INTEGRATED LETTER REPORT AND TIERED ENVIRONMENTAL ASSESSMENT

OF THE

OPERATIONAL ANALYSIS AND TARGETED WATER CONTROL PLAN UPDATES FOR THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN IN ALABAMA, FLORIDA, AND GEORGIA

EAXX-202-00-K5P-1727867613

Appendix F

George W. Andrews Water Control Plan

The enclosed document contains chapters 3, 7, and Exhibit C: Standing Instructions to the Damtenders for Water Control from each of the West Point, Walter F. George, George W. Andrews, and Master Water Control Manuals. These chapters have been selected out of the complete 2017 Water Control Manuals due to their direct relation to implementation of the 4 Flow Objectives analyzed in the ILR/TEA pursuant to the Stay Agreement Alternative. The Stay Agreement itself can be found in Appendix A. All added language within is indicated by red text.

US Army Corps
of Engineers®
Mobile District

WATER CONTROL MANUAL

APPENDIX D

GEORGE W. ANDREWS LOCK AND DAM AND LAKE GEORGE W. ANDREWS

CHATTAHOOCHEE RIVER
GEORGIA AND ALABAMA

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
MOBILE, ALABAMA

APRIL 1965

Revised February 1978, November 1996, March 2017 and December 2024

George W. Andrews Lock and Dam

III - HISTORY OF PROJECT

3-01. Authorization. The Corps first considered navigation locks and dams for the Apalachicola River Basin in the early 1930s in a report on the Apalachicola River System in accordance with House Document No. 308, 69th Congress, First Session. The report, which had a general plan for the overall development of the basin was submitted to Congress in 1934 but was immediately recalled to consider additional information.

The Rivers and Harbors Act of 1945 approved the general plan presented in House Document No. 342, 76th Congress, First Session, and authorized the initiation and partial accomplishment of that plan by constructing two dams in the Apalachicola River Basin. The Rivers and Harbors Act of 1946 modified the general plan to include improvements consisting of Buford Dam, Fort Benning Lock and Dam, and the Upper Columbia and Jim Woodruff multiple purpose developments.

A letter report dated 29 November 1952, subject: *Report on Development of Chattahoochee River between Upper Limits of Jim Woodruff Pool and Columbus, Georgia*, prepared by the Mobile District, presented several plans for developing the Chattahoochee River below Columbus. The letter report recommended the adoption of the plan consisting of a low navigation dam near Columbia, Alabama, and a high navigation power dam near Fort Gaines, Georgia, in lieu of the Fort Benning Lock and Dam and Upper Columbia development in the authorizing document. The Chief of Engineers approved the plan as the basis for further studies in an endorsement dated 16 January 1953, and on 19 May 1953, the Committee on Public Works of the House of Representatives approved the changes as recommended in the report.

In February 1972, the 92nd Congress enacted Public Law 92-229, which provided that the Columbia Lock and Dam on the Chattahoochee River, Alabama, be known and designated as the George W. Andrews Lock and Dam and the reservoir formed by such dam be known and designated as Lake George W. Andrews. The President approved the bill on 15 February 1972.

3-02. Planning and Design. Design Memorandum No. 1, Determination of Site Location and Reservoir Level, was submitted on 7 May 1954, and the location was approved in the second endorsement by the Chief of Engineers dated 19 August 1954. The reservoir level, however, was not approved until 26 July 1956 when a conference was held in Mobile, Alabama, attended by representatives of the Mobile District and the SAD. At the conference, the full pool was established at elevation 102 feet NGVD29 and the minimum pool at elevation 96 feet NGVD29. Also discussed at the conference were the spillway discharge requirements and the type of spillway gates to be considered. A tabulation of reports and design memoranda prepared for the George W. Andrews Project follows:

3-03. Construction. Construction started in July 1959, under a contract awarded to Cook Construction Company for the excavation for the lock chamber. On 2 May 1960, the contract for construction of the lock and dam was awarded to Winston Brothers Company, Green Construction Company, and Tecon Corporation. Construction of the lock and dam began in late May 1960 (Figures 3-1, 3-2 and 3-3). Upon completion of the lock and dam in August 1963, the project was essentially completed at a cost of approximately $13 million.

Table 3-1 Design Memoranda

Letter Report - Report on Development of Chattahoochee River Between Upper Limits of Jim Woodruff Pool and Columbus, GA	November 29, 1952
Design Memorandum No. 1 - Determination of Site Location and Reservoir Level	May 7, 1954
Design Memorandum No. 2 - Geology and Foundation	October 15, 1953
Design Memorandum No. 3 (Revised May 1958); General Design	June 19, 1958
Design Memorandum No. 4 - Design of Spillway, Lock, Approach Channels and Access Road	July 3, 1958
Design Memorandum No. 5 - Real Estate Memorandum - Damsite and Access Road	October 27, 1958
Design Memorandum No. 6 - Real Estate Memorandum - (Reservoir)	February 13, 1961
Design Memorandum No. 8 - Appendix Power Wave Regulation, (Appendix Electric Computer Program)	March 11, 1960
Design Memorandum No. 8 - Power Wave Regulation	June 30, 1961
Design Memorandum No. 9 - Reservoir Clearing, Mosquito Control and Floatage Removal	March 9, 1962
Design Memorandum No. 10 - Relocation, Columbia Sewage System	March 31, 1961
Design Memorandum No. 12-A - Preliminary Master Plan	February 7, 1961
Design Memorandum No. 12-B (c-1) -Public Use and Administrative Facilities	March 23, 1962

