range should not occur. The New License for the Project includes the Normal Operating Ranges for reservoir levels (i.e., Normal Minimum, Normal Maximum, and Normal Target Elevations) as listed in the Reservoir Elevations License Article (A-1.0 Reservoir Elevation Articles).
9. Large Water Intake – Any water intake (e.g., public water supply, industrial, agricultural, power plant) having a maximum instantaneous capacity greater than or equal to one million gallons per day (MGD) that withdraws water from the Catawba-Wateree River Basin.
10. Public Water Supply (PWS) – Any water delivery system owned and/or operated by any governmental or private entity that utilizes waters from the Catawba-Wateree River Basin for

the public interest including drinking water for residential, commercial, industrial, and institutional uses; irrigation; and/or other public uses.

11. **Critical Reservoir Elevation** – Unless it is otherwise stated as applying only to a specific intake or type of intake, the Critical Reservoir Elevation is the highest level of water in a reservoir (measured in feet above MSL or feet relative to the full pond contour with 100.0 ft. corresponding to full pond) below which any Large Water Intake used for PWS or industrial uses, or any regional power plant intake located on the reservoir will not operate at its Licensee-approved capacity. The Critical Reservoir Elevations, as of October 31, 2022, are defined below:

Project Reservoir	Critical Reservoir Elevation (ft. relative to local datum) (100 ft = Full Pond)	Type of Limit
Lake James	50.0	Power Production
Lake Rhodhiss	89.4	Municipal Intake
Lake Hickory	92.0	Municipal Intake
Lookout Shoals Lake	74.9	Municipal Intake
Lake Norman	90.0	Power Production
Mountain Island Lake	90.5	Municipal Intake
Lake Wylie	92.6	Industrial Intake
Fishing Creek Reservoir	95.0	Municipal Intake
Great Falls Reservoir	87.2	Power Production
Cedar Creek Reservoir	80.3	Power Production
Lake Wateree	92.5	Municipal Intake

12. **Total Usable Storage (TUS)** – The sum of the Project’s volume of water expressed in ac-ft contained between each reservoir’s Critical Reservoir Elevation and the Normal Full Pond Elevation.
13. **Remaining Usable Storage (RUS)** – The sum of the Project’s volume of water expressed in ac-ft contained between each reservoir’s Critical Reservoir Elevation and the actual reservoir elevation at any given point in time.
14. **Storage Index (SI)** – The ratio, expressed in percent, of RUS to TUS at any given point in time.
15. **Target Storage Index (TSI)** – The ratio of RUS to TUS based on the Project reservoirs being at their Normal Target Elevations. The following table lists the TSIs for the first day of each month. The TSI percentages are updated simultaneous to any updates to the Critical Reservoir Elevations above.

Month	Target Storage Index For 1 st Day of Month (%) ¹	Target Storage Index For 1 st Day of Month (%) ¹ (Modified) ²
Jan	63	63
Feb	55	55
Mar	64	64
Apr	70	70
May	77	80
Jun	77	80
Jul	77	80
Aug	77	80
Sep	77	80
Oct	77	80
Nov	71	71
Dec	65	65

¹ TSIs for other days of the month are determined by linear interpolation.

² Future modified Comprehensive Relicensing Agreement (CRA) values with higher Normal Target Elevations at Lake James, Lake Norman, and Lake Wylie in May through October shall become effective after Wateree Dam is modified to improve flood management or after December 31, 2025, whichever is later.

16. **U.S. Drought Monitor** – A synthesis of multiple indices, outlooks, and news accounts that represents a consensus of federal and academic scientists concerning the drought status of all parts of the United States. Typically, the U.S. Drought Monitor indicates intensity of drought as D0-Abnormally Dry, D1-Moderate, D2-Severe, D3-Extreme, and D4-Exceptional. The website address is <http://droughtmonitor.unl.edu>. The following federal agencies are responsible for maintaining the U.S. Drought Monitor:

- Joint Agricultural Weather Facility (U.S. Department of Agriculture and Department of Commerce/National Oceanic and Atmospheric Administration [DOC/NOAA])
- Climate Prediction Center (DOC/NOAA/National Weather Service)
- National Centers for Environmental Information (DOC/NOAA)

17. **U.S. Drought Monitor Three-Month Numeric Average** – If the U.S. Drought Monitor has a reading of D0-D4 for any part of the Catawba-Wateree River Basin that drains to Lake Wateree, the Basin will be assigned a numeric value for the current month. This monthly numeric value will equal the area-weighted average Drought Monitor designation (e.g., D0 = 0, D4 = 4) for the Catawba-Wateree River Basin that drains to Lake Wateree. A normal condition in the Basin, defined as the absence of a Drought Monitor designation, would be assigned a numeric value of negative one (-1). A running average numeric value of the current month and the previous two months will be monitored and designated as the U.S. Drought Monitor Three-Month Numeric Average.

