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U.S. ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
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CENAD-RBT

MAY 24 2016

MEMORANDUM FOR Commander, Norfolk District, (CENAO-EC/Mr. Reece), Fort Norfolk 803 Front Street, Norfolk, VA 23510-1096

SUBJECT: Approval of the Review Plan for Revisions to Reservoir Regulation Manual, Gathright Dam and Lake Moomaw, Virginia

1. References:

- a. Memorandum, CENAO-EC, 29 March 2015, subject: as above;
- b. Memorandum, CECW-CE, 2 July 2013, subject: Policy Guidance Letter – Peer Review of Updates to Water Control Manuals;
- c. CENAO Final Environmental Assessment, April 2014, subject: Gathright Dam Low Flow Augmentation Project, Alleghany County, Virginia;
- d. CENAO Finding of No Significant Impact (FONSI), 8 May 2013, subject: Gathright Dam Low Flow Augmentation Project, Alleghany County, Virginia;
- e. EC 1165-2-214, Water Resources Policies and Authorities – Civil Works Review, 15 December 2012;
- f. ER 1110-2-240, Water Control Management, dated 8 October 1982.

2. The Review Plan (Encl) for revision of the water control plan and manual for Gathright Dam and Lake Moomaw was prepared in accordance with References 1e and 1f.

3. The North Atlantic Division Engineering and Construction Division is the Review Management Organization for the Agency Technical Review.

4. The Review Plan for Gathright Dam and Lake Moomaw is approved. The Review Plan is subject to change as circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution require new written approval from this office.

5. In accordance with Reference 1e, Appendix B, Paragraph 6, post this approved Review Plan on your district website for public review and comment. Also the review plan will be posted on the Division website.

CENAD-RBT

SUBJECT: Approval of the Review Plan for Revisions to Reservoir Regulation Manual,
Gathright Dam and Lake Moomaw, Virginia

6. The point of contact is Mr. Ralph LaMoglia, PE, 347-370-4599 or
ralph.a.lamoglia@usace.army.mil.

Encl

A handwritten signature in black ink, appearing to read "W. H. Graham", with a long horizontal flourish extending to the right.

WILLIAM H. GRAHAM
Brigadier General, USA
Commanding

CF: (w/ Encl)
CECW-NAD-RIT (M. Voich)
CENAO-EC (Mr. O. Reece)

REVIEW PLAN

Revisions to Reservoir Regulation Manual

Gathright Dam and Lake Moomaw Alleghany County, Virginia

Norfolk District U.S. Army Corps of Engineers

MSC Approval Date: 24 May 2016

Last Revision Date: _____



US Army Corps
of Engineers ®

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GATHRIGHT DAM AND LAKE MOOMAW

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REVIEW PLAN

GATHRIGHT DAM AND LAKE MOOMAW REVISIONS TO RESERVOIR REGULATION MANUAL

1. PURPOSE OF DOCUMENT.

a. Purpose. The purpose of this Review Plan is to define the scope and level of peer review for updates and revisions to the existing Gathright Dam and Lake Moomaw Reservoir Regulation Manual.

b. Requirements. Engineering Circular (EC) 1165-2-214, Water Resource Policies and Authorities - Civil Works Review, describes an accountable, comprehensive, life-cycle review strategy for Civil Works products. It establishes a seamless process for reviewing all projects progressing through the planning, design, and construction phases as well as through the operation, maintenance, repair, replacement and rehabilitation (OMRR&R) phases. The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review.

Engineering Regulation (ER) 1110-2-240, Water Control Management, requires that all reservoirs, locks and dams, re-regulation and major control structures, and inter-related water resources systems have up-to-date regulation manuals. The water control plans contained in these manuals must be prepared with appropriate consideration given to all applicable Congressional Acts relating to operation of Federal facilities, i.e., Fish and Wildlife Coordination Act, National Environmental Policy Act, the Clean Water Act, etc. Recent litigation, court decisions, and U.S. Army Corps of Engineers (USACE) Office of Counsel opinions have determined that reservoir regulation manuals have the force of law.

Reservoir regulation manuals are therefore considered to be documents that require compliance with EC 1165-2-214. Guidance on the content and format of reservoir regulation manuals is also contained in ER 1110-2-8156, Preparation of Water Control Manuals, with additional guidance in Engineering Manual (EM) 1110-2-3600, Management of Water Control Systems. Information on water control plan development can also be found in ER 1105-2-100, Planning Guidance Notebook, and in ER 1165-2-119, Modifications to Completed Projects.

c. References.