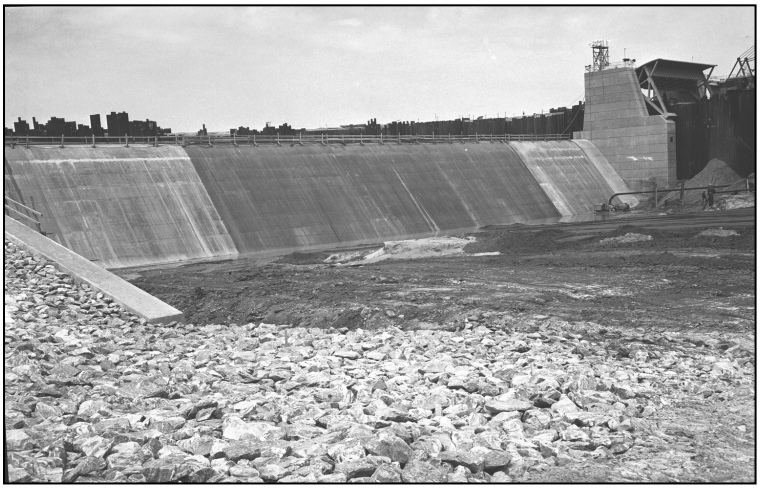

Figure 3-1. Dam Under Construction, Circa 1962-63

Figure 3-2. Gate Supports, Circa 1961-62

Figure 3-3. Foundation for Miter Gate, Circa 1961-62

3-04. Related Projects. George W. Andrews Lock and Dam is one of five Corps reservoir projects in the ACF Basin. Buford Dam, West Point Dam, and Walter F. George Lock and Dam are upstream, while Jim Woodruff Lock and Dam is downstream of the project. The Corps reservoirs on the Chattahoochee River are operated as a system to accomplish authorized functions as described in the *ACF Basin Master Water Control Manual (with Appendices)*. Outflows from George W. Andrews Dam are influenced by the Master Manual and requirements at other Corps projects. One function of the George W. Andrews Project is to reregulate peaking hydropower releases from the upstream Walter F. George powerhouse. The reregulation assists in the daily operations of Jim Woodruff Lock and Dam.

In addition, six privately owned dams are upstream on the Chattahoochee River in the vicinity of Columbus, Georgia, between Walter F. George Dam and West Point Dam. The privately owned reservoirs on the Chattahoochee River are primarily run-of-river projects containing very little storage capacity and, consequently, do not significantly influence flows in the river or the operation of the Corps projects. These projects reregulate the hydropower releases from West Point Dam in a manner similar to the way George W. Andrews Project re-regulates the hydropower discharges from Walter F. George Dam.

3-05. Modifications to Regulations. From the time the George W. Andrews Project became operational in 1963, changes in needs and conditions in the ACF Basin have led to modifications to the water control regulation of the project as described below:

a. Pre-Drawdown of Lake Andrews. In October 1967, the Mobile District conducted a test to investigate operating Lake Andrews at a constant elevation of 102 feet NGVD29. At this time, the regulation plan called for a pre-drawdown of Lake Andrews beginning 90 minutes prior to the start of the Walter F. George generation schedule. By comparing similar Walter F. George generation schedules with and without the pre-drawdown of Lake Andrews, it was observed that there was very little affect on river velocity and about a one foot difference in the tailwater elevation below Andrews Lock and Dam. At that time, it was determined that more tests needed to be conducted before making a recommendation to abandon the pre-drawdown at Andrews, however, some minor changes were made to hold the Andrews pool at elevation 101 feet NGVD29 during the later portion of the Walter F. George generation schedule. In the 1996 George A. Andrews' manual revision, pre-drawdown of Lake Andrews was abandoned. In

addition, the lake would now be operated at elevation 102.5 feet NGVD29 when there was no release scheduled from Walter F. George as long as head limits at the dam were not violated.

b. Revised Interim Operating Plan. The Revised Interim Operating Plan (RIOP) was implemented in June 2008 and modified in May 2012. The purpose of the RIOP was to support compliance with the Endangered Species Act of 1973 for Federally listed threatened and endangered species and their Federally designated critical habitat in the Apalachicola River and to avoid or minimize potential adverse effects associated with discretionary operations at Jim Woodruff Lock and Dam. The RIOP directly affected flows and fall rates in the Apalachicola River and prescribed the minimum flow releases to be made from Jim Woodruff Dam under specific hydrologic conditions. However, the releases made from Jim Woodruff Dam in accordance with the RIOP used the composite conservation storage of all the upstream reservoirs in the ACF System. The Corps operates five Federal reservoirs on the ACF as a system, and releases made from Jim Woodruff Dam under the RIOP reflected the downstream end-result for system wide operations measured by daily releases from Jim Woodruff Dam into the Apalachicola River. The RIOP did not describe operational specifics at any of the four Federal reservoirs upstream of Jim Woodruff Lock and Dam or other operational parameters at those reservoirs. Instead, the RIOP described the use of the composite conservation storage of the system and releases from the upstream reservoirs as necessary to assure that the releases made from Jim Woodruff Dam would comply with the Endangered Species Act of 1973 by minimizing effects on Federally listed threatened and endangered species and Federally designated critical habitat.