18. **Critical Flows** – The minimum flow releases from the hydro developments that may be necessary to:

- a. prevent long-term or irreversible damage to aquatic communities consistent with the resource management goals and objectives for the affected stream reaches;

- b. provide some basic level of operability for Large Water Intakes located on the affected stream reaches; and,
- c. provide some basic level of water quality maintenance in the affected stream reaches.

For the purposes of this LIP, the Critical Flows are as follows:

- a. Linville River, below the Bridgewater Development (Lake James): 75 cubic feet per second (cfs).
 - b. Catawba River Bypassed Reach below the Bridgewater Development (Lake James): 25 cfs.
 - c. Oxford Regulated River Reach below the Oxford Development (Lake Hickory): 100 cfs.
 - d. Lookout Shoals Regulated River Reach below the Lookout Shoals Development: 80 cfs.
 - e. Wylie Regulated River Reach below the Wylie Development: 700 cfs.
 - f. Great Falls Bypassed Reaches (Long and Short) at the Great Falls-Dearborn Development: 450 cfs and 80 cfs respectively.
 - g. Wateree Regulated River Reach below the Wateree Development: 800 cfs.
 - h. Leakage flows at the remaining Project structures. Leakage flows are defined as the flow of water through wicket gates when the hydro units are not operating and seepage through, over, and under the Project structures at each development.
19. Recreation Flow Reductions – Since all recreation flow releases must be made by either releasing water through hydroelectric generation or through flow releases that bypass hydro generation equipment, reductions in Project Flow Requirements will impact recreation flow releases.
20. Organizational Abbreviations – Organizational abbreviations include the North Carolina Department of Environmental Quality (NCDEQ), North Carolina Wildlife Resources Commission (NCWRC), South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Health and Environmental Control (SCDHEC), Federal Energy Regulatory Commission (FERC), National Marine Fisheries Service (NMFS), United States Bureau of Indian Affairs (BIA), United States Fish and Wildlife Service (USFWS), and the United States Geological Survey (USGS).
21. CW-DMAG – The CW-DMAG will be tasked with working with the Licensee when the LIP is initiated. This team will also meet as necessary to foster a basin-wide response to an LIC (see Procedure section of this LIP). Members of the CW-DMAG agree to comply with this LIP. Membership in the CW-DMAG is open to the following organizations, of which each organization may have up to two members, with one vote per organization for making decisions:
- a. NCDEQ
 - b. NCWRC
 - c. NMFS
 - d. SCDNR

- e. SCDHEC
- f. USFWS
- g. USGS
- h. Each Owner of a Large Water Intake located on one of the Project reservoirs or the main stem of the Catawba-Wateree River
- i. Each Owner of a Large Water Intake located on any tributary stream within the Catawba-Wateree River Basin
- j. Licensee (CW-DMAG Coordinator)

The CW-DMAG will meet at least annually (typically during the month of May or June) beginning in 2007 and continuing throughout the term of the New License, regardless of the LIC status, to review prior year activities, review data input from Large Water Intake Owners, and discuss other issues relevant to the LIP. The Licensee will maintain an active roster of the CW-DMAG and update the roster as needed. All CW-DMAG members will keep the Licensee informed of changes in their representation, including current contact information. The Licensee will prepare meeting summaries of all CW-DMAG meetings and will make these meeting summaries available to the public by posting on its website.

22. Revising the LIP – During the term of the New License, the CW-DMAG will review and update the LIP periodically to ensure continuous improvement of the LIP and its implementation. These evaluations and modifications will be considered at least once every ten (10) years during the New License term. Modifications must be approved by a consensus of the participating CW-DMAG members. If the participating members cannot reach consensus, then the dispute resolution procedures set forth in Section 31.0 of the CRA will apply. Approved modifications will be incorporated through revision of the LIP and the Licensee will file the revised LIP with the FERC. If any modifications of the LIP require amendment of the New License, the Licensee will: (i) provide notice to all Parties to the CRA advising them of the proposed license article amendment and the Licensee's intent to file it with the FERC; (ii) submit the modification request to the NCDEQ and/or the SCDHEC for formal review and approval as may be required by any reopener conditions of the respective state's 401 Water Quality Certification for the Project; and (iii) file a license amendment request for FERC approval. During this process, the CW-DMAG may appoint an ad hoc committee to address issues and revisions relevant to the LIP. The filing of a revised LIP by the Licensee will not constitute or require modification to the CRA and any Party to the CRA may be involved in the FERC's public process for assessing the revised LIP. Issues such as sediment fill impact on reservoir storage volume calculations, revising the groundwater monitoring plan, and substitution of a regional drought monitor for the U.S. Drought Monitor, if developed in the future, are examples of items that may be addressed.
23. Water Withdrawal Data Collection and Reporting – The Licensee will maintain information on cumulative water use from Project reservoirs beginning in 2006 and continuing throughout the term of the New License and will make the information available to water intake owners and governmental agencies upon their request. The Licensee will require all owners of Large Water Intakes located within the FERC Project Boundaries to report to the Licensee, on an annual basis in MGD, their average monthly and monthly daily maximum water withdrawals from and flow returns to the Project or its tributary streams that drain to Lake Wateree. The Licensee will request similar withdrawals and returns data from other Large Water Intake owners located in the Catawba-Wateree River Basin to the confluence with the Congaree River. The Licensee will maintain a database of this information

