

Yadkin Project (FERC No. 2197)

Hydro Project Maintenance and Emergency Protocol

1.0 Overview

Under some maintenance and emergency situations, certain license conditions may be impractical or even impossible to meet and may need to be suspended or modified temporarily. The objectives of this Hydro Project Maintenance and Emergency Protocol (HPMEP) are to define the most likely situations of this type, identify the potentially impacted license conditions, and outline the general approach that Alcoa Power Generating Inc. (Licensee) will take at the Yadkin Project (Project) (Federal Energy Regulatory Commission – FERC No. 2197) to maintain operations consistent with license conditions, to the maximum extent possible, and to communicate with the resource agencies and affected parties.

Due to the potential variability of these abnormal situations, this HPMEP is not intended to give an exact step-by-step solution path. It does, however, provide basic expectations for the Licensee's approach to dealing with the situation. The specific details of each maintenance or emergency situation will vary and will be determined on a case-by-case basis as this HPMEP is implemented.

The Licensee will review the requirements of this HPMEP each time it is used and if it determines revisions are warranted, the Licensee will consult with appropriate resource agencies and shall file with the Commission a revised HPMEP for the Yadkin Project. The Licensee shall include with the revised HPMEP documentation of consultation, copies of comments and recommendations on the revised HPMEP after it has been drafted and provided to the agencies for their review, and specific descriptions of how comments are accommodated by the final revised HPMEP. The Licensee shall allow a minimum of 30 days for the agencies to comment on the revised HPMEP prior to filing it with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information. Upon Commission approval, the Licensee shall implement the revised HPMEP, including any changes required by the Commission.

2.0 Key Definitions, Facts, and Assumptions

1. Required Minimum Instream Flows – For the purposes of this HPMEP, this term refers to the Required Minimum Instream Flow requirements included in the new FERC license for the Project.
2. LIP Flows - For the purposes of this HPMEP, a Low Inflow Protocol (LIP) flow is any flow required under the LIP.
3. Public Information Obligations – The Licensee will develop and provide information on its website to inform the public on reservoir water elevations, Project releases, usability of public access areas, reservoir inflows, meteorological forecasts, Historical and Actual Stream Gage Three-Month Rolling Average Flow calculations, U.S. Drought Monitor Three-Month Numeric Average calculations, LIP status, flow and drought triggers, and implementation of this HPMEP.

4. Full Pond Elevation – Also referred to as “full pond”, this is the elevation of a reservoir (measured in feet, USGS datum [NGVD 1929] that corresponds to the point at which water would first begin to spill at the dam if the Licensee took no action. This elevation corresponds to the lowest point along the top of the flood gates. The Full Pond Elevations for the Yadkin Project reservoirs are:

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

5. Normal Minimum Elevation (NME) – The elevation of a reservoir (measured in feet, USGS datum [NGVD 1929]) that defines the bottom of the reservoir’s Normal Operating Range for a given day of the year.
6. Normal Reservoir Operating Range – The band of reservoir water elevations within which the Licensee normally attempts to maintain a given reservoir on a given day. Each reservoir has its own specific Normal Reservoir Operating Range, bounded by Full Pond Elevation and Normal Minimum Elevation. If net inflows to the reservoir are within a reasonable tolerance of the average or expected amounts, Project equipment is operating properly, the LIP has not been implemented, and this HPMEP has not been implemented, reservoir water elevation excursions outside of the Normal Reservoir Operating Range should not occur. The new FERC license for the Project includes operating curves that establish the Normal Reservoir Operating Range for each Project reservoir.