c. Settlement Flow Objectives. Settlement negotiations in the lawsuit challenging the 2017 updates to ACF Water Control Manuals resulted, after completion of the *Integrated Letter Report and Tiered Environmental Assessment (ILR/TEA) for the Operational Analysis and Targeted Water Control Plan Updates for the Apalachicola Chattahoochee Flint River Basin in Alabama, Florida, and Georgia* , in dismissal of the state of Alabama's lawsuit against USACE and option of the following Flow Objectives:

1. An objective to maintain a minimum average daily flow of 1,350 cfs over any 7- day period at the gage located on the Chattahoochee River at 14th, Street at Columbus, Georgia (Gage No. 02341460) when the ACF Basin is not in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual.

2. An objective to maintain a minimum average weekday flow of 2,000 cfs at the gage located on the Chattahoochee River near Columbia, Alabama (Gage No. 02343801) when the ACF Basin is not in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual.

3. An objective to maintain the minimum average flows at Columbus, Georgia and Columbia, Alabama, described in items (1) and (2) above, on two days each calendar week starting each Monday, when the ACF Basin is in "Drought Zone Operations" as that term is defined in the 2017 ACF Master Manual; and

4. An objective to maintain Lake Seminole at or above an elevation of 76 feet NVGD in the same manner and to the same extent as provided in the 2017 ACF Master Manual, and in particular the following paragraphs from Appendix A, the Water Control Manual for Jim Woodruff Lock and Dam and Lake Seminole: Chapter lll, paragraph 3-03; Chapter VII, paragraphs 7-03, 7-0S(a), 7-10, and 7-11; and Chapter VIII, Paragraph 8-11 b.

In order to meet the Flow Objectives at West Point, the discharges necessary to support maintaining a daily average flow of 1,350 cfs over any 7-day period (7-day forward moving average) at 14th, Street at Columbus, Georgia (Gage No. 02341460) and a minimum average weekday flow of 2,000 cfs on the Chattahoochee River near Columbia, AL (Gage No. 02313801) under normal conditions will be made. When Drought operations have been triggered, the flow target shifts to maintain the minimum average Flows of 1,350 cfs for at least two calendar days at Columbus, Georgia and 2,000 cfs for at least two calendar days at Columbia, Alabama, on two days each calendar week starting each Monday.

3-06. Principal Regulation Problems. The principal regulation problem at George W. Andrews Dam is the head limitation that, by design, must not exceed 25 feet. Special attention is required to prevent exceeding the head limitation during periods of low inflow, when the upstream Walter F. George power plant is shut down over weekends or other extended periods. When the George W. Andrews pool falls below elevation 102 feet NGVD29, the allowable structural head limitation increases to 26 feet. The operational constraints because of head limitations at George W. Andrews Dam and at Walter F. George Dam and Jim Woodruff Dam are described in detail in Chapter VII of this manual. These head limitations require a focused coordinated effort in the operation of the Jim Woodruff, George W. Andrews, and Walter F George projects, especially during low-flow conditions.

VII - WATER CONTROL PLAN

7-01. General Objectives. The original congressionally authorized purpose for the George W. Andrews Lock and Dam as contained in its authorizing legislation was navigation. Several other project purposes have been added at George W. Andrews through nationwide authorizing legislation. Those purposes are water quality, recreation, and fish and wildlife conservation and conservation of Federally listed threatened and endangered species and their critical habitat. The George W. Andrews spillway is operated to provide navigation depths upstream to Walter F. George Lock and Dam and to reregulate the outflow from peaking power operations at the Walter F. George powerhouse. The regulation plan seeks to meet the needs of all project purposes at the George W. Andrews Project.

7-02. Constraints. There are limiting conditions of headwater and tailwater elevations at George W. Andrews Dam and limitations on maximum head at Walter F. George Dam and Jim Woodruff Dam that could affect regulation of the George W. Andrews reservoir. Those conditions are discussed in the following paragraphs.

a. Limitation on Maximum Head at George W. Andrews Dam. The major operating constraint that must take precedent over all others is structural head limitations—the difference between the headwater and tailwater—which must not exceed 25.0 feet any time the pool is above 102 feet NGVD29. This head limitation increases to 26 feet NGVD29 any time the George W. Andrews pool is below the fixed crest spillway elevation of 102 feet NGVD29. Head limits should cause no difficulties during the recovery and stabilizing phases of normal peaking regulation, when tailwater elevations will still be fairly high from the large spillway discharges during the drawdown period. However, special attention will be required to prevent exceeding the head limitation during periods of low inflow, when the Walter F. George power plant is shut down over weekends or other extended periods.