including the Licensee's own non-hydro water use records (i.e., water uses due to thermal power generation). These annual withdrawal summaries will be in writing, certified for accuracy by a professional engineer or other appropriate official, and will be provided to the Licensee by January 31 of each year for the preceding calendar year beginning in 2007. This information may be used to determine if future increased water withdrawals would be within the projections of the Water Supply Study conducted during the relicensing process and filed with the FERC as part of the Licensee's Application for New License for the Project or subsequent updates to the projections.

24. Reclaimed Water – Wastewater that has been treated to reclaimed water standards and is re-used for a designated purpose (e.g., industrial process, irrigation). Reclaimed Water will not be subject to the water use restrictions outlined in this LIP.
25. Drought Response Plan Updates – All Large Water Intake Owners will review and update their Drought Response Plans or Ordinances (or develop a plan or ordinance if they do not have one) by June 30, 2007 and as necessary within 180 days following the acceptance by the FERC of any future LIP revisions during the term of the New License to ensure compliance and coordination with the LIP, including the authority to enforce the provisions outlined herein, provided that the requirements of the LIP are consistent with state law.
26. Relationship Between the LIP and the MEP – The MEP outlines the response the Licensee will take under certain emergency and equipment failure and maintenance situations to continue practical and safe operation of the Project, to mitigate any related impacts to license conditions, and to communicate with resource agencies and the affected parties. Under the MEP, temporary modifications of prescribed flow releases and the reservoir level Normal Operating Ranges are allowed. Lowering levels of Project reservoirs caused by situations addressed under the MEP will not invoke implementation of this LIP. Also, if the LIP has already been implemented at the time that a situation covered by the MEP is initiated, the Licensee will typically suspend implementation of the LIP until the MEP situation has been eliminated. The Licensee may, however, choose to continue with the LIP if desirable.
27. Consensus – Consensus is reached when all CW-DMAG members in attendance can 'live with' the outcome or proposal being made. The concept of consensus is more fully described in the Catawba-Wateree Hydroelectric Project Relicensing Stakeholder Teams Charter (dated October 2005).
28. Monitored USGS Streamflow Gages – The Monitored USGS Streamflow Gages are identified as USGS streamflow gage #s 02145000 (South Fork Catawba River at Lowell, NC), 02137727 (Catawba River near Pleasant Gardens, NC), 02140991 (Johns River at Arney's Store, NC), and 02147500 (Rocky Creek at Great Falls, SC).
29. Instream Flows for Recreation – The New License for the Project includes prescribed recreational flow releases as listed in the Recreational Flows License Article (A-2.0 Flow Articles).
30. Minimum Flows – The New License for the Project includes the minimum flow requirements as listed in the Minimum Flows License Article, the Wylie High Inflow Protocol License Article, and the Flows Supporting PWS and Industrial Processes License Article (A-2.0 Flow Articles).

31. Project Flow Requirements – These flow requirements include the Minimum Flows and the portion of the Recreational Flows (A-2.0 Flow Articles) that is greater than the Minimum Flows for Normal Conditions (i.e., conditions outside of this LIP or MEP).
32. Public Information System – The New License for the Project includes the requirement to provide information to the public as specified in the Public Information Article (A-8.0).
33. Spring Reservoir Level Stabilization Program – The New License for the Project includes the reservoir level requirements in the Spring Reservoir Level Stabilization Program License Article (A-1.0 Reservoir Elevation Articles).

PROCEDURE

During periods of normal inflow, reservoir levels will be maintained within prescribed Normal Operating Ranges. During times when inflow is not adequate to meet all normal demands for water and maintain reservoir levels as normally targeted, the Licensee will progressively reduce hydro generation while meeting Project Flow Requirements. During a Low Inflow Watch or a LIC (as defined below), the Licensee and other water users will follow the protocol set forth below for the Project regarding communications and adjustments to hydro station flow releases, bypassed flow releases, minimum reservoir elevations, and other water demands. The adjustments set forth below will be made on at least a monthly basis and are designed to equitably allocate the impacts of reduced water availability in accordance with the purpose statement of this LIP.

Trigger points that demonstrate worsening hydrologic conditions will define various stages of the LIC. A summary of trigger points for various stages is provided in the table below. The specific triggers required to enter successive stages are defined in the procedure for each stage.