- EC 1165-2-214, Water Resources Policies and Authorities, Civil Works Review, 15 December 2012.
- EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011.
- ER 1110-2-12, Quality Management, 30 Sep 2006.
- ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007.
- ER 1110-2-240, Water Control Management, 8 October 1982.

- ER 1110-2-8156, Preparation of Water Control Manuals, 31 August 1995.
- EM 1110-2-3600, Management of Water Control Systems, 30 November 1987.
- ER 1165-2-119, Modifications to Completed Projects, 20 September 1982.

2. REVIEW MANAGEMENT ORGANIZATION.

The Project Delivery Team (PDT) within the Norfolk District, Corps of Engineers (CENAO) has prepared this Review Plan. This Review Plan addresses the updates and revisions to the Gathright Dam and Lake Moomaw Reservoir Regulation Manual in accordance with the requirements of EC 1165-2-214. The North Atlantic Division, Corps of Engineers (CENAD) is the Review Management Organization (RMO) for this effort and is responsible for managing the overall peer review described herein, to include approving this Review Plan and managing the ATR. Once approved, CENAO will post the Review Plan on its public website.

3. BACKGROUND INFORMATION.

a. Reservoir Regulation Manual. CENAO will prepare updates and revisions to the Gathright Dam and Lake Moomaw Reservoir Regulation Manual in accordance with ER 1110-2-240, ER 1110-2-8156, and EM 1110-2-3600. Assuming satisfactory completion of the DQC and ATR reviews, CENAD is the approving authority for this document. An IEPR is not considered to be necessary for this document for reasons described later in Section 6.

b. Project Description. Gathright Dam and Lake Moomaw is a multiple purpose reservoir project constructed by the U.S. Army Corps of Engineers (USACE). The reservoir is located on the Jackson River about nineteen miles upstream of the city of Covington in Alleghany County, VA. The dam is 257 feet high and controls runoff from 345 square miles. The Jackson River combines with the Cowpasture River to form the James River 43 miles downstream of the project. The James River Basin is the largest river basin in the Commonwealth of Virginia flowing from the Alleghany Highlands through the Blue Ridge Mountains down to Richmond Virginia encompassing a drainage area of 6,798 square miles. Gathright Dam and Lake Moomaw contains about 79,930 acre-feet of flood control storage and about 60,747 acre-feet of conservation storage.

The original project was completed in 1979 to serve the Congressionally authorized purposes of flood risk management, low flow augmentation and recreation. Since completion, the project has prevented an estimated \$328 million in flood damages (through FY 2015). Most of the recreation facilities were turned over to the U. S. Forest Service for operation and maintenance prior to the reservoir being filled.

c. Need for Revisions to Reservoir Regulation Manual. The reservoir regulation manual for Gathright Dam and Lake Moomaw was prepared in 1984 by CENAO. Revisions to the latest version are needed for several reasons:

- To update the format and style of the existing manual to meet current guidelines and regulations.
- To update various charts and plots to reflect operational experience.
- To update descriptions of data acquisition, processing, and dissemination methods to reflect current technology.
- To update contact and communication information.
- To revise the Low Flow Augmentation Flow Requirements to reflect changes requested by the Commonwealth of Virginia to improve downstream aquatic habitat and water quality (i.e., to modify the water control plan).

This last item was a result of lengthy process of study and investigation conducted in partnership with the Commonwealth of Virginia. Initially, this was conducted as a Section 216 Study and reached the stage of conducting the Feasibility Scoping Meeting with CENAD. It was subsequently determined to complete the investigations including NEPA documentation with Operations and Maintenance funding.

The main objective of this effort was to investigate the potential to utilize a series for short pulse releases to improve the aquatic habitat and water quality of the Lower Jackson River from Covington to the mouth. Important findings of these efforts were the following: (1) Short Pulse Releases are effective at scouring periphyton (algae) in the lower Jackson River thereby restoring a more natural aquatic environment and (2) The storage required for the Pulse Releases could be balanced by relatively minor reductions in the existing Low Flow Augmentation Requirements resulting in no net change in the existing authorized conservation storage and no encroachment into the flood control storage.