b. Tailwater Elevations at Walter F. George Dam. The tailwater at Walter F. George Dam must not, at any time, be more than 88 feet below the headwater, so as not to exceed the project design-head limitation. In particular, the Walter F. George tailwater must not be allowed to fall below elevation 102 feet NGVD29 when the headwater is at or above the summer operating pool elevation of 190 feet NGVD29. A tailwater elevation at Walter F. George of 102 feet NGVD29 is also required to provide a controlling navigation depth of 9 feet (with normal maintenance dredging) in the upper reaches of Lake George W. Andrews. It is important that operators coordinate any drawdown of the George W. Andrews pool with releases through the Walter F. George powerhouse to prevent excessive lowering of the Walter F. George tailwater and thereby increasing the net head at Walter F. George above 88 feet and also impacting navigation between George W. Andrews and Walter F. George.

c. Maximum Drawdown and Recovery at George W. Andrews Dam. The headwater at George W. Andrews Dam will not be drawn down below elevation 96 feet NGVD29 and will not be allowed to recover above elevation 103 feet NGVD29 during reregulation of peaking power releases. The routine operations described on Exhibit C is designed to permit drawdown and recovery within those limits, but headwater elevations will be observed at frequent intervals during such operations, and gates will be adjusted the minimum amount necessary to avoid exceeding the drawdown and recovery limits.

d. Limitation on Maximum Head at Jim Woodruff Dam. A similar head limitation at the Jim Woodruff Project requires that fairly high outflows be maintained when that pool is at or above elevation 77 feet NGVD29. During periods of low inflow to the Jim Woodruff pool, that requirement results in a rather rapid drawdown and consequent reduction of the George W.

Andrews tailwater. To prevent excessive lowering of the George W. Andrews tailwater during such periods of low inflow, the Jim Woodruff pool should be filled to the highest practicable level before any extended shutdown at the Walter F. George power plant. If it is impossible to maintain the George W. Andrews tailwater at elevation 77 feet NGVD29 or higher by such means, limited operation of the Walter F. George power plant or equivalent spillway discharges may be required. Without such supporting inflows, operation of the George W. Andrews spillway to meet the head limitation will result in a temporary drawdown of the pool and below minimum navigation depths at Walter F. George. The operators at Walter F. George powerhouse must be notified when the Jim Woodruff pool is to be drawn down below elevation 77 feet NGVD29.

7-03. Overall Plan for Water Control. The George W. Andrews Project is a run-of-river project, meaning that it does not store inflows except to reregulate them over a short period. The purpose of the project is to reregulate flows downstream for navigation and to maintain a steady pool at Jim Woodruff. Because of that, the overall plan for the operation of George W. Andrews is not considered in the system operations of the other four Corps ACF Basin projects other than to maintain the pool and tailwater within acceptable limits for Walter F. George and Jim Woodruff as discussed above. The following paragraphs outline methods for regulating the pool under various conditions.

a. Operation during normal daily/weekend shutdowns of Walter F. George. During extended shutdown periods at the Walter F. George power plant, such as overnight and on weekends, the George W. Andrews pool will become nearly flat and stable at elevation 102 feet NGVD29. During such periods of shutdown, the George W. Andrews spillway gates will normally be adjusted only as required to compensate for changes in local inflow while maintaining the static-full-pool elevation.

(1) For normal daily peaking operation at the Walter F. George powerhouse, the George W. Andrews gate setting required for reregulation will be determined by the existing George W. Andrews flow conditions, the scheduled amount of generation, and the number of generating units available at Walter F. George. The gates will be opened in step increments as shown in Plates 2-5 and 2-6 at the rate of one step each six minutes. When the required setting has been attained, the gates will be held in that position, except for any necessary minor adjustments as described below, while the headwater drops to its lowest point and then recovers to the full-pool elevation.

(2) The George W. Andrews headwater will not be drawn down below elevation 96 feet NGVD29 and will not be allowed to rise above elevation 103 feet NGVD29 during operation for reregulation of peaking power releases. Changes in the prescribed gate settings might be required to prevent exceeding those limitations.

(3) After the minimum elevation has been reached and the pool begins to recover, the gates will be adjusted to allow the pool to gradually recover to about elevation 101 feet NGVD29. The pool will then be held near elevation 101 feet NGVD29 as long as generation is continuing at Walter F. George powerhouse. When generation ceases, the gates at George W. Andrews will be adjusted the minimum amount necessary to bring the pool level up to 102 feet NGVD29. After recovery to that elevation, the headwater could continue to rise for a time and should peak between elevations 102 and 103 feet NGVD29. Gates will be opened additional steps, if required, to prevent the pool elevation from exceeding 103 feet NGVD29. After the pool has peaked on recovery and drops to elevation 102.5 feet NGVD29, gates will be closed in one-step increments, in reverse order from opening, to slow the rate of fall and stabilize the pool

near elevation 102 feet NVGD. As long as pool elevation is 102.5 feet NGVD29 or greater, all gates will be opened a minimum of one-half foot.