Summary of LIP Trigger Points

Stage	Storage Index ¹		Drought Monitor ² (3-month average)		Monitored USGS ³ Streamflow Gages
0 ⁴	90% < SI < 100% TSI		3mo Avg DM ≥ 0		AVG ≤ 85% LT 6mo Avg
1	75% TSI < SI ≤ 90% TSI	and	3mo Avg DM ≥ 1	or	AVG ≤ 78% LT 6mo Avg
2	57% TSI < SI ≤ 75% TSI	and	3mo Avg DM ≥ 2	or	AVG ≤ 65% LT 6mo Avg
3	42% TSI < SI ≤ 57% TSI	and	3mo Avg DM ≥ 3	or	AVG ≤ 55% LT 6mo Avg
4	SI ≤ 42% TSI	and	3mo Avg DM = 4	or	AVG ≤ 40% LT 6mo Avg

¹ The ratio of RUS to TUS at a given point in time.

² DM = The three-month numeric average of the published U.S. Drought Monitor.

³ The sum of the rolling six-month average for the Monitored USGS Streamflow Gages as a percentage of the period of record (i.e., long-term [LT]) rolling average for the same six-month period for the Monitored USGS Streamflow Gages.

⁴ Stage 0 is triggered when any two of the three trigger points are reached.

Stage 0 Actions

The Licensee will monitor the SI, the U.S. Drought Monitor, and the Monitored USGS Streamflow Gages on at least a monthly basis and will declare a Stage 0 Low Inflow Watch if any two of the following conditions occur:

- a. On the first or sixteenth day of the month (or first business day thereafter), SI is below the TSI, but greater than 90% of the TSI, while providing the Project Flow Requirements.
- b. The U.S. Drought Monitor Three-Month Numeric Average has a value greater than or equal to 0.
- c. The sum of the actual rolling six-month average streamflows at the Monitored USGS Streamflow Gages is equal to or less than 85% of the sum of the period of record rolling average streamflows for the same six-month period.

When a Low Inflow Watch has been declared, the Licensee will activate the CW-DMAG, including the initiation of monthly meetings or conference calls to occur on the second Tuesday of each month. These monthly discussions will focus on:

- a. Proper communication channels between the CW-DMAG members.
- b. Information reporting consistency for CW-DMAG members, including an SI history and forecast (at least a 90-day look back and look ahead) from the Licensee, a water use history and forecast (at least a 90-day look back and look ahead) from each water user on the CW-DMAG, streamflow gage and groundwater monitoring status from the state agencies and USGS, and state-wide drought response status from the state agencies.
- c. Refresher training on this LIP.
- d. Overview discussions from each CW-DMAG member concerning their role and plans for responding if a Stage 1 or higher LIC is subsequently declared.

Stage 1 Actions

1. The Licensee will declare a Stage 1 LIC and notify the CW-DMAG if:

- a. On the first or sixteenth day of the month (or first business day thereafter), the SI is at or below 90% of the TSI, but greater than 75% of the TSI, while providing the Project Flow Requirements,

and either of the following conditions exists:

- b. The U.S. Drought Monitor Three-Month Numeric Average has a value greater than or equal to 1.
- c. The sum of the actual rolling six-month average streamflows at the Monitored USGS Streamflow Gages is equal to or less than 78% of the sum of the period of record rolling average streamflows for the same six-month period.

2. The Licensee will complete the following activities after the Stage 1 LIC declaration:

Within 1 day:

- a. Reduce the Project Flow Requirements by 60% of the difference between the normal Project Flow Requirements and the Critical Flows. These reduced Project Flow Requirements are referred to as Stage 1 Minimum Project Flows.
- b. Reduce the Normal Minimum Elevations by two feet at Lake James and Lake Norman and by one foot at each of the other Project reservoirs, but not to levels at any reservoir below the applicable Critical Reservoir Elevation. These elevations are referred to as the Stage 1 Minimum Elevations.

Within 5 days:

- c. Update its website and Interactive Voice Response (IVR) messages to account for the impacts of the LIP on reservoir levels, usability of the Licensee's public access areas, and recreation flow schedules.
 - d. Notify FERC, USFWS, BIA, NMFS, and the Catawba Indian Nation of the Stage 1 LIC declaration.
 - e. Provide bi-weekly (once every two weeks) information updates to owners of Large Water Intakes about reservoir levels, meteorological forecasts, and inflow of water into the system.
 - f. In addition, the Licensee may, at its sole discretion, modify or suspend its use of selected operating procedures that are designed for periods of normal or above normal inflow to optimize the water storage capabilities of the Project, including the Normal Maximum Elevations and Normal Target Elevations for reservoir levels; the Spring Reservoir Level Stabilization Program; the Wylie High Inflow Protocol and at Lake Wateree, the Spring Stable Flow Periods and Floodplain Inundation Periods. These modifications and suspensions may be used at the Licensee's sole discretion in any LIC (Stages 1 through 4).
3. Owners of PWS intakes and owners of intakes used for irrigation with a capacity greater than 100,000 gallons per day will complete the following activities within 14 days after the Stage 1 LIC declaration:
- a. Notify their water customers and employees of the LIC through public outreach and communication efforts.
 - b. Request that their water customers and employees implement voluntary water use restrictions, in accordance with their drought response plans, which may include:
 - Reduction of lawn and landscape irrigation to no more than two days per week (e.g., residential, multi-family, parks, streetscapes, schools)
 - Reduction of residential vehicle washing.
- At this stage, the goal is to reduce water usage by 3-5% (or more) from the amount that would otherwise be expected. The baseline for this comparison will be generated by each entity and will be based on existing conditions (i.e., drought conditions). For the purposes of determining 'the amount that would otherwise be expected', each entity may consider one or more of the following:
- Historical maximum daily, weekly, and monthly flows during drought conditions.