As part of the Section 216 Study extensive modeling both within the reservoir and downstream of the dam to the mouth of the Jackson River was accomplished. Additionally single test pulses were conducted in 2010, 2011 and 2012. Subsequent to the termination of the Section 216 Study, the Commonwealth of Virginia requested, and CENAD approved, a temporary deviation to implement the revised plan for an entire season in 2013, 2014 and 2015. It is important to note that there would be no change to the flood operations or to the Drought Contingency Plan.

d. Factors Affecting Scope and Level of Review. The effects and consequences of the proposed change to the Low Flow Augmentation operations were initially investigated in the Section 216 Study utilizing the CEQUAL-W2 model for the reservoir and the EPA WASP7 model for the Jackson River downstream of the project. Both models were calibrated with historic water quality data provided by CENAO and the resource agencies of the Commonwealth of Virginia. The conducting of single test pulses in 2010, 2011, and 2012 also allowed for field data to be obtained confirming the feasibility of implementing this change. The findings were coordinated with Federal, state, & local resource agencies and the public. Generally, respondents expressed strong support for the proposed adjustment. A final Environmental Assessment (EA) was published in April 2013 and a Finding of No Significant Impact (FONSI) was released in May 2013. A Record of Environmental Consideration (REC) was prepared, coordinated with agencies and signed in July 2014. The purpose of the REC was to allow additional flexibility to develop the Low Flow Augmentation Requirements and Pulse Flows within the boundaries established in the EA. The temporary deviations, 2013 through 2015, produced environmental improvements.

With these analyses and documents as background, there are two types of changes anticipated within the revised Gathright Dam and Lake Moomaw Reservoir Regulation Manual. The first type of change involves routine updates necessitated by continually evolving conditions. These routine updates will cover items such as: contacts (to revise names, phone numbers and email addresses); document format (to conform to recent guidance); charts/plots/tables (to reflect hydrologic data and operational data since the original reservoir regulation manual was approved); and data acquisition/processing/dissemination methods (to reflect recent improvements in data management technology).

The second type of change involves the revision of the Low Flow Augmentation Requirements and the Implementation of short Pulse Releases. The reductions, in minimum low flow augmentation requirements, would range between 9 and 13 percent and the peak pulse flows would range from 3,000 to 4,000 cfs. It is important to note that the revisions to the Low Flow Augmentation Requirements will: (1) require no additional outlay of Federal or non-federal funds; (2) involve no physical changes or new construction; and (3) maintain the existing storage allocation among flood control storage and conservation storage.

Updates and revisions to the Gathright Dam and Lake Moomaw Reservoir Regulation Manual are not expected to be challenging or controversial. There are minimal risks associated with these changes. It is expected that the aquatic habitat and water quality improvements found during the Temporary Deviations would be continued. The pulse releases will be scheduled and published in the late spring allowing for river users to be well informed. Additionally the individual pulses are also publicized prior to the event minimizing any threats to human life/safety associated with the changes. Operational experience gained in the three years of Temporary Deviations supports this conclusion. The reservoir elevations in Lake Moomaw will be slightly higher under these changes through the primary recreational season, up to 1.5 feet, and will be equal to the existing water control plan on November 1st of each year.

e. Cost and Schedule. A cost estimate and preliminary schedule have been prepared for tasks associated with updating and revising the Gathright Dam and Lake Moomaw Reservoir Regulation Manual. The estimated cost of the entire effort is \$117,100 (including reviews), and the estimated duration is 16 months (assuming a 1 March 2016 start date and a 30 June 2017 completion date, with NAD approval by 31 May 2017). Attachment 1 displays the preliminary schedule, major tasks, and estimated costs.

4. DISTRICT QUALITY CONTROL/QUALITY ASSURANCE.

a. Purpose. The purpose of DQC is to perform an internal review of basic science and engineering work products in the revised Gathright Dam and Lake Moomaw Reservoir Regulation Manual, with a focus on fulfilling project quality requirements. Per guidance contained in EC 1165-2-214, all such documents shall undergo DQC.

b. Process. CENAO shall manage the DQC process. The DQC shall be conducted by in-house staff of reviewers not directly involved in the revisions to the reservoir regulation manual. DQC activities shall be documented using DrChecks review software to record all DQC comments, responses, and associated resolutions accomplished throughout the review process. The DrChecks report containing

the comments, responses, and resolutions will be provided to the ATR team along with a DQC certification.