b. Andrews Operation with No Release at Walter F. George Powerhouse. The George W. Andrews spillway will be operated to maintain navigation depths throughout the reservoir as long as such operation is consistent with the 25-foot limitation on headwater-tailwater differential. For navigation purposes, the static full pool has been established as elevation 102 feet NGVD29. During extended periods of shutdown at the Walter F. George powerhouse, the George W. Andrews spillway gates will be operated to pass the inflow and hold the pool at that elevation, with all gate settings made in accordance with the gate operating schedule, Plates 2-5 and 2-6. If the Jim Woodruff pool is below elevation 77 feet NGVD29 and the local inflow to George W. Andrews Dam is small, it might become necessary to raise the tailwater by increasing the gate openings to avoid exceeding the 25-foot head limitation. That will result in a drawdown below elevation 102 feet NGVD29 in the George W. Andrews pool. When such a drawdown is required, the power project superintendent or operator in charge at Walter F. George powerhouse will evaluate the situation and decide if emergency releases from the power plant or spillway at Walter F. George are necessary. The extent to which the George W. Andrews pool can be drawn down will depend on channel conditions, traffic on the waterway, and the expected generation schedules. The powerhouse operator will immediately notify the Mobile District when it is decided that emergency releases from Walter F. George reservoir will be required to prevent an excessive drawdown of the George W. Andrews pool.

c. Andrews Operation to Re-regulate Power Releases from Walter F. George Powerhouse. When the Walter F. George powerhouse is used for peaking generation, the George W. Andrews reservoir will follow Exhibit C. The gates will be operated in accordance with the instructions, and in the order of gate openings shown in Plates 2-5 and 2-6. When generation is scheduled with a shutdown period of four hours or longer during the day, each generation period will be treated as a separate operation. The gates will then be adjusted at the rate of four gate steps each 20 minutes until the desired gate setting is achieved. When the required gate setting has been achieved, the gates will be left in that position as the George W. Andrews headwater drops to its lowest elevation and then begins recovery, except that gates will be closed the minimum amount necessary to prevent a drawdown below elevation 96 feet NGVD29 if such drawdown appears likely to occur. When the George W. Andrews pool begins to rise above the maximum drawdown, the gates will remain in the last drawdown setting until the pool recovers to between elevations 100.0 and 101.0 feet NGVD29. The gates will then be adjusted in accordance with instructions in Plates 2-5 and 2-6 to hold the pool near elevation 101.0 feet NGVD29 until generation is scheduled to cease at Walter F. George. The gates will then be operated to raise the pool level to elevation 102.0 feet NGVD29. During and after recovery, the spillway gates at George W. Andrews will be operated to prevent the pool level from exceeding elevation 103.0 feet NGVD29 by checking the pool as often as necessary.

7-04. Standing Instructions to Damtender. Exhibit C contains general instructions for operation of the George W. Andrews reservoir. The instructions when used in conjunction with the gate operating schedule shown on Plates 2-5 and 2-6 should be sufficient for practically any conditions encountered. They will be followed at all times unless the Mobile District issues special instructions.

If sustained failure of communications occurs between Walter F. George and George W. Andrews, personnel at George W. Andrews will operate the spillway gates, and the Mobile District will be notified for further operating instructions. If such contact is also impossible, the operators will maintain the pool at elevation 102.0 feet NGVD29 until communication is reestablished. If flood flow should occur during a communications failure, the spillway gates will

be operated in accordance with instructions in Case III of Exhibit C. All changes in gate setting will be made in one-step increments, or less, in the order shown on the gate operating schedule, Plates 2-5 and 2-6.

7-05. Flood Risk Management. When the inflow to the full Walter F. George pool increases to 25,000 cfs or more, the power plant will be operated continuously, and when the inflow exceeds full plant capacity (about 30,000 cfs), the power releases will be supplemented by spillway discharges. Under those conditions, the George W. Andrews spillway will be operated to pass the inflow, with the headwater not exceeding elevation 102 feet NGVD29, until all gates are opened clear. The discharge with pool elevation 102 feet NGVD29 and all gates open will be approximately 43,600 cfs, and the tailwater elevation will be about 100 feet NGVD29 feet. For flows greater than 43,600 cfs, the pool elevation will rise with increase in flow. The gates will remain in the full-open position until the headwater crests and then recedes to elevation 102.5 feet NGVD29, after which the gates will be operated to slow the rate of fall and stabilize the pool at elevation 102 feet NGVD29 until peaking operations are resumed at the powerhouse. Headwater and tailwater rating curves for headwater elevations above 103 NGVD29 and tailwater elevations above 102 NGVD29 are shown in Plate 2-8. The tailwater rating curve for elevations below 102 NGVD29 are shown on plate 2-9.

Operation during flood conditions or continuous generation at Walter F. George Powerhouse. During periods of continuous generation at Walter F. George powerhouse, the George W. Andrews pool will be maintained between elevations 100.0 and 101.0 feet NGVD29 until generation has been cancelled. The pool level will then be raised to elevation 102.0 feet NGVD29 as quickly as practicable. When flood flows at George W. Andrews exceeds the gated spillway capacity at normal operating levels, the spillway gates will remain fully open as the pool level rises with increasing inflow. After the pool level has peaked, the gates will remain fully open until the pool level recedes to an elevation about one-half foot above the operating level (102.0 feet NGVD29 if not generating at Walter F. George, 100.0 to 101.0 feet NGVD29 if generating continuously). The gates will then be adjusted as rapidly as necessary to maintain the pool level as near that operating level as practicable.