- Increased customer base (e.g., population growth, service area expansion) since the historical flow comparison.
 - Changes in major water users (e.g., industrial shifts) since the historical flow comparison.
 - Climatic conditions for the comparison period.
 - Changes in water use since the historical flow comparison.
 - Other system specific considerations.
- c. Provide a status update to the CW-DMAG on actual water withdrawal trends. Discuss plans for moving to mandatory water use restrictions, if required.
4. Owners of Large Water Intakes, other than those referenced in Item 3 above, will complete the following activities within 14 days after the Stage 1 LIC declaration:
- a. Notify their customers and employees of the LIC through public outreach and communication efforts.
 - b. Request that their customers and employees conserve water through reduction of water use, electric power consumption, and other means.
 - c. Provide a status update to the CW-DMAG on actual water withdrawal trends.

Stage 2 Actions

1. The Licensee will declare a Stage 2 LIC and notify the CW-DMAG if:
- a. On the first or sixteenth day of the month (or first business day thereafter), the SI is at or below 75% of the TSI, but greater than 57% of the TSI, while providing the Stage 1 Minimum Project Flows,
- and either of the following conditions exists:
- b. The U.S. Drought Monitor Three-Month Numeric Average has a value greater than or equal to 2.
 - c. The sum of the actual rolling six-month average streamflows at the Monitored USGS Streamflow Gages is equal to or less than 65% of the sum of the period of record rolling average streamflows for the same six-month period.
2. The Licensee will complete the following activities after the Stage 2 LIC declaration:
- Within 1 day:
- a. Eliminate prescribed recreation flow releases at this stage and all subsequent stages. Reduce the Project Flow Requirements by 95% of the difference between the normal Project Flow Requirements and Critical Flows. These reduced flows are referred to as Stage 2 Minimum Project Flows.
 - b. Reduce the Stage 1 Minimum Elevations by one additional foot at Lake James (three feet total below Normal Minimum Elevation) and two additional feet at Lake Norman (four feet total below Normal Minimum Elevation) and by one additional foot (two feet total below Normal Minimum Elevations) at each of the other Project reservoirs but

not to levels at any reservoir below the applicable Critical Reservoir Elevation. These elevations are referred to as the Stage 2 Minimum Elevations.

Within 5 days:

- c. Update its website and IVR messages to account for the impacts of the LIP on reservoir levels, usability of the Licensee's public access areas, and recreation flow schedules.
 - d. Notify FERC, USFWS, BIA, NMFS, and the Catawba Indian Nation of the Stage 2 LIC declaration.
 - e. Provide bi-weekly information updates to owners of Large Water Intakes about reservoir levels, meteorological forecasts, and inflow of water into the system.
 - f. In addition, the Licensee may, at its sole discretion, modify or suspend its use of selected operating procedures that are designed for periods of normal or above normal inflow to optimize the water storage capabilities of the Project, including the Normal Maximum Elevations and Normal Target Elevations for reservoir levels; the Spring Reservoir Level Stabilization Program; the Wylie High Inflow Protocol; and at Lake Wateree, the Spring Stable Flow Periods and Floodplain Inundation Periods. These modifications and suspensions may be used at the Licensee's sole discretion in any LIC (Stages 1 through 4).
3. Owners of PWS intakes and owners of intakes used for irrigation with a capacity greater than 100,000 gallons per day will complete the following activities within 14 days after the Stage 2 LIC declaration:
 - a. Notify their water customers and employees of the continued LIC and movement to mandatory water use restrictions through public outreach and communication efforts.
 - b. Require that their water customers and employees implement mandatory water use restrictions, in accordance with their drought response plans, which may include:
 - Limiting lawn and landscape irrigation to no more than two days per week (e.g., residential, multi-family, parks, streetscapes, schools)
 - Eliminating residential vehicle washing.
 - Limiting public building, sidewalk, and street washing activities except as required for safety and/or to maintain regulatory compliance.

