

**REVIEW PLAN for ENGINEERING AND DESIGN PRODUCTS  
MONTGOMERY L/D – NEW RIVER CHAMBER  
UPPER OHIO NAVIGATION PROJECT  
PITTSBURGH DISTRICT**

**Current Version Date:** 14 July 2020

1. PURPOSE AND REQUIREMENTS

- a. Purpose. This review plan defines levels and scopes of review required for the engineering and design (E&D) products for the Montgomery Locks and Dam (L/D) – New River Chamber as part of the Upper Ohio Navigation Project.
- b. References. This review plan is prepared in accordance with regional business process QMS 08504 LRD and latest versions of the guidance documents listed below.
  - (1) Engineering Regulation (ER) 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews
  - (2) ER 1110-1-12, Quality Management
  - (3) Engineering Circular (EC) 1165-2-217, Civil Works Review Policy
  - (4) Upper Ohio Navigation Project, Project Management Plan
- c. Requirements. The design and construction activities and documents for Montgomery L/D – New River Chamber project are required to be reviewed by independent technical experts in accordance with ER 1110-1-12 and EC 1165-2-217. Review requirements may include district quality control/assurance (DQC), agency technical review (ATR) and independent external peer (IEPR) review as indicated below.

2. REVIEW MANAGEMENT ORGANIZATION (RMO). The RMO for this project is the Inland Navigation Design Center. The RMO has provided the District with written concurrence for this review plan.

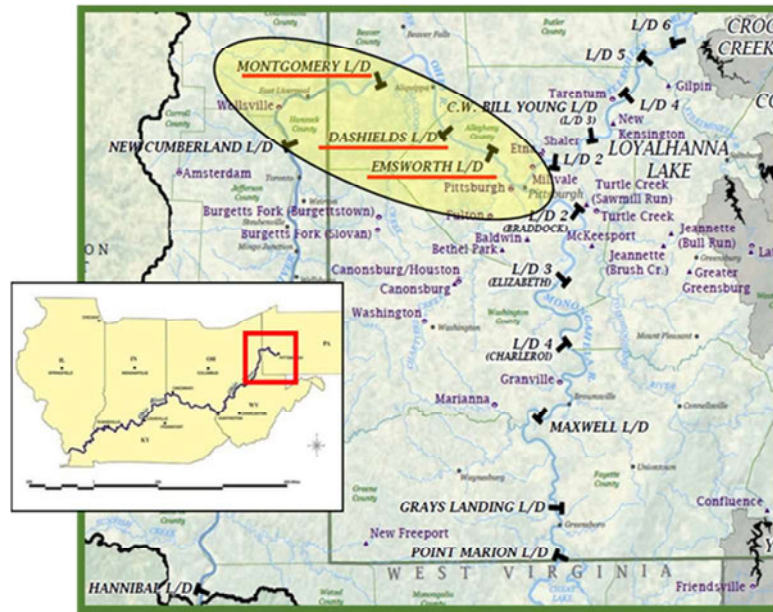
3. PROJECT SCOPE AND PRODUCTS

Project Description and Scope of Work.

- a. The Upper Ohio Navigation Project addresses lock condition and capacity issues at Emsworth, Dashields, and Montgomery Locks and Dams on the Ohio River in Pennsylvania. All three facilities were constructed between 1919 and 1936, and each underwent a major rehabilitation in the 1980s to extend their useful life another 25 years. The Chief's Report recommends replacement of each auxiliary lock with construction of one new lock chamber (110' wide by 600' long) at each facility riverward of the existing main lock chamber. This new lock chamber would serve as the main lock chamber. The Chief's Report was signed on September 12, 2016, and the project was authorized in the 2016 Water Infrastructure Improvements for the Nation Act.

This review plan applies to the portion of the Upper Ohio Navigation Project consisting of the removal of the existing auxiliary lock chamber and the construction of a one new 110' by 600' lock chamber at Montgomery Locks and Dam.

Project Type:	Navigation
Location:	Montgomery Locks and Dam, Ohio River, PA
Purpose/Function:	Lock Chamber
Key Physical Components:	Lock Wall monoliths, Filling and Emptying System, Miter Gates, Guard Walls.
Estimated Construction Cost:	\$601 million FY20 Project First Cost
E&D Product Method Delivery:	Regional (LRD) USACE Team led by the INDC
Construction Delivery Method:	TBD



- b. Engineering and Design Products. The engineering and design products to be prepared and reviewed include the following:
  - a. Design Documentation Report (DDR)
  - b. Plans and Specifications (P&S)
  - c. Engineering Considerations and Instructions for Field Personnel (ECIFP)
- c. Required Quality Reviews.
  - (1) District Quality Control (DQC): DQC procedures will be performed for all E&D products.
  - (2) Agency Technical Review (ATR): The District Chief of Engineering has determined based on Tables 3 and 4 of QMS 08504 LRD that ATR is required.
  - (3) Type II Independent External Peer Review (IEPR), Safety Assurance Review (SAR): The District Chief of Engineering has determined that the project does not pose significant life safety risks and a Type II IEPR (SAR) is not required.
- d. Technical Risk Analysis and Review Charge: ATR is required and a review charge will be prepared and issued to each review team. According to paragraph 7.4 d and Table 4 of QMS 08504 LRD, the independent technical reviews will focus on the following primary project complexities and risks:

- (1) Large number of project components – Risk element 10.
    - a. The project includes the design and construction of major environmental, civil, structural, H&H, and several other components.
  - (2) Subsurface investigation – Risk element 13.
    - a. The new lock chamber walls and guard walls will require foundation designs that will be designed based on geotechnical parameters determined through extensive subsurface investigation.
  - (3) Unusual subsurface or foundation conditions – Risk element 15.
    - a. The subsurface conditions contain numerous coal seams which will affect foundation design.
  - (4) Unusual site conditions such as unstable soils, contamination, brownfield, close proximity to existing infrastructure (public or private), etc. – Risk element 16.
    - a. The new lock chamber is to be built in close proximity to the existing dam and main lock chamber at Montgomery L/D of which the existing lock is at risk of failure. Negative impacts of the demolition of the auxiliary chamber or the construction of the new chamber on the existing structures could result in a loss of pool or navigation.
  - (5) High amount of mechanical and electrical installations – Risk element 20.
    - a. The project includes extensive mechanical and electrical systems to operate the miter gates and filling & emptying system.
    - b. Relocating power feeds to the existing facility.
  - (6) High degree of instrumentation and control systems – Risk element 21.
    - a. The project may require a high degree instrumentation to monitor the existing structures during construction.
  - (7) State of the art/leading edge or new technology – Risk element 22.
    - a. The project is intending to utilize remote lock operations to operate the new lock chamber. This would be the first lock chamber to utilize remote operations in USACE.
  - (8) Multiple construction contracts – Risk 23.
    - a. Due to funding constraints, it may be necessary to employ multiple construction contracts to complete the project.
  - (9) Complicated or unusual construction process, including in-the-wet, float-in, underwater, cofferdams, coffer boxes, etc. – Risk element 28.
    - a. The project intends to employ innovative in-the-wet construction methods.
  - (10) Substantial critical path activities – Risk 29.
    - a. The construction sequence is still being developed. At this time it is anticipated that most of the primary features will have to be built sequentially, i.e. excavation prior to foundation construction, prior to lock chamber walls, prior to in-chamber features.
4. PROJECT DELIVERY TEAM (PDT). Pittsburgh District is the geographic district and has responsibility for Project Management, Environmental, Contracting, Construction, Operations and Dam Safety aspects of the project. The Inland Navigation Design Center (INDC) will be the Engineer of Record and assumes responsibility for technical aspects of the design in accordance with ER 1110-1-8168, ROLES AND RESPONSIBILITIES OF THE INLAND NAVIGATION DESIGN CENTER MANDATORY CENTER OF EXPERTISE. Design team staff will utilize members from the INDC Community of Practice (INDCoP). Discipline leads will be practicing navigation engineers within the INDCoP. The project delivery team members are listed in Attachment 1.

5. REVIEW EXECUTION. District quality control (DQC) will be performed per Chapter 3 of ER 1110-1-12 and Section 8 of EC 1165-2-217. ATR shall be performed in accordance with Section 9 of EC 1165-2-217. Based on the review charge in paragraph 3.d, the technical discipline(s) and expertise required for the ATR are shown in Table 1. ATR reviewers are listed Attachment 1. Review documentation will be stored in ProjectWise.

Table 1. ATR Technical Discipline(s) and Expertise	
Technical Discipline or Reviewer Name	Expertise Required
ATR Lead	Will possess the necessary skills and experience to lead a virtual team through the ATR process. Will be a member of the Inland Navigation Design CoP. Will possess a minimum 20 years of experience in Navigation projects. The member shall be a registered Professional Engineer (PE) or have equivalent qualifying experience.
Hydraulics	Will be a member of the Inland Navigation Design CoP. Will possess a minimum of 15 years of experience with Navigation hydraulics, specifically approach conditions and filling and emptying systems. The member shall be a registered Professional Engineer (PE) or have equivalent qualifying experience.
Civil	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in design of Navigation projects. Specifically, site layout, spoil site configurations, haul roads, survey control, cross-section development, etc. The member(s) shall be a registered Professional Engineer (PE), or have equivalent qualifying experience.
Structural - HSS	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in design of Hydraulic Steel Structures. The member(s) shall be a registered Professional Engineer (PE), or have equivalent qualifying experience.
Structural – Fabrication/Welding	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in design of Hydraulic Steel Structures, specifically the fabrication of large steel structures (miter gates, etc.). The member(s) shall be a registered Professional Engineer (PE), or have equivalent qualifying experience.
Structural	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in design of Navigation structures. Specifically, reinforced concrete monoliths, cellular cofferdams and damming structures. The member(s) shall be a registered Professional Engineer (PE), or have equivalent qualifying experience.