7-06. Recreation. Most recreational activities at Lake George W. Andrews occur during the summer months. Because George W. Andrews operates to maintain a generally stable pool, access to recreational areas such as swimming beaches and boat ramps are generally not limited. Other recreational opportunities at George W. Andrews are hiking trails, picnic areas, a fishing deck, and camping.

The resource manager will be responsible for contacting various lakeshore interests and keeping the public informed of lake conditions during drawdown periods. The resource manager will close beaches and boat ramps as necessary, patrol the lake, mark hazards, and perform other necessary tasks to mitigate the effects of low lake levels.

7-07. Water Quality. Water control regulation of the ACF projects is not performed to meet specific water quality standards. However, specific minimum releases and other incidental releases are made that provide benefits to water quality in the basin and support the USACE goal of supporting and sustaining water quality. Mobile District operates a water quality monitor in the headwaters above the George W. Andrews Dam, which measures dissolved oxygen, temperature, pH, and conductivity. The data collected from the monitoring system can be used to evaluate any future water quality management plan.

7-08. Fish and Wildlife. Operations for fish and wildlife do not supersede the normal operating procedures of maintaining the pool within the top of conservation.

Game fish in Lake George W. Andrews include largemouth bass, white bass, hybrids, crappie, channel catfish and bream. Alabama and Georgia have a reciprocal agreement concerning fishing licenses, with each State accepting the use of a current license from either state on the lake. The Corps and the Georgia Department of Natural Resources have maintained a series of fish attractors in Georgia waters for better fishing.

7-09. Water Supply. No major users of water are at the George W. Andrews pool. The City of Columbia, Alabama, has a wastewater return on the George W. Andrews pool.

Two major industries withdraw water for plant process purposes and discharge wastewater back into the Chattahoochee River just downstream of the George W. Andrews Dam (headwaters of Lake Seminole). The Georgia Pacific Corporation Plant is on the Chattahoochee River near Cedar Springs, in Early County, Georgia, below the George W. Andrews Dam. The plant uses six pumps with an intake elevation of 72.67 feet NGVD29. Pumping capacity is reduced at pool elevations below 75 feet NGVD29. The GAEPD permit specifies a daily maximum withdrawal of 144 million gallons per day (mgd), with a monthly average of 115 mgd. The wastewater discharge from this plant is approximately 72 mgd. The Farley Nuclear Power Plant is on the west bank of the Chattahoochee River near Columbia, Houston County, Alabama, below George W. Andrews Dam. The Alabama Department of Environmental Management permit specifies a withdrawal of 105.36 mgd for the Farley Plant. The plant becomes severely affected when the pool elevation at Lake Seminole drops below elevation 75.0 feet NGVD29. Southern Nuclear defines a flow 2,000 cfs and an elevation 74.5 feet NGVD29 as minimum conditions for long-term operation of the Farley Plant. The Farley Plant can and has historically operated for short periods with flows below 2,000 cfs. Extended operation of flows lower than 2,000 cfs and a river elevation below 74.5 feet NGVD29 would require evaluation to determine the potential environmental and operations impacts.

7-10. Hydroelectric Power. No hydroelectric power facilities are at George W. Andrews Lock and Dam.

7-11. Navigation. No storage is provided in the George W. Andrews pool for navigation; however, because navigation is one of the purposes of the project, it is discussed in detail in Paragraph 7-03, *Overall Plan for Water Control*, earlier in this chapter.

7-12. Drought Contingency Plans. No storage is provided in the George W. Andrews pool for regulating releases during periods of low inflow. The regulation plan will tend to smooth out peaking releases from the Walter F. George powerhouse and give a lower George W. Andrews outflow of somewhat longer duration than would occur with constant-pool operation. During extended periods of powerhouse shutdown or low-capacity generation, the George W. Andrews spillway will be operated to pass the inflow, with pool held constant at elevation 102 feet NGVD29. Any regulating releases from upstream projects will thus be expedited through the George W. Andrews pool.

7-13. Flood Emergency Action Plans. The Corps is responsible for developing Flood Emergency Action Plans for the ACF System, in accordance with ER 1110-2-1156, *Engineering and Design Safety of Dams – Policy and Procedures*, 31 March 2014. The George W. Andrews Project Emergency Action Plan, undated, is a stand-alone document maintained in hard copy in the MDO and on site in the lock control station, in Eufaula, Alabama, and electronic copies are maintained on the site Local Area Network. Example data available in the Emergency Action Plan are dam incident assessment, emergency contact information, flood inundation information, management responsibilities and response, and procedures for use of the plan.