At this stage, the goal is to reduce water usage by 5-10% (or more) from the amount that would otherwise be expected (as discussed in Stage 1 above).

 - c. Enforce mandatory water use restrictions through the assessment of penalties.
 - d. Provide a status update to the CW-DMAG on actual water withdrawal trends.
4. Owners of Large Water Intakes, other than those referenced in Item 3 above, will complete the following activities within 14 days after the Stage 2 LIC declaration:
 - a. Continue informing their customers and employees of the LIC through public outreach and communication efforts.
 - b. Request that their customers and employees conserve water through reduction of water use, electric power consumption, and other means.

- c. Provide a status update to the CW-DMAG on actual water withdrawal trends.

Stage 3 Actions

1. The Licensee will declare a Stage 3 LIC and notify the CW-DMAG if:

- a. On the first or sixteenth day of the month (or first business day thereafter), the SI is at or below 57% of the TSI, but greater than 42% of the TSI, while providing the Stage 2 Minimum Project Flows,

and either of the following conditions exists:

- b. The U.S. Drought Monitor Three-Month Numeric Average has a value greater than or equal to 3.
- c. The sum of the actual rolling six-month average streamflows at the Monitored USGS Streamflow Gages is equal to or less than 55% of the sum of the period of record rolling average streamflows for the same six-month period.

2. The Licensee will complete the following activities after the Stage 3 LIC declaration:

Within 1 day:

- a. Reduce the Project Flow Requirements to Critical Flows. These reduced flows are referred to as Stage 3 Minimum Project Flows.
- b. Reduce the Stage 2 Minimum Elevations by seven additional feet at Lake James (ten feet total below Normal Minimum Elevation) and one additional foot at Lake Norman (five feet total below Normal Minimum Elevation) and by one additional foot (three feet total below Normal Minimum Elevations) at each of the other Project reservoirs but not to levels at any reservoir below the applicable Critical Reservoir Elevation. These elevations are referred to as the Stage 3 Minimum Elevations.

Within 5 days:

- c. Update its website and IVR messages to account for the impacts of the LIP on reservoir levels, usability of the Licensee's public access areas, and recreation flow schedules.
- d. Notify FERC, USFWS, BIA, NMFS, and the Catawba Indian Nation of the Stage 3 LIC declaration.
- e. Provide bi-weekly information updates to owners of Large Water Intakes about reservoir levels, meteorological forecasts, and inflow of water into the system.
- f. In addition, the Licensee may, at its sole discretion, modify or suspend its use of selected operating procedures that are designed for periods of normal or above normal inflow to optimize the water storage capabilities of the Project, including the Normal Maximum Elevations and Normal Target Elevations for reservoir levels; the Spring Reservoir Level Stabilization Program; the Wylie High Inflow Protocol; and at Lake Wateree, the Spring Stable Flow Periods and Floodplain Inundation Periods. These modifications and suspensions may be used at the Licensee's sole discretion in any LIC (Stages 1 through 4).

3. Owners of PWS intakes and owners of intakes used for irrigation with a capacity greater than 100,000 gallons per day will complete the following activities within 14 days after the Stage 3 LIC declaration:
 - a. Notify their water customers and employees of the continued LIC and movement to more stringent mandatory water use restrictions through public outreach and communication efforts.
 - b. Require that their water customers and employees implement increased mandatory water use restrictions, in accordance with their drought response plans, which may include:
 - Limiting lawn and landscape irrigation to no more than one day per week (e.g., residential, multi-family, parks, streetscapes, schools)
 - Eliminating residential vehicle washing.
 - Limiting public building, sidewalk, and street washing activities except as required for safety and/or to maintain regulatory compliance.
 - Limiting construction uses of water such as dust control.
 - Limiting flushing and hydrant testing programs, except to maintain water quality or other special circumstances.
 - Eliminating the filling of new swimming pools.

At this stage, the goal is to reduce water usage by 10-20% (or more) from the amount that would otherwise be expected (as discussed in Stage 1 above).
 - c. Enforce mandatory water use restrictions through the assessment of penalties.
 - d. Encourage industrial/manufacturing process changes that reduce water consumption.
 - e. Provide a status update to the CW-DMAG on actual water withdrawal trends.
4. Owners of Large Water Intakes, other than those referenced in Item 3 above, will complete the following activities within 14 days after the Stage 3 LIC declaration:
 - a. Continue informing their customers and employees of the Low Inflow Condition through public outreach and communication efforts.
 - b. Request that their customers and employees conserve water through reduction of water use, electric power consumption, and other means.
 - c. Encourage industrial/manufacturing process changes that reduce water consumption.
 - d. Provide a status update to the CW-DMAG on actual water withdrawal trends.