5. AGENCY TECHNICAL REVIEW.

a. Purpose. The purpose of an ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR assesses whether the analyses are technically correct and comply with published USACE guidance. The ATR also assures that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. A preliminary draft scope of work or “Charge” to the ATR team is included as Attachment 2.

b. Process. The ATR process will be managed within USACE by the designated RMO and will be conducted by a qualified team from outside the home district. The ATR team shall be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team leader will be from outside of CENAD. The ATR shall be conducted according to guidelines set forth in this Review Plan and the Charge (Attachment 2). Certification of the ATR will be required before the CENAO Commander transmits the final Gathright Dam and Lake Moomaw Reservoir Regulation Manual to CENAD for approval.

c. ATR Team Expertise. A minimum of two ATR team members will be required for the review of the Gathright Dam and Lake Moomaw Water Control Manual. These team members shall have technical knowledge and expertise in the disciplines listed in the table below. Preferably, the ATR team leader will have extensive experience in water management at USACE reservoirs. The ATR team leader will use the “ATR Lead Checklist” and “ATR Charge Template” developed by the National Planning Centers of Expertise as resources when conducting the review.

ATR Team Members/Disciplines	Expertise Required
ATR Team Leader	The ATR team leader shall be a senior professional, preferably with experience in making water management decisions, in developing water control manuals, in preparing reservoir regulation manuals, and in conducting ATR's. The team leader shall also have the skills and experience necessary to lead a virtual team through the ATR process. Typically, the ATR team leader shall also serve as a reviewer for a specific discipline (such as planning, hydraulics/hydrology, water management, economics, environmental resources, etc). The ATR team leader must be from outside CENAD.
Water Management	This reviewer shall be an expert in the field of water management, with a particular emphasis on daily operations at USACE multi-purpose reservoirs. This expertise shall include a thorough understanding of hydrology and hydraulics as it pertains to reservoir systems, especially systems containing conservation storage utilized for low flow augmentation and pulse releases.
Division Water Management	This reviewer shall be a member of CENAD senior staff so as to involve MSC personnel early in the process. This involvement is important so that final review and approval of the revised Gathright Dam and Lake Moomaw Reservoir Regulation Manual can be expedited upon completion of the ATR process.

d. Documentation. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the CENAO, RMO/CENAD, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT,

it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-2-12, Quality Management, or in ER 1105-2-100, Planning Guidance Notebook (Appendix H – Policy Compliance Review and Approval of Decision Documents), as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern was elevated to the vertical team for resolution.

After the ATR documentation is completed, the ATR team leader shall prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been either resolved or elevated to the vertical team. A sample Statement of Technical Review is included as Attachment 4. If all issues have been resolved, the CENAO Commander shall submit the final Gathright Dam and Lake Moomaw Reservoir Regulation Manual, along with the ATR's Statement of Technical Review, to CENAD for approval. If significant unresolved issues remain, the vertical team shall make every effort to resolve them quickly so that the Gathright Dam and Lake Moomaw Reservoir Regulation Manual can be revised if necessary and submitted for CENAD approval in a timely manner.

6. INDEPENDENT EXTERNAL PEER REVIEW.

a. Purpose. The purpose of an IEPR is to conduct an independent review of documents where the proposed action and associated risk are of such magnitude that a critical examination by a qualified team outside the USACE is warranted. For example, the development of a controversial Master Manual for a large river basin where numerous alternatives are considered may fall into this category.

b. Process. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will normally consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR's.

- **Type I IEPR.** Type I IEPR reviews are managed outside the USACE and are conducted on project studies. A Type I IEPR panel assesses the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. A Type I IEPR covers the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

Reservoir regulation manuals may require a Type I IEPR if any of the following specific criteria are met:

- The project involves a significant threat to human life/safety assurance;
- There is a request by the Governor of an affected state for a peer review by independent experts;
- The project requires an Environmental Impact Statement (EIS);

- The project/study is likely to involve significant public dispute as to the size, nature, or effects of the project;
 - The project/study is likely to involve significant public dispute as to the economic or environmental cost or benefit of the project;
 - The information in the decision document or anticipated project design is likely to be based on novel methods, involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices;
 - The project design is anticipated to require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule; and
 - There are other circumstances where the Chief of Engineers or Director of Civil Works determines that a Type I IEPR is warranted.
- Type II IEPR. Type II IEPR reviews, or Safety Assurance Reviews (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. A Type II IEPR panel conducts reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

A Type II IEPR is not usually anticipated for reservoir regulation manuals and water control plans unless they are integral to the design and construction phases.