7-14. Other. Other considerations, in addition to the authorized project purposes, may be accommodated on an as needed basis. Adjustments are made to system regulation at times for downstream construction, to aid in rescue or recovery from drowning accidents, environmental studies, or cultural resource investigations.

a. Operation for Passing Drift. Occasional operation of the spillway gates will be required for passing accumulations of drift. Instructions and limitations for that type of operation are described in the *Operation and Maintenance Manual* for the George W. Andrews Project. Because the permissible gate openings increase with tailwater elevations, such an operation will usually be performed during the reregulation of peaking power releases. Such manipulation of gates within the prescribed limits should not materially affect the drawdown or recovery operation.

b. Correlation with Other Projects. The correlation of operations at the George W. Andrews and Walter F. George Projects has been described in Paragraph 7-03, "Overall Plan for Water Control". Operation of the George W. Andrews spillway will also be correlated with the operation of Jim Woodruff reservoir to the extent that the latter affects tailwater elevations at George W. Andrews Dam during periods of low inflow. The George W. Andrews spillway must always be operated in such manner that the difference between headwater and tailwater elevations does not exceed 25 feet when the George W. Andrews pool elevation is above 102 feet NGVD29 and 26 feet when it is below 102 feet NGVD29. Because that condition is most likely to occur with a low tailwater elevation, the operators at Walter F. George will always be notified when the Jim Woodruff pool is to be drawn down below elevation 77.

c. High Water Action Plan. During periods of high inflow when the pool is expected to exceed its top of conservation, certain actions are taken by the project staff to prepare areas around the project for rising pool levels and to ensure public safety. In the event abnormally high releases (usually exceeding Walter F. George turbine capacity) are forecast to be made from the project, the project staff will also notify the downstream interests of potential flooding as a result of operations at the dam. Critical elevations and releases are discussed in detail in the High Water Action Plan provided in Exhibit E.

d. Settlement Flow Objectives. For the purpose of meeting the requirements of the Settlement Flow Objectives, discharges from George Andrews will be made to support maintaining a minimum average weekday flow of 2,000 cfs on the Chattahoochee River near Columbia, Georgia (Gage No. 02343801) when the ACF basin is not in Drought Zone Operations. When the ACF basin enters Drought Zone Operations, two days each calendar week starting each Monday, releases from George Andrews, will be made to maintain the 2,000 cfs daily average flow as measured by the downstream gage at Columbia, Alabama (Gage No. 02343801).

7-15. Deviation from Normal Regulation. Water management inherently involves adapting to unforeseen conditions. The development of water control criteria for the management of water resource systems is carried out throughout all phases of a water control project. The water control criteria are based on sound engineering practice utilizing the latest approved models and techniques for all foreseeable conditions. There may be further refinements or enhancements of the water control procedures, in order to account for changed conditions resulting from unforeseen conditions, new requirements, additional data, or changed social or economic goals. However, it is necessary to define the water control plan in precise terms at a particular time in order to assure carrying out the intended functional commitments in accordance with the authorizing documents (EM 1110-2-3600 Management of Water Control Systems). Adverse

impacts of the water control plan may occur due to unforeseen conditions. When this occurs, actions will be taken within applicable authority, policies, and coordination to address these conditions when they occur through the implementation of temporary deviations to the water control plan, such as interim operation plans. Such deviations may require additional environmental compliance prior to implementation.

The Corps is occasionally requested to deviate from the water control plan. Prior approval for a deviation is required from the Division Commander except as noted in subparagraph a. deviation requests usually fall into the following categories:

a. Emergencies. Examples of some emergencies that can be expected to occur at a project are drowning and other accidents, failure of the operation facilities, chemical spills, treatment plant failures, and other temporary pollution problems. Water control actions necessary to abate the problem are taken immediately unless such action would create equal or worse conditions. The Mobile District will notify the division office as soon as practicable.

b. Unplanned Deviations. Unplanned instances can create a temporary need for deviations from the normal regulation plan. Unplanned deviations may be classified as either major or minor but do not fall into the category of emergency deviations. Construction accounts for many of the minor deviations and typical examples include utility stream crossings, bridge work, and major construction contracts. Minor deviations can also be necessary to carry out maintenance and inspection of facilities. The possibility of the need for a major deviation mostly occurs during extreme flood events. Requests for changes in release rates generally involve periods ranging from a few hours to a few days, with each request being analyzed on its own merits. In evaluating the proposed deviation, consideration must be given to impacts on project and system purposes, upstream watershed conditions, potential flood threat, project condition, and alternative measures that can be taken. Approval for unplanned deviations, either major or minor, will be obtained from the division office by telephone or electronic mail prior to implementation.

c. Planned Deviations. Each condition should be analyzed on its merits. Sufficient data on flood potential, lake and watershed conditions, possible alternative measures, benefits to be expected, and probable effects on other authorized and useful purposes, together with the district recommendation, will be presented by letter or electronic mail to the division for review and approval.

7-16. Rate of Release Change. There are no restrictions on releases from George W. Andrews during normal operations. There are restrictions on the rate of change below Jim Woodruff that could require releases from George W. Andrews. During high flows, it is desirable to uniformly lower discharge downstream as allowable by conditions and equipment to lessen the impacts of the erosive nature of high flows.

