

# REVIEW PLAN

FOR

*Mahoning Creek Hydroelectric Project*

*Federal Energy Regulatory Commission Project No. 12555*

*Section 408 Report*

*Pittsburgh District*

MSC Approval Date: 25 January 2011

Last Revision Date:



US Army Corps  
of Engineers ®

# REVIEW PLAN

*Mahoning Creek Hydroelectric Project, Armstrong County, Pennsylvania  
Federal Energy Regulatory Commission Project P-12555  
Section 408 Report*

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## 1. Purpose and Requirements

- a. Purpose. This review plan defines the scope and level of review required for the Section 408 Report to be completed during the post-licensing stage of the Mahoning Creek Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project P-12555. This project consists of modifications to Mahoning Dam to construct and operate a hydroelectric plant as proposed by the Mahoning Creek Hydroelectric Company LLC (Fairlawn, Ohio), hereinafter referred to as the licensee. The Pittsburgh District Chief of Engineering and Construction is responsible for the review of this project and will coordinate said review with the Chiefs of Operation and Project Management. The Pittsburgh District requests MSC approval of this review plan.
- b. References:
  - i. Engineering Circular 1165-2-209, 31 January 2010 Water Resources Policies and Authorities – Civil Works Review Policy
  - ii. Engineering Regulation 1110-2-1462, 20 February 1991 Water Quality and Water Control Considerations for Non-Federal Hydropower Development at Corps of Engineers Projects
  - iii. Engineering Regulation 1110-2-1454, 15 July 1983 Engineering and Design-Corps Responsibilities for Non-Federal Hydroelectric Power Development Under the Federal Power Act.
  - iv. ER 1110-2-1150 31 Aug 1999 Engineering and Design for Civil Works Projects
  - v. CECW-PB Memorandum dated 23 Oct 2006, Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects
  - vi. CECW-PB Memorandum dated 17 Nov 08, Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects
  - vii. CECW-P Document “Section 408 Submittal Package Guide, Final 11/12/08”
  - viii. E-mail correspondence from Jeffrey Benedict, LRP-BR-EP and Mark Jones, EC, Subject: EC 209 Policy Applied to Hydropower 408 Process for Mahoning Hydro, 3 June 2010.
  - ix. E-mail correspondence from Hank Jarboe, LRD-PDS-P, Subject: RE: EC 209 Policy Applied to Hydropower 408 Process for Mahoning Hydro, 3 June 2010.
- c. Requirements. This review plan was developed in accordance with EC 1165-2-209, which establishes an accountable comprehensive, life-cycle review strategy for Civil Works products. Hydroelectric power projects proposed by non-Federal entities are addressed by paragraph 13 (Special Cases Independent External Peer Review [IEPR]). Special cases exist where non-Federal interests undertake the study, design or

implementation of a Federal project or a modification to a USACE project. When a non-Federal interest undertakes a study, design or implementation of a Federal project, or requests permission to alter a Federal project, the non-Federal interest is required to undertake, at its own expense, any IEPR that the Government determines would have been required if the Government were doing the work. Results of the IEPR will be submitted as part of the Section 408 decision package documenting the District approval of the proposed hydroelectric power project based on the following criteria:

- i. The proposed project will not adversely affect the stability or structural integrity of the Federal project
- ii. The proposed project will not adversely affect the operation of the Federal project for the authorized purposes (flood control, water quality and recreation)
- iii. All environmental impacts have been adequately addressed.
- iv. EC 1165-2-209 outlines three levels of review, District Quality Control/Quality Assurance, Agency Technical Review, and Independent External Peer Review. In addition to these three levels of review, decision documents are subject to policy and legal compliance review and, if applicable, model certification and approval.
- v. District Quality Control (DQC). DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). Since this is not a Corps of Engineers design the Quality Control (QC) review will be undertaken by the developer and or his consultants. Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews including calculation checks, supervisory reviews and etc. The Pittsburgh District Project Delivery Team (PDT) will perform a Quality Assurance (QA) review of all submitted products. The PDT is responsible for a complete review of all documents submitted to assure the overall integrity of the products and to verify that the products have undergone QC reviews prior to submitting the product to the Agency Technical Review Team (See Paragraph ii below).
- vi. Agency Technical Review (ATR). ATR will be a rigorous in-depth review conducted by a qualified team of Pittsburgh District staff. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The main charge to the ATR team will be to verify that the modifications to Mahoning Dam are done in a professional manner, safely, and will not adversely affect the operation of the project. If lacking the appropriate expertise, the district will supplement their staff with outside subject matter experts. The district will utilize vertical team coordination to assure

technical requirements are met throughout the process. See CECW-PB Policy Memorandum “Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects,” dated 17 Nov 2008 for additional discussion and policy on this topic. The ATR will be documented in DrChecks.

- vii. Independent External Peer Review (IEPR). Based on vertical team discussions and agreements a Type II IEPR, based upon Section 2035 of WRDA 2007, will be performed by a team of independent, qualified individuals organized, paid for, and managed by the Developer. The report on the IEPR will be included in the 408 documentation. Following Paragraph 13 Special Cases IEPR of EC 1165-2-209 the Developer will use the National Academies of Science (NAS) policy for selecting reviewers and will be encouraged to use an Outside Eligible Organization (OEO) for management of the effort. See EC 1165-2-209, Appendix E for more information on the selection of panel members.
- viii. Policy and Legal Compliance Review. The Pittsburgh District Office of Counsel will perform the policy and legal compliance review of the Section 408 package and certify legal sufficiency.