- c. Decision on IEPR. After reviewing IEPR criteria, the PDT determined that none of these criteria apply to the revisions being proposed for the Gathright Dam and Lake Moomaw Reservoir Regulation Manual. The proposed changes appear to be consistent with the conditions and policies that would grant an exclusion from the requirement for a Type I IEPR. An exclusion from a Type I IEPR will be requested from HQUSACE.

7. POLICY AND LEGAL COMPLIANCE REVIEW.

All documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings.

8. MODEL CERTIFICATION AND APPROVAL.

- a. Policy. Planning and water management models are defined as any mathematical models or analytical tools that planners and engineers use to define water resources management problems

and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives, and to support decision making. MSC Commanders are responsible for assuring that models used for all planning and water management activities are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

As part of the USACE Scientific and Engineering Technology (SET) Initiative, many planning and engineering models (including both USACE developed and commercially developed software packages) have been identified as preferred or acceptable for use on Corps investigations. The use of such certified/approved planning or water management models is highly recommended and should be used whenever appropriate. The selection and application of the appropriate models and the review of input and output data are still the responsibility of the users and are subject to DQC and ATR review. All models used in the development of the Reservoir Regulation Manual revisions were either on the SET List or other Federal Agency models that were approved for the original Gathright Dam and Lake Moomaw Section 216 Study.

b. Planning Models. None used.

c. Engineering Models. Two engineering models were used during the Gathright Dam and Lake Moomaw 216 Study to model in-lake and downstream water quality parameters. They are detailed in the following paragraphs. It should be noted that the findings of these modeling effort have been confirmed with operational experience and field data obtained in the 2013, 2014 and 2015 Temporary Deviations.

CE-QUAL-W2

USACE's CE-QUAL-W2 is a two-dimensional, longitudinal/vertical, hydrodynamic and water quality model. Because the model assumes lateral homogeneity, it is best suited for relatively long and narrow water bodies exhibiting longitudinal and vertical water quality gradients. The model has been applied to rivers, lakes, reservoirs, estuaries, and combinations thereof. This model was used to assess potential changes to the dissolved oxygen and water temperature profiles in Lake Moomaw

Water Quality Analysis Simulation Program (WASP)

EPA's Water Quality Analysis Simulation Program (WASP7) is an enhancement of the original WASP (Di Toro et al., 1983; Connolly and Winfield, 1984; Ambrose, R.B. et al., 1988). This model helps users interpret and predict water quality responses to natural phenomena and manmade pollution for various pollution management decisions. WASP is a dynamic compartment-modeling program for aquatic systems, including both the water column and the underlying benthos.

9. REVIEW SCHEDULES AND COSTS.

a. DQC Cost and Schedule. CENAO will conduct the District Quality Control /Quality Assurance review. The review team will be assembled using in-house staff members who are not directly involved in preparing the revisions to the Gathright Dam and Lake Moomaw Reservoir Regulation Manual. See Attachment 1 for an overview of tasks, costs, and schedules. The DQC review is

currently estimated to cost \$10,000. The preliminary schedule indicates that the DQC review will occur in October and November 2016.

b. ATR Cost and Schedule. CENAD will set up and facilitate the conduct of the Agency Technical Review. CENAO and CENAD will work with the ATR Team Leader to ensure that adequate funding is available and is commensurate with the level of review needed. The ATR Team Leader shall provide organization codes for each team member and a responsible financial point of contact (CEFMS responsible employee) for creation of labor codes. Reviewers shall monitor individual labor code balances and alert the ATR Team Leader to any possible funding shortages. Any funding shortages will be negotiated on a case-by-case basis and in advance of a negative charge occurring.

See Attachment 1 for an overview of tasks, costs, and schedules. The ATR is currently estimated to cost \$15,300. The preliminary schedule indicates that ATR activities will occur in December 2016 and January 2017.

c. Type I IEPR Cost and Schedule. Not applicable.

d. Model Review Cost and Schedule. Not applicable.

10. PUBLIC COORDINATION.

a. Prior Activities. Federal, state, and local resource agencies as well as the general public were all involved in the conduct of the Section 216 Low Flow Augmentation Study. The work during this study allowed for the alternative that will be used in the revised Reservoir Regulation Manual was identified and extensively modeled.