EXHIBIT C

STANDING INSTRUCTIONS TO THE DAMTENDERS FOR WATER CONTROL

GEORGE W. ANDREWS LOCK AND DAM

GENERAL INSTRUCTIONS FOR OPERATION OF GATED SPILLWAY

(See Plates 2-5 and 2-6)

CASE I – NO RELEASE AT WALTER F. GEORGE:

A. ANDREWS TAILWATER ABOVE 77.5. The Andrews locktender will open or close gates as necessary to maintain the upper pool as near elevation 102.5 as practicable. However, whenever the pool is above 102.5 the minimum gate opening will be step 4.

B. ANDREWS TAILWATER BELOW 77.5. When the Andrews tailwater is lower than elevation 77.5 the locktender will raise or lower gates to maintain a difference between pool and tailwater of 25 feet when the Andrews pool elevation is above 102 feet NGVD29. This maximum difference increases to 26 feet when the Andrews pool is below 102 feet NGVD29. The locktender will notify the power project operator at Walter F. George that a head-water difference operation has begun.

C. MINIMUM GATE STEP. In either case above the minimum gate opening will be step 1 (one gate at .5 foot opening).

CASE II – WITH PEAKING OPERATIONS AT WALTER F. GEORGE POWERHOUSE:

A. INITIAL OPENINGS. There will be no pre-drawdown of the Andrews pool level. The locktender will begin opening spillway gates at the same time that generation starts at Walter F. George Powerhouse. At the time that generation begins, the Andrews locktender will open gates to gate step 4 (all gates open .5 feet). After the initial opening, the locktender will open spillway gates 4 gate steps every 20 minutes until the target gate step in paragraph II-B. below is reached.

B. TARGET OPENINGS. The initial target opening will depend upon the maximum number of turbines which will be releasing water during scheduled generation at W.F. George.

1 unit	2 units	3 units	4 units
Step 8	step 16	step 20	step 24

C. MINIMUM GATE POOL. The opening sequence in II-A and II-B above should lower the Andrews pool down from 102 to between 101 to 99.0 before the arrival of flow from W. F. George. However, in no case should the pool be lowered below 96.0 without first consulting the Mobile District.

D. GATE ADJUSTMENTS DURING INFLOW. As the inflow from W. F. George begins to raise the Andrews pool, additional gates will be opened (or closed) as necessary to maintain the pool between 100, and 101. In general, the gates should be opened or closed no more than 2 steps every 20 minutes.

E. GATE ADJUSTMENTS AFTER W.F. GEORGE SHUTDOWN. At the end of the George generation schedule, the gates at Andrews will be gradually closed at a rate not exceeding closing two gate steps every 20 minutes above gate step 24 and not exceeding four gate steps

every 20 minutes below step 24. Gates will be closed to allow the pool to rise to an elevation between 102 and 103. However, whenever the pool is above 102.5, the minimum gate opening will be step 4 (4 gates open .5 feet).

F. UNUSUAL CONDITIONS. (Opening gates) Gates may be opened more rapidly than described in paragraphs II-A, II-B, and II-D to prevent the pool rising above elevation 103. (Closing gates) The locktender may close gates more rapidly than two steps every 20 minutes in the case of downstream emergencies or in the case of unexpected or unforeseen shutdown of Walter F. George generation. In any such case the gates will be closed no more than to the minimum gate step for the current pool elevation at Andrews as discussed in both Case I and Case II of this exhibit.

CASE III – FLOOD CONDITIONS AND/OR CONTINUOUS GENERATION AT WALTER F. GEORGE POWERHOUSE:

During periods of continuous generation at Walter F. George powerhouse, the George W. Andrews pool will be maintained between elevations 100.0 and 101.0 feet NGVD29 until generation has been cancelled. The pool level will then be raised to elevation 102.0 feet NGVD29 as quickly as practicable. When flood flows at George W. Andrews exceeds the spillway capacity at normal operating levels, the spillway gates will remain fully open as the pool level rises with increasing inflow. After the pool level has peaked, the gates will remain fully open until the pool level recedes to an elevation about one-half foot above the operating level (102.0 feet NGVD29 if not generating at Walter F. George, 100.0 to 101.0 feet NGVD29 if generating continuously). The gates will then be adjusted as rapidly as necessary to maintain the pool level as near that operating level as practicable. At a discharge of greater than about 40,000 cfs, maintaining the pool within these elevations will not be possible and there is no restriction on the rate of opening or closing gates under flood conditions.

CASE IV – SETTLEMENT FLOW OBJECTIVES:

For the purpose of meeting the requirements of the Settlement Flow Objectives, discharges from George Andrews will be made to support maintaining a minimum average weekday flow of 2,000 cfs on the Chattahoochee River near Columbia, Georgia (Gage No. 02343801) when the ACF basin is not in Drought Zone Operations. When the ACF basin enters Drought Zone Operations, two days each calendar week starting each Monday, releases from George Andrews, will be made to maintain the 2,000 cfs daily average flow as measured by the downstream gage at Columbia, Alabama (Gage No. 02343801). In the need of clarification, the locktender will contact the Water Management Section for specific guidance.

CASE V – EMERGENCIES:

In the case of vessel groundings, spills, or other emergencies, the locktender will contact the Water Management Section for specific guidance.