7. Most Likely Situations - The following table identifies the most likely situations when this HPMEP will be implemented and the license conditions that would most likely be affected:

Situation	Indications	Potentially Affected License Conditions	
		Required Minimum Instream Flows or LIP Flows	Normal Reservoir Operating Range
Hydro Unit or Dam Maintenance	Maintenance may require hydro unit shutdown or gates placed out of service.	X	X
Maintenance of Normal Means of Providing Required Minimum Instream Flow	Maintenance will require interruption of scheduled minimum releases from normal locations.	X	
Safety Emergency	Red Alert or Yellow Alert (i.e. dam failure has occurred, is imminent or a potential failure situation is developing) is declared per Emergency Action Plan or other dam safety concern is identified.	X	X
Voltage or Capacity Emergency	A voltage or capacity emergency is declared by the electric grid security authority.	X	X
Reservoir Drawdown Beyond Normal Minimum Elevation due to maintenance, emergency or other reasons (not due to low inflow)	The reservoir water elevation at a reservoir is significantly below Normal Minimum Elevation	X	X
Expected or existing high inflow event	The reservoir water elevation at a reservoir is significantly below the Normal Minimum Elevation	X	X

8. Returning to Normal - Some of the above situations can impact the Licensee's ability to operate the Project in the most efficient and safest manner for power production. The Licensee will therefore endeavor in good faith to repair existing Project equipment and facilities and return them to service within a reasonable period of time, commensurate with the severity of the equipment / facility repair requirements.
9. Scheduled Maintenance – Maintenance that is planned at least 3 months in advance.
10. Unscheduled Maintenance - Any maintenance activity other than Scheduled Maintenance that arises out of need, generally in response to unexpected conditions or events.

11. Incidental Maintenance – Maintenance of Project works that are very brief or that require minimal, if any, deviation from normal license conditions. For the purposes of this HPMEP, maintenance of Project works that does not require deviation from any license conditions related to Required Minimum Instream Flows, LIP Flows or the Normal Reservoir Operating Ranges or are less than 24 hours in duration are considered Incidental Maintenance and, except for the identified notification for Incidental Maintenance that impact Required Minimum Instream Flows, are exempt from the requirements of this HPMEP.
12. Notification Guidance for Scheduled Maintenance - Once a likely maintenance schedule has been established, the Licensee will endeavor in good faith to provide as much advance notice as possible to the affected parties identified in this HPMEP.
13. Notification Guidance for Unscheduled Maintenance and Emergencies – In the event of an emergency or unscheduled maintenance, it is not possible for the Licensee to assure any level of advance notice. For these situations, the Licensee will endeavor in good faith to inform the affected parties identified in this HPMEP within some reasonable amount of time after the situation has been identified.
14. Preparation for High Inflow Events – With modern forecasting, it is more possible than ever to predict large precipitation events and to increase generation hours to reduce reservoir water elevations in order to mitigate the potential for spilling and downstream high water. Typically, this type of advance action is taken from 1 to 5 days before the expected arrival of a storm. It is assumed that the Normal Reservoir Operating Ranges may not provide adequate flexibility (i.e. band width) to allow for this type of reservoir water elevation reduction under heavy inflow circumstances, and therefore, allowances are made in this HPMEP to lower reservoir water elevations below the Normal Minimum Elevations, if needed, in preparation for such events.
15. Relationship Between this HPMEP and the Low Inflow Protocol – The Low Inflow Protocol (LIP) provides for deviations from the Required Minimum Instream Flows and deviation from the Normal Reservoir Operating Ranges when water demands on the reservoirs substantially exceed net inflow. Lowered reservoir water elevations caused by maintenance or emergency situations addressed under this HPMEP will not invoke implementation of the LIP.
16. Critical Flow – The flow that is considered necessary to prevent long-term or irreversible damage to aquatic communities consistent with the resource management goals and objectives for the affected stream reaches and necessary to provide some basic level of water quality maintenance in affected river reaches. The LIP defines the Critical Flow from the Falls Development as 770 cfs, measured on a daily average basis
17. Organizational Abbreviations - Organizational abbreviations include Alcoa Power Generating Inc. (APGI), Progress Energy (PE), North Carolina Department of Environment and Natural Resources (NCDENR), North Carolina Division of Water Resources (NCDWR), North Carolina Division of Water Quality (NCDWQ), North Carolina Wildlife Resources Commission (NCWRC), the United States Fish and Wildlife Service (USFWS).
18. Voltage and Capacity Emergencies – The Yadkin transmission system is interconnected to the Duke Power transmission system and the Progress Energy transmission system. If system reliability is at risk due to Voltage and Capacity Emergencies, the ability to provide secure and continuous electric service becomes compromised. The electric grid security