CENAO subsequently prepared an Environmental Assessment and FONSI concerning the in-lake, lake-side and downstream impacts of changing Low Flow Augmentation Requirements and the implementation of several small pulse releases. These documents were coordinated with the resource agencies and general public as well.

b. Current Activities. Commonwealth of Virginia Resource Agencies will continue to be part of the PDT revising the water control plan and in the adaptive management of implementing the plan under Temporary Deviations until the Revised Reservoir Regulation Manual can be approved.. If necessary, agencies with regulatory review responsibilities will be contacted for coordination as required by applicable laws and procedures. Copies of resource agency and public comments on CENAO's Environmental Assessment will be provided to the ATR team. No additional public meetings are anticipated because of the minor nature of changes to the water control plan (i.e., slight changes to the Low Flow Augmentation Requirements and several relatively small pulse releases) and since the proposed revised water control plan has been followed in three previous years under Temporary Deviations.

11. REVIEW PLAN - APPROVAL AND UPDATES.

The CENAD Commander is responsible for ensuring that this Review Plan is appropriate for the planned revisions to the Gathright Dam and Lake Moomaw Reservoir Regulation Manual and also

for approving this Review Plan. The Review Plan is a living document and may change as revisions to the Reservoir Regulation Manual progress. CENAO is responsible for keeping the Review Plan up-to-date. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the CENAD Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the CENAD Commanders' approval memorandum, will be posted on the CENAO's webpage.

12. REVIEW PLAN - POINTS OF CONTACT.

Questions and/or comments concerning this Review Plan can be directed to the following points of contact:

- R. Owen Reece, Jr., Water Manager, Hydrology and Hydraulics Section, Engineering Branch, Engineering and Construction Division, CENAO-EC-EH. owen.r.reece@usace.army.mil.

ATTACHMENT 1

TASKS, SCHEDULES, AND COSTS

GATHRIGHT DAM AND LAKE MOOMAW REVISED WATER CONTROL PLAN & UPDATED RESERVOIR REGULATION MANUAL

TASK	FY 2016 = \$79.6								FY 2017 = \$37.5								
	Mar '16	Apr '16	May '16	Jun '16	Jul '16	Aug '16	Sep '16	Oc '16	Nov '16	Dec '16	Jan '17	Feb '17	Mar '17	Apr '17	May '17	Jun '17	
Complete Review Plan	\$2.5																
Approve Review Plan (NAD)		---															
Refine Water Control Plan		\$12.1															
Prepare preliminary draft RRM			\$65.0														
Perform District Quality Control								\$10.0									
Prepare final draft RRM									\$6.0								
Conduct ATR											\$15.3						
Prepare final RRM													\$6.2				
Approve final RRM (NAD)															---		
Distribute RRM																---	

ATTACHMENT 2

DRAFT

GUIDANCE AND CHARGE TO PANEL MEMBERS AGENCY TECHNICAL REVIEW

REVISIONS TO RESERVOIR REGULATION MANUAL GATHRIGHT DAM AND LAKE MOOMAW

BACKGROUND

It is the policy of the U.S. Army Corps of Engineers (USACE) that technical, scientific, and engineering information used to support recommendations contained in decision and implementation documents be thoroughly reviewed to ensure technical quality and practical application. Engineering Circular 1165-2-214, Civil Works Review, establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products. Agency Technical Review (ATR) is an important component of this overall strategy, with such review to be conducted by USACE professionals outside the home District where the work was performed.

OBJECTIVE

The objective of this ATR is to conduct a thorough review of the recently revised Reservoir Regulation Manual for Gathright Dam and Lake Moomaw, Alleghany County, VA. The original Reservoir Regulation Manual for Gathright Dam and Lake Moomaw was prepared in 1984. A recent revision was completed in November 2016, and it is the subject of the current ATR process. This recent document contains a newly revised water control plan that includes modified criteria for making Low Flow Augmentation Releases from the existing conservation storage. The revised Low Flow Augmentation Releases were developed in close coordination with the Commonwealth of Virginia Resource Agencies. They formed the basis for operations in both 2013, 2014 and 2015 under Temporary Deviations requested by the Commonwealth of Virginia and approved by CENAD. The resulting changes to the Low Flow Augmentation Releases are now included in the Gathright Dam and Lake Moomaw Reservoir Regulation Manual and are to be the primary focus of this ATR. Other changes to the Reservoir Regulation Manual include descriptions of improved data management techniques and communication methods as well as updated charts and graphs reflecting operational experience since the original Reservoir Regulation Manual was approved.