Stage 4 Actions

1. The Licensee will declare a Stage 4 Low Inflow Condition (LIC) and notify the CW-DMAG if:
 - a. On the first or sixteenth day of the month (or first business day thereafter), the SI is at or below 42% of the TSI, while providing the Stage 3 Minimum Project Flows.

and either of the following conditions exists:

- b. The U.S. Drought Monitor Three-Month Numeric Average has a value of 4.
 - c. The sum of the actual rolling six-month average streamflows at the Monitored USGS Streamflow Gages is equal to or less than 40% of the sum of the period of record rolling six-month average streamflows for the same six-month period.
2. The Licensee will complete the following activities after the Stage 4 LIC declaration:
- a. Continue to provide Critical Flows as long as possible.

Within 1 day:

- b. Reduce the Stage 3 Minimum Elevations to the Critical Reservoir Elevations.
- c. Establish a meeting date and notify the CW-DMAG.

Within 5 days:

- d. Notify FERC, USFWS, BIA, NMFS and the Catawba Indian Nation of the Stage 4 LIC.
- e. Continue to update its website and IVR messages to account for the impacts of the LIP on reservoir levels, usability of the Licensee's public access areas, and recreation flow schedules.
- f. Provide bi-weekly information updates to owners of Large Water Intakes about reservoir levels, meteorological forecasts, and inflow of water into the system.
- g. In addition, the Licensee may, at its sole discretion, modify or suspend its use of selected operating procedures that are designed for periods of normal or above normal inflow to optimize the water storage capabilities of the Project, including the Normal Maximum Elevations and Normal Target Elevations for reservoir levels; the Spring Reservoir Level Stabilization Program; the Wylie High Inflow Protocol, and at Lake Wateree, the Spring Stable Flow Periods and Floodplain Inundation Periods. These modifications and suspensions may be used at the Licensee's sole discretion in any LIC (Stages 1 through 4).

Note: Once a Stage 4 LIC is declared, the RUS in the reservoir system is small and can be fully depleted in a matter of weeks or months. Groundwater recharge may also contribute to declining reservoir levels. For these reasons, in the Stage 4 LIC, the Licensee may not be able to ensure that flow releases from its hydro developments will meet or exceed Critical Flows or that reservoir elevations will be greater than or equal to the Critical Reservoir Elevations.

3. Owners of PWS intakes and owners of intakes used for irrigation with a capacity greater than 100,000 gallons per day will complete the following activities within 14 days after the Stage 4 LIC declaration:
- a. Notify their water customers and employees of the continued LIC and movement to **emergency** water use restrictions through public outreach and communication efforts.
 - b. Restrict all outdoor water use.

- c. Implement emergency water use restrictions in accordance with their drought response plans, including enforcement of these restrictions and assessment of penalties.
- d. Prioritize and meet with their commercial and industrial large water customers to discuss strategies for water reduction measures including development of an activity schedule and contingency plans.
- e. Prepare to implement emergency plans to respond to water outages (e.g., Raw Water Intake Contingency Plans).
- f. Provide a status update to the CW-DMAG on actual water withdrawal trends.

At this level, the goal is to reduce water usage by 20-30% (or more) from the amount that would otherwise be expected (as discussed in Stage 1 above).

- 4. Owners of Large Water Intakes on the CW-DMAG, other than those referenced in Item 3 above, will complete the following activities within 14 days after the Stage 4 LIC declaration:
 - a. Continue informing their customers and employees of the LIC through public outreach and communication efforts.
 - b. Request that their customers and employees conserve water through reduction of water use, electric power consumption, and other means.
 - c. Encourage industrial/manufacturing process changes that reduce water consumption.
 - d. Provide a status update to the CW-DMAG on actual water withdrawal trends.
- 5. The CW-DMAG will:
 - a. Meet within 5 days after the declaration of the Stage 4 LIC and determine if there are any additional measures that can be implemented to:
 - (1) reduce water withdrawals without creating more severe regional problems;
 - (2) reduce water releases from the Project without creating more severe regional problems; or
 - (3) use additional reservoir storage without creating more severe regional problems.
 - b. Work together to develop plans and implement any additional measures identified above.

Recovery from the Low Inflow Protocol

- 1. Recovery under the LIP as conditions improve will be accomplished by reversing the staged approach outlined above, except that:
 - a. All three of the trigger points identified above for declaring the lower numbered stage must be met or exceeded before returning reservoir minimum elevations and Project flows to levels specified in that LIC stage, Low Inflow Watch, or Normal Conditions.
 - b. In addition to the triggers used to designate LIP stages, groundwater levels must show improvement to designate less restrictive LIP stages. The wells listed in the

table titled “USGS Catawba-Wataree Groundwater Network Wells” will be monitored to evaluate the condition of groundwater resources upstream of Wataree Dam. The monthly average of the daily mean water levels reported by USGS for the groundwater network wells will be used to evaluate groundwater conditions.