authority continuously monitors the electric transmission system. Therefore, for the purposes of this HPMEP, a voltage or capacity emergency shall exist when declared by the electric grid security authority.

19. Human Health and Safety and Electric System Integrity are of Utmost Importance – Nothing in this HPMEP will limit the Licensee’s ability to take any and all lawful actions necessary at the Yadkin Project to protect human health and safety, protect its equipment from major damage, and ensure the stability of the regional electric grid. It is recognized that the Licensee may take the steps that are necessary to protect these things without prior consultation or notification.
20. Large Water Intake – For the purposes of this HPMEP, a Large Water Intake is any intake (e.g. public water supply, industrial, agricultural, power plant, etc.) having a maximum instantaneous capacity greater than or equal to one Million Gallons per Day (MGD), the FERC approval level for new intakes.
21. Critical Reservoir Water Elevation – The elevation of water in a reservoir (measured in feet, USGS datum [NGVD 1929]) below which a Large Water Intake or hydropower plant located on the reservoir cannot operate under normal conditions. The Critical Reservoir Water Elevations are the Critical Reservoir Water Elevations defined in the LIP.

3.0 General Approach to Abnormal Situations

A. Powerhouse and Dam Maintenance

1. Mitigating Actions

a. Scheduled Maintenance

Scheduling - To the extent practical, the Licensee will avoid scheduling unit maintenance that would impact Required Minimum Instream Flows or LIP Flows, unless it is likely that the equipment condition will cause damage or unscheduled unit maintenance if repairs are delayed.

b. Unscheduled Maintenance

Required Minimum Instream Flow Releases – If the Unscheduled Maintenance affects equipment that provides the normal method of providing Required Minimum Instream Flows or LIP Flows, then the Licensee will endeavor in good faith to restore some or all of the Required Minimum Instream Flows or LIP Flow as soon as practicable.

2. Communication with Resource Agencies and Affected Parties

a. Scheduled Maintenance

1) Direct Consultation - If the Scheduled Maintenance will affect any Required Minimum Instream Flow release or Normal Reservoir Operating Range, the Licensee will consult with NCDENR, NCWRC, PE, and USFWS, as soon as approximate maintenance schedule dates are determined, but at least 10 days prior to beginning any reservoir drawdown for the unit maintenance. If the scheduled maintenance is expected to result in a drawdown of any of the Project reservoirs below the Critical Reservoir Water Elevation, the Licensee will consult with the North Carolina State Historic Preservation Office (NCSHPO). The Licensee will notify FERC after consultation with agencies. If the maintenance will require a reservoir drawdown below the Critical Reservoir Water Elevation (as defined in the LIP) the Licensee will notify the owner of any Large Intakes located on the reservoir of the maintenance and drawdown schedule. The Licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the maintenance.

2) General Notification – If the Scheduled Maintenance will affect any downstream Required Minimum Instream Flow release or Normal Reservoir Operating Range, at least 10 days before beginning any reservoir drawdown or the unit maintenance, the Licensee will add the appropriate messages to its public information website and/or its reservoir water elevation phone system to inform the general public of the maintenance and drawdown schedule.

b. Unscheduled Maintenance

1) Direct Notification - If the Unscheduled Maintenance will affect any Required Minimum Instream Flow, LIP Flow, or Normal Reservoir Operating Range, the

Licensee will notify NCDENR, NCWRC, PE, USFWS, and FERC as soon as possible after the unscheduled maintenance begins, but no longer than 72 hours afterwards. If the maintenance will require a reservoir drawdown below the Critical Reservoir Water Elevation (as defined in the LIP), the Licensee will notify the owner of any Large Intakes located on the reservoir of the maintenance and drawdown schedule.