GENERAL GUIDANCE

The Project Delivery Team (PDT) for this project is comprised of employees from the Corps of Engineers, Norfolk District (CENAO). The Review Management Organization (RMO) and facilitator for this ATR effort is the Corps of Engineers, North Atlantic Division (CENAD). CENAO/CENAD will provide an initial

orientation briefing via webinar for ATR panel members. This briefing will furnish an overview of the need for and scope of revisions to the Gathright Dam and Lake Moomaw Water Control Plan and Reservoir Regulation Manual. No site visits are planned. It is anticipated that the review and comment/response process will be handled electronically, primarily through DrChecks review software. Conference calls and/or face-to-face meetings among ATR panel members can be arranged by CENAD, if needed.

The following general guidance concerning the development of water control plans and reservoir regulation manuals is available for consultation by ATR panel members during the review process.

- ❖ EC 1165-2-214 (Civil Works Review) - describes general procedures for ensuring the quality and credibility of USACE decision, implementation, and operations and maintenance documents and work products.
- ❖ ER 1110-2-240 (Water Control Management) - describes the policies to be followed by USACE in developing and carrying out water control management activities at Federal projects, including the establishment of water control plans that shall be continually reviewed, updated, and adjusted to ensure the best use of available water resources.
- ❖ ER 1110-2-8156 (Preparation of Water Control Manuals) – describes the format and procedures to be followed in preparing water control manuals.
- ❖ EM 1110-2-3600 (Management of Water Control Systems) – describes the management of the hydrologic/hydraulic aspects of completed projects to include collecting and handling of data, determining project inflow and outflow, scheduling releases for authorized project purposes, and coordinating water management decisions.
- ❖ ER 1165-2-119 (Modifications to Completed Projects) – describes methods for determining if/when changes to completed projects can be accomplished under existing authorities to better serve on-going water resource needs.

DOCUMENTS PROVIDED

The following documents and reference materials will be provided to the panel members conducting the ATR. The document presented in bold font is the only document to be reviewed for comment. All other documents are provided as background information or as reference for the convenience of the ATR panel members.

- ❖ CENAO Gathright Dam and Lake Moomaw Reservoir Regulation Manual, November 2016.
- ❖ CENAO Review Plan, February 2016, Subject: Revisions to Reservoir Regulation Manual, Gathright Dam and Lake Moomaw.
- ❖ CENAO Finding of No Significant Impact (FONSI), 8 May 2013, Subject: Gathright Dam Low Flow Augmentation Project, Alleghany County, Virginia.
- ❖ CENAO Final Environmental Assessment, April 2013, Subject: Gathright Dam Low Flow Augmentation Project, Alleghany County, Virginia.
- ❖ CENAO Supporting Documentation of Gathright Dam and Lake Moomaw Project Temporary Deviation Results 2015.
- ❖ CENAO Supporting Documentation of Gathright Dam and Lake Moomaw Project Temporary Deviation Results 2014.
- ❖ CENAO Supporting Documentation of Gathright Dam and Lake Moomaw Project Temporary Deviation Results 2013.

- ❖ VADEQ Pulse Test Results 2012.
- ❖ VADEQ Pulse Test Results 2011.
- ❖ VADEQ Pulse Test Results 2010.
- ❖ Gathright Dam and Lake Moomaw Section 216 Feasibility Scoping Meeting Package
- ❖ Gathright Dam and Lake Moomaw Section 216 Modeling Report
- ❖ VADEQ TMDL Report for Jackson River
- ❖ CENAO Gathright Dam and Lake Moomaw Final Regulation Manual, August 1984.

CHARGE TO ATR PANEL MEMBERS

ATR panel members shall review the revised Gathright Dam and Lake Moomaw Reservoir Regulation Manual to "... ensure that the product is consistent with established criteria, guidance, procedures, and policy" (EC 1165-2-214, Appendix C, Section 3d(1), page C-2). Additionally, the ATR panel members shall examine the Reservoir Regulation Manual: (1) to assess the technical adequacy of the presented methods, assumptions, criteria, decision factors, applications, and explanations, and (2) to assure that information is presented in a reasonably clear manner for ease of understanding by water control managers and dam operators alike. Policy guidance and technical requirements are contained in the USACE references cited above in "General Guidance".

The primary focus of this ATR shall be on the project operations to improve downstream aquatic habitat and water quality in the Lower Jackson River through a modification of the original Low Flow Augmentation requirements. CENAO, VADEQ and VADGIF have conducted extensive study, modeling and operational results from the 2013, 2014 and 2015 Temporary Deviations (see Documents Provided previously) and have determined that the reduction of the original Low Flow Augmentation requirements balanced by a series of six short pulse releases will improve the downstream aquatic habitat and water quality in the Lower Jackson River. It is important to note that such modifications are merely operational changes; there is no new construction, no reallocation of storage, and no outlay of Federal or non-Federal funds.