USGS Catawba-Wataree Groundwater Network Wells			
Groundwater Monitor Station	Site ID	Site Name	Date Installed
#1 USGS Kershaw County near Liberty Hill	342440080443900	KER- 433 KERSHAW COUNTY NR LIBERTY HILL (REGOLITH)	5/11/2009
	342440080443901	KER- 435 KERSHAW COUNTY NR LIBERTY HILL (BEDROCK)	5/11/2009
#2 USGS Lancaster County Airport	344333080503600	LAN- 497 LANCASTER COUNTY AIRPORT (REGOLITH)	1/12/2010
	344333080503601	LAN- 498 LANCASTER COUNTY AIRPORT (BEDROCK)	1/12/2010
#3 USGS Mineral Springs Research Station	345609080415102	UN-147 MINERAL SPRINGS RS TRANSITION ZONE WELL	3/26/2011
	345609080415103	UN-148 MINERAL SPRINGS RS BEDROCK WELL	3/26/2011
#4 USGS York County Airport	345830081033100	YRK-3295 YORK COUNTY AIRPORT (BEDROCK)	9/3/2010
	345830081033101	YRK-3296 YORK COUNTY AIRPORT (REGOLITH)	9/2/2010
#5 USGS Pasour Mountain Research Station	352012081154301	GS-289 PASOUR MTN RS REGOLITH WELL, PM-25	4/21/2010
	352012081154302	GS-290 PASOUR MTN RS TRANSITION ZONE WELL, PM-3	4/21/2010
#6 USGS Langtree Peninsula Research Station near Mount Mourne	353135080524201	IR-130 LANGTREE RS MW-2S NR MT MOURNE (REGOLITH)	3/3/2001
	353135080524202	IR-131 LANGTREE RS MW-2I (TRANSITION ZONE)	3/3/2001
	353135080524203	IR-132 LANGTREE RS MW-2D (QUARTZ DIORITE)	3/3/2001
#7 USGS Pleasant Gardens Research Station	354133082042201	MC-107 NEAR PLEASANT GARDENS RS, NC (REGOLITH)	8/20/2010
	354133082042203	MC-109 NEAR PLEASANT GARDENS, NC (BEDROCK)	8/20/2010
#8 USGS Glen Alpine Research Station near Morganton	354302081433201	BK-126 GLEN ALPINE RS NEAR MORGANTON, NC (BEDROCK)	1/13/2000
	354302081433202	BK-127 GLEN ALPINE RS NR MORGANTON, NC (REGOLITH)	11/1/2008
#9 USGS Oxford Research Station near Claremont	354616081085101	CW-350 OXFORD RS NR CLAREMONT (TRANSITION ZONE)	3/24/2011
	354616081085102	CW-351 OXFORD RS NR CLAREMONT, NC (BEDROCK)	8/1/2009
#10 USGS Granite Falls Research Station	355031081243202	CD-101 GRANITE FALLS RS TRANSITION ZONE WELL	3/17/2011
	355031081243203	CD-102 GRANITE FALLS RS BEDROCK WELL	3/17/2011

Movement between LIP stages during recovery will be determined by comparing the current monthly average water level for each well to the range of monthly average water

levels for each well calculated from the period of record data through the most recent USGS approved Water Year (October-September) to determine comparative percentiles.

The results of the monthly calculations will be combined and compared to the Groundwater Recovery Triggers defined below. Groundwater trigger levels will be updated annually. The following triggers will be used in combination with the three triggers used for defining LIP stages to designate improving conditions.

Groundwater Recovery Triggers

The following recovery steps are authorized when the groundwater network's current combined monthly average water level meets the designated trigger.

- i. Recovery to Stage 3: Monthly period of record low water level or higher
- ii. Recovery to Stage 2: Monthly period of record 10th percentile or higher
- iii. Recovery to Stage 1: Monthly period of record 25th percentile or higher
- iv. Recovery to Stage 0 and Normal: Monthly period of record 50th percentile or higher

The calculations described in this Item 1.b. will be used for informational purposes only until approved USGS data reflecting the range of historical hydrologic conditions in the Catawba-Wateree River Basin which ultimately drains to Wateree Dam are available.

2. The NCDEQ, SCDNR, SCDHEC, USGS, and the Licensee will determine by consensus when the groundwater trigger points for recovery are reached.
3. The Licensee will directly notify the CW-DMAG members within 5 days following attainment of all the trigger points necessary to recover to a lower stage of the LIC, Low Inflow Watch, or Normal Conditions.
4. The Licensee will update its website and IVR messages within 5 days following attainment of all the trigger points necessary to recover to a lower stage of the LIC, Low Inflow Watch, or Normal Conditions to account for the impacts of the LIP on reservoir levels, usability of the Licensee's public access areas, and recreation flow schedules.
5. The Licensee will notify FERC, USFWS, BIA, NMFS, and the Catawba Indian Nation within 5 days following attainment of all the trigger points necessary to recover to a lower stage of the LIC, Low Inflow Watch, or Normal Conditions.