- 2) General Notification – If the Unscheduled Maintenance will affect any Required Minimum Instream Flow, LIP Flow or Normal Reservoir Operating Range, as soon as possible after the unscheduled maintenance begins but no longer than 72 hours afterwards, the Licensee will add the appropriate messages to its public information website and its reservoir water elevation phone system to inform the general public of the maintenance and drawdown schedule.
- 3) Direct Consultation – If the Unscheduled Maintenance will affect any Required Minimum Instream Flow, LIP Flow, or Normal Reservoir Operating Range, the Licensee will consult with NCDENR, NCWRC, PE, USFWS as soon as possible after the unscheduled maintenance begins, but no longer than 10 days afterwards. If the Unscheduled Maintenance is expected to result in a drawdown of any of the Project reservoirs below the Critical Reservoir Water Elevation, the Licensee will consult with the NCSHPO. The Licensee will notify FERC after consultation with agencies. The Licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the maintenance.

B. Maintenance of the Normal Means of Providing Required Minimum Instream Flow

1. Mitigating Actions

a. Scheduled Maintenance

- 1) Scheduling - To the extent practical, the Licensee will avoid scheduling maintenance that would impact the ability to release Required Minimum Instream Flows from the Project, unless it is likely that the equipment condition will cause damage or an unscheduled maintenance condition if repairs are delayed.
- 2) Required Minimum Instream Flows - If the Scheduled Maintenance cannot avoid impacting Required Minimum Instream Flows from the Project, then the Licensee will endeavor in good faith to restore some or all of the Required Minimum Instream Flows as soon as practicable.
- 3) Critical Flow – To the extent practical, the Licensee will avoid falling below the Critical Flow (as defined in the LIP). If it is determined that 100% exceedance of the Critical Flow cannot reasonably be achieved, the Licensee will work with the resource agencies to monitor any potential aquatic species impacts in the affected reach below Falls Dam.

b. Unscheduled Maintenance

- 1) Required Minimum Instream Flows - If the Unscheduled Maintenance cannot avoid impacting Required Minimum Instream Flows or LIP Flows, then the Licensee will endeavor in good faith to restore some or all of the Required Minimum Instream Flows or LIP Flows as soon as practicable.

- 2) Critical Flow – To the extent practical, the Licensee will avoid falling below the Critical Flow (as defined in the LIP) as noted above. If it is determined that 100% exceedance of the Critical Flow cannot reasonably be achieved, the Licensee will work with the resource agencies to monitor any potential aquatic species impacts in the affected reach below Falls Dam.

2. Communication with Resource Agencies and Affected Parties

a. Scheduled Maintenance

- 1) Direct Consultation – If the Scheduled Maintenance cannot avoid impacting Required Minimum Instream Flows from the Project, the Licensee will consult with NCDENR, NCWRC, PE, and USFWS, as soon as approximate maintenance schedule dates are determined, but at least 10 days prior to beginning the maintenance. The Licensee will notify FERC after consultation with the agencies. The Licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the maintenance.
- 2) General Notification – If the Scheduled Maintenance will affect any Required Instream Minimum Flow, at least 10 days before beginning the maintenance, the Licensee will add the appropriate messages to its public information website and its reservoir water elevation phone system to inform the general public of the maintenance.

b. Unscheduled Maintenance

- 1) Direct Notification - If the Unscheduled Maintenance cannot avoid impacting Required Minimum Instream Flows from the Project, the Licensee will notify NCDENR, NCWRC, PE, USFWS, and FERC as soon as possible after the unscheduled maintenance begins, but no longer than 72 hours afterwards.
- 2) Direct Consultation – If the Unscheduled Maintenance cannot avoid impacting Required Minimum Instream Flows or LIP Flows, the Licensee will consult with NCDENR, NCWRC, PE, USFWS as soon as possible after the Unscheduled Maintenance begins, but no longer than 10 days afterwards. The Licensee will notify FERC after consultation with agencies. The Licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the maintenance.