Other aspects of Gathright Dam and Lake Moomaw operations for flood risk reduction and recreation have not changed substantially since the original Reservoir Regulation Manual was published in August 1984. ATR panel members may consider these other project purposes and offer comments as appropriate, especially as they might relate to Low Flow Regulation operations. ATR panel members shall use the DrChecks software to offer review comments and provide for continuity of the review record. Review comments shall follow the normal four-part comment structure.

- ❖ Review concern – identify product’s information deficiency or incorrect application of policy, guidance, or procedures.
- ❖ Basis for the concern – cite appropriate law, policy, guidance, or procedure that has not been properly followed.
- ❖ Significance of the concern – indicate importance of concern with regard to project operation, efficiency, effectiveness, safety, Federal interest, or public acceptability.
- ❖ Probable specific action needed to resolve the concern – identify actions needed to satisfactorily resolve the concern.

ATR panel members shall backcheck PDT responses to their comments and may either close the comments or attempt to resolve any remaining issues. Conference calls can be used to address incomplete or unclear information before determining whether further specific concerns may exist. Summaries of these discussions shall be included in the backcheck documentation included in DrChecks. Identifying a comment as “Critical” in DrChecks indicates a concern that is significant and could affect policy conformance or technical validity of information contained in the Reservoir Regulation Manual. ATR panel members shall advise the ATR Team Leader of any unresolved issues where the PDT and ATR panel members “agree to disagree” as well as flag any “critical” comments.

Grammatical comments shall not be submitted in DrChecks. Grammatical comments shall be submitted to the ATR Team Leader via email as a Word document in track changes format or as a separate Word document that outlines the comments. The ATR Team Leader shall consolidate these grammatical comments and provide them to the PDT outside of DrChecks.

At the conclusion of the ATR, the ATR Team Leader shall prepare a statement of technical review and certification documenting the completion of the process. This statement shall include signatures from the ATR Team Leader, RMO, Project Manager, and senior level staff (for sample, see EC 1165-2-214, Appendix C, Attachment C-1, page C-10).

ATTACHMENT 3

PRELIMINARY **TEAM ROSTERS**

Include contact information for the DQC, PDT, ATR team, and MSC. The credential and years of experience for the ATR team should be included when it is available.

Product Delivery Team Roster			
Team Member	Expertise	Telephone	Email
R. Owen Reece, Jr (Project Manager)	Water Management, Planning, Civil Engineering, Hydrology and Hydraulics	757-201-7772	owen.r.reece@usace.army.mil

District Quality Control Team Roster			
Team Member	Expertise	Telephone	Email
Robin Williams	Water Management Hydrology & Hydraulics	757-2017104	robin.m.williams@usace.army.mil

ATR Team Roster – Review Panel Members To Be Determined			
Team Member	Expertise	Telephone	Email
Ralph LaMoglia	Water Management	347-370-4599	Ralph.A.Lamoglia@usace.army.mil

ATTACHMENT 4

SAMPLE STATEMENT OF TECHNICAL REVIEW

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the <type of product> for <project name and location>. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name
ATR Team Leader
Office Symbol/Company

Date

SIGNATURE

Name
R. Owen Reece, Jr., P.E
Project Manager, Norfolk District
CENAO-EC-EH

Date

SIGNATURE

Ralph LaMoglia, P.E.
North Atlantic Division
CENAD-RBT

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: Describe the major technical concerns and their resolution.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

Matthew T. Byrne, P.E
Chief, Engineering & Construction Division,
Norfolk District
CENAO-EC

Date

ATTACHMENT 5

REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 6

ABBREVIATIONS

ATR	Agency Technical Review
CENAO	Norfolk District, Corps of Engineers
CENAD	North Atlantic Division, Corps of Engineers
DQC	District Quality Control/Quality Assurance
EA	Environmental Assessment
EC	Engineering Circular
EIS	Environmental Impact Statement
EM	Engineering Manual
ER	Engineering Regulation
FONSI	Finding of No Significant Impact
HH&C CoP	Hydraulics, Hydrology and Coastal Community of Practice
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IEPR	Independent External Peer Review
OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
MSC	Major Subordinate Command
PDT	Project Delivery Team
SET	Science and Engineering Technology
SAR	Safety Assurance Review
USACE	U.S. Army Corps of Engineers