Electrical	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in electrical design for Navigation structures. Specifically, power, lighting and controls for new or rehabilitated Lock projects.
Mechanical	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in mechanical design for Navigation structures. Specifically, design of machinery for miter gates and culvert valves as well as hydraulic systems.
Geotechnical	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in design of Navigation projects. Specifically, parameters for a variety of monolith foundations, cellular cofferdams, and materials. The member(s) shall be a registered Professional Engineer (PE).
Geology	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 15 years of experience in engineering geology/rock mechanics. The member(s) shall be a registered Professional Geologist (PG), or have equivalent qualifying experience.
Cost	Will be a member of the Cost CoP and approved by the Cost Center of Expertise in Walla Walla District.
Materials	Will be a member of the Inland Navigation Design CoP. Will possess a minimum 10 years of experience in materials to include aggregate testing, concrete mix designs, thermal properties of the materials and analysis. The member(s) shall be a registered Professional Geologist (PG) or Professional Engineer (PE), or have equivalent qualifying experience.
Environmental	Will possess a minimum 15 years of experience in environmental design/permitting/NEPA compliance.
Construction	Will be a member of the Construction CoP. Will possess a minimum 15 years of experience to include construction, quality control & quality assurance, and construction contract administration.
Operation	Will possess a minimum 15 years of experience in lock maintenance and operation.

6. REVIEW SCHEDULE AND BUDGET. The schedule and budgets for reviews are shown in Table 2.

<b>Table 2. Review Schedule and Budgets</b>			
<b>Review</b>	<b>Start Date</b>	<b>Finish Date</b>	<b>Budget (\$)</b>
30% Design DQC	1 JUL 2021	29 JUL 2021	\$50,000
30% Design ATR	5 AUG 2021	4 SEP 2021	\$150,000
30% BCOES	5 AUG 2021	4 SEP 2021	\$25,000
60% Design DQC	1 APR 2022	22 APR 2022	\$50,000
60% Design ATR	23 APR 2022	23 MAY 2022	\$150,000
60% BCOES	23 APR 2022	23 MAY 2022	\$25,000
95% Design DQC	6 NOV 2022	6 DEC 2022	\$50,000

95% Design ATR	22 OCT 2022	6 DEC 2022	\$150,000
95% BCOES	6 DEC 2022	30 JAN 2023	\$50,000

7. REVIEW PLAN POINTS OF CONTACT. Questions and comments relating to this review plan can be directed to the following points of contact:

a. Project Leaders.

(1) Project Manager: [REDACTED]

(2) Technical Lead: [REDACTED]

b. Design Center: [REDACTED]

c. ATR Leader: [REDACTED]

d. Review Management Organization (RMO): [REDACTED]

e. Great Lakes and Ohio River Division (LRD) POC: [REDACTED]

8. DISTRICT APPROVAL: [REDACTED]

District Chief of Engineering

ATTACHMENT 1 – TEAM MEMBERS

PROJECT DELIVERY TEAM (leads only)		
Function/Discipline	Name	Office
Customer	Inland Waterway User	n/a
Project Manager	[REDACTED]	LRP
Technical Lead	[REDACTED]	INDC
Cost Engineer (required)	[REDACTED]	LRP
Value Engineer (required)	[REDACTED]	LRH
Geospatial Lead (required)	[REDACTED]	LRP
Structural Lead	[REDACTED]	LRL
Mechanical Lead	[REDACTED]	LRP
Electrical Lead	[REDACTED]	LRP
H&H Lead	[REDACTED]	LRP
Geological Lead	[REDACTED]	DSPC
Geotechnical Lead	[REDACTED]	LRL
Materials Lead	[REDACTED]	LRP
Civil Lead	[REDACTED]	LRP
Environmental Lead	[REDACTED]	LRP
Real Estate	[REDACTED]	LRP
Operations Representative	[REDACTED]	LRP
MSC Technical Representative	[REDACTED]	LRD
DQC REVIEWERS		

Function/Discipline	Name	Office
DQC Lead	TBD	TBD
H&H	[REDACTED]	MVR
<b>BCOES REVIEWERS</b>		
Function/Discipline	Name	Office
Biddability	TBD	TBD
Constructability	TBD	TBD
Operability	TBD	TBD
Environmental	TBD	TBD
Sustainability	TBD	TBD
Contracting	TBD	TBD
Office of Counsel	TBD	TBD
<b>ATR REVIEWER(S)</b>		
Function/Discipline	Name	Office
ATR Leader	[REDACTED]	MVR
Structural (HSS)	[REDACTED]	MVR
Structural	[REDACTED]	MVR
Structural (Fab'n/Welding)	[REDACTED]	NWP
Civil	[REDACTED]	MVR
Geology	[REDACTED]	MVP
Geotechnical	[REDACTED]	MVR
Materials	[REDACTED]	MVN
Hydraulics	[REDACTED]	LRL
Construction	[REDACTED]	MVR
Mechanical	[REDACTED]	MVN
Electrical	[REDACTED]	MVS
Cost	[REDACTED]	LRC
Environmental	[REDACTED]	MVP
Filling & Emptying System	ERDC Member	ERDC