C. Dam Safety Emergency

1. Actions

Safety Must Come First – If a Red Alert or Yellow Alert is declared per the Licensee's Emergency Action Plan, or other dam safety concerns arise, the Licensee can take any and all steps necessary to restore the dam to a safe condition.

2. Communication with Resource Agencies and Affected Parties

- a. Direct Notification – Notification of any dam safety emergency will be conducted strictly in accordance with the Licensee's Emergency Action Plan. In cases where dam safety concerns arise that are not a Red Alert or Yellow Alert per the Licensee's Emergency Action Plan, consultation with resource agencies and affected parties will occur as soon as possible, after the dam safety concern arises.
- b. Once Dam Safety Conditions Have Stabilized – The Licensee will add the appropriate messages to its public information website and/or its reservoir water elevation phone system to inform the general public of the situation and any expected return to normal operation.

D. Voltage and Capacity Emergencies

1. Actions

- a. Normal Reservoir Operating Range – If a Voltage or Capacity Emergency (as defined above) occurs, the Licensee may take any and or all steps necessary to aid in restoring the electric grid to a stable condition.
- b. Conserving Water for Power Generation - If a Voltage or Capacity Emergency is expected to continue for two weeks or more, the Licensee may reduce Project outflow below Required Minimum Instream Flows or LIP Flows to the Critical Flow (as defined in the LIP) if taking such action is necessary to maintain the water inventory in Project reservoirs for use during the voltage and capacity emergency. During a voltage and capacity emergency, the Licensee will not conserve water for power generation strictly as a cost avoidance measure, but only to assist in addressing the emergency.

2. Communication with Resource Agencies and Affected Parties

- a. Direct Notification - The Licensee will notify NCDENR, NCWRC, PE, USFWS and FERC as soon as possible following a deviation from license conditions for Voltage or Capacity Emergency reasons. If the Voltage or Capacity Emergency is expected to result in a drawdown of a reservoir below its Critical Reservoir Water Elevation, the Licensee will notify NCSHPO.
- b. General Notification - Within 72 hours following the start of the emergency deviation, the Licensee will add the appropriate messages to its public information website and its reservoir water elevation phone system to inform the general public of the situation and any expected dates for return to normal operations.
- c. Direct Consultation – The Licensee will consult with NCDENR, NCWRC, PE, and USFWS as soon as possible following a deviation from license conditions for voltage or capacity emergency reasons. The Licensee will consult with downstream water users if they are affected by the Voltage and Capacity Emergency through reduction of the Required Minimum Instream Flow or LIP Flow to the Critical Flow. If the voltage or capacity emergency is expected to result in a drawdown of any of the Project reservoirs below the Critical Water Elevation, the Licensee will consult with NCSHPO. The Licensee will notify FERC after consultation with agencies. If the emergency requires a reservoir drawdown below the Critical Reservoir Water Elevation the Licensee will notify

the owner of any Large Intakes located on the reservoir of the nature of the emergency and the anticipated drawdown schedule. The Licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the emergency.

E. Reservoir Drawdown

1. Actions

a. Planned Drawdowns

- 1) Scheduling - To the extent practical, the Licensee will avoid scheduling reservoir drawdowns needed for maintenance purposes that would impact the ability of the Licensee to release Required Minimum Instream Flows from the Project.
- 2) Required Minimum Instream Flows - If a Planned Drawdown cannot avoid impacting Required Minimum Instream Flows from the Project, then the Licensee will endeavor in good faith to restore some or all of the Required Minimum Instream Flows as soon as practicable.
- 3) Critical Flow – To the extent practical, the Licensee will avoid falling below the Critical Flow (as defined in the LIP). If it is determined that 100% exceedance of the Critical Flow cannot reasonably be achieved, the Licensee will work with the resource agencies to monitor any potential aquatic species impacts in the affected reach below Falls Dam.

b. Unplanned Drawdowns

- 1) Required Minimum Instream Flows - If an Unplanned Drawdown cannot avoid impacting Required Minimum Instream Flows from the Project, then the Licensee will endeavor in good faith to restore some or all of the Required Minimum Instream Flows as soon as practicable.
- 2) Critical Flow – To the extent practical, during an Unplanned Drawdown, the Licensee will avoid falling below the Critical Flow (as defined in the LIP). If it is determined that 100% exceedance of the Critical Flow cannot reasonably be achieved, the Licensee will work with the resource agencies to monitor any potential aquatic species impacts in the affected reach below Falls Dam.

2. Communication with Resource Agencies and Affected Parties

a. Planned Drawdowns

- 1) Direct Consultation – If the Planned Drawdown will cause the reservoir to be out of the Normal Reservoir Operating Range, the Licensee will consult with NCDENR, NCWRC, PE, and USFWS as soon as approximate dates of a planned drawdown are determined, but at least 10 days prior to beginning the drawdown. If the Planned Drawdown is expected to draw the reservoir below the Critical Reservoir Water Elevation, the Licensee will consult with NCSHPO. If the Planned Drawdown is expected to go below the Critical Reservoir Water Elevation (as defined in the LIP), the Licensee will consult with the owners of any Large Intakes located on the

reservoir. The Licensee will notify FERC after consultation with agencies. The licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the drawdown.

- 2) General Notification – If the Planned Drawdown will cause the reservoir to be out of the Normal Reservoir Operating Range, at least 10 days before beginning any drawdown, the Licensee will add the appropriate messages to its public information website and its reservoir water elevation phone system to inform the general public of the planned drawdown schedule.

b. Unplanned Drawdowns

- 1) Direct Notification - If an Unplanned Drawdown causes the reservoir to be out of the Normal Reservoir Operating Range or the unplanned drawdown cannot avoid impacting Required Minimum Instream Flows or LIP Flows, the Licensee will notify NCDENR, NCWRC, PE, USFWS, and FERC, of the Unplanned Drawdown as soon as practicable, but no longer than 72 hours afterwards.
- 2) Direct Consultation – If the Unplanned Drawdown cannot avoid impacting Required Minimum Instream Flows or LIP Flows, the Licensee will consult with NCDENR, NCWRC, PE, and USFWS as soon as possible, but no longer than 10 days afterwards. The Licensee will notify FERC after consultation with agencies. The Licensee will consider options suggested by the identified agencies and organizations that could lessen the impact of the drawdown.

F. Expected or Existing High Inflow Event

1. Actions

In preparation for an expected high inflow event or in response to an ongoing high inflow event, the Licensee may reduce reservoir water elevations significantly below the Normal Minimum Elevation, in order to minimize the effects of spilling. The reservoir water elevation may be below Normal Minimum Elevations for as long as necessary to minimize the effects of spilling and to manage reservoir elevations during high inflow events.

2. Communication with Resource Agencies and Affected Parties

- a. Direct Notification - The Licensee will notify NCDENR, NCWRC, PE, USFWS and FERC as soon as practicable following a deviation from the Normal Reservoir Operating Range for an existing or expected high inflow event. If the drawdown is anticipated to go below Critical Reservoir Water Elevation (as defined in the LIP) of the reservoir, the Licensee will notify the owners of any Large Water Intakes on the reservoir.
- b. General Notification – As soon as practicable after the Licensee determines that deviation from Normal Reservoir Operating Range is needed due to an ongoing or expected high inflow event, the Licensee will add the appropriate messages to its public information website and its reservoir water elevation phone system to inform the general public of the situation and any expected dates for return to normal operations.