## 2. PROJECT INFORMATION

Mahoning Creek Dam is a concrete gravity dam, 926 feet in length, 154 feet wide at the base. There is a vertical lift gate controlled center spillway. The outlet works consist of three 5’8” x 10’ gate controlled sluices, one 24” ball valve conduit and one 36” ring jet valve.

Mahoning Dam was authorized by the Flood Control Acts of 1936 and 1938 to provide flood protection to the lower Allegheny River Valley and the Upper Ohio River Valley. Mahoning also stores water and releases it downstream during dry periods to improve water quality and quantity for domestic and industrial use, navigation, recreation, esthetics and aquatic life.

The applicant has followed the Integrated Licensing Procedure (ILP)<sup>1</sup> described in the “Handbook for Hydroelectric Project Licensing and 5 MW Exemptions from Licensing”, FERC, April 2004. The preliminary permit was originally issued on March 25, 2005. This permit provided the applicant exclusive rights to study the feasibility of hydroelectric power development at Mahoning for a three-year period. Their Notice of Intent to File a License Application and Preliminary Application Document (PAD) was issued in December 2005.

The proposed project utilizes an existing penstock in monolith 15, located in the left

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<sup>1</sup> The ILP was established by FERC in 2003 with the goal of creating efficiencies by integrating a potential license applicant’s pre-filing consultation with the activities of the FERC and other agencies pursuant to the Federal Power Act, the National Environmental Policy Act (NEPA) and other applicable legislation. Taken from ORDER GRANTING REHEARING, FERC Project P-405-097, Issued May 20, 2010.

abutment of Mahoning Dam. This penstock was part of the original construction and has been plugged since the dam was built. The power house is proposed to be built 1000 feet downstream of the dam, just below the existing weir at the end of the stilling basin. Powerhouse discharge is proposed to enter the stream downstream of the existing weir and stilling basin. The PAD described the major features of the proposed project as follows:

- a. Steel intake structure attached to the upstream face of the dam, with removable trash racks and dewatering bulkhead panels
- b. Vertical slide gate attached to the upstream face of the dam to isolate the penstock
- c. Steel lining of the existing plugged 108-inch-diameter existing penstock penetration through the dam (monolith 15)
- d. Buried steel penstock expanded from 108-inch to 120- inch, and 1,050 foot-long, running from the dam to the proposed powerhouse on the left (south) bank, with vent and access manholes.
- e. Bifurcation of the 120-inch-diameter penstock to two 93-in diameter penstocks, with turbine shut-off valves
- f. Reinforced concrete powerhouse containing two vertical generating units on the left (south) bank, approximately 100 feet downstream of the stilling basin weir.
- g. 2.2-mile long, 25-kilovolt (kV) transmission line with the existing Allegheny Power 12.5-kV right-of-way.
- h. Refurbished 0.5-mile access road.
- i. Excavated tailrace approximately 200 feet into stream and associated armoring of the affected river bottom and/or the shoreline.

Because this is a non-Federal alteration to a Federal project the Pittsburgh District PDT is mainly concerned with the operational, environmental and physical impacts to the existing project. This review plan is meant to ensure that the Developer's design meets these three major conditions: the engineering aspects (structural integrity and stability) of Mahoning Dam are not adversely impacted; there is no diminishment in the capability of the Corps to carry out the authorized purposes of Mahoning Dam; and that environmental impacts have been adequately evaluated and addressed. The authorized purposes of Mahoning Dam are Flood Damage Reduction, Fish & Wildlife and Recreation. As described in this Review Plan, our intent is to insure that the proposed alteration of the Federal project is not injurious to the public interest and will not impair the usefulness of Mahoning Dam. In order to provide assurance that their plans are technically correct and sufficient, the Developer must submit enough information, data, calculations and drawings to substantially define those features of work that could impact the operation, safety, and stability of, or the Government's ability to control flow through, Mahoning Dam. These features include, but may not be limited to, the intake tower, trash racks, closure panels, slide gate (including the gate, seals, guides, and mechanical operator), bulkheads or other emergency closure system, lining and grouting of the existing conduit through the dam at Monolith 15, the downstream buried steel penstock including excavation for and support of the penstock, powerhouse including excavation and foundation and the access road to the

powerhouse. Construction drawings and specifications may not need to be developed to the 100% level for the Section 408 submission, but sufficient detail must be provided to ensure the adequacy of the features/appurtenances provided. Pittsburgh District will consider a staged submittal process where less critical features of the powerhouse could be submitted subsequent to the development of the Section 408 package. General discussion should be included on construction sequencing including access to the top of the dam and the equipment to be installed there (temporary and permanent), in the reservoir, and elsewhere. Critical aspects of plant operation that must be addressed in the submittal package include, but may not be limited to, plans for routine and emergency contacts and operations that require hydropower plant personnel to be available or on call to operate plant machinery at all times and an alert/alarm system in case of unexpected changes in this facility. More detailed operational aspects will be addressed in the Operations Memorandum of Agreement that will be developed after the Section 408 package is complete.

Our environmental concerns have been documented in many earlier submissions, particularly our April 23, 2010 comments to the Environmental Assessment, and recognize that the FERC is preparing a supplemental Environmental Assessment that may address them. Our major concerns remain with the proposed minimum flow of 30 cubic feet per second through the stilling basin, the lack of evidence to the conclusions in the Environmental Assessment of insignificant impacts to water quality in the lake, stilling basin and Mahoning Creek downstream of the dam, and lack of full consideration of an alternative locating the powerhouse upstream such that the outflow is to the stilling basin. We will also require that mitigation and adaptive management issues are adequately developed to support work activities the Section 408 Package.

### 3. AGENCY TECHNICAL REVIEW

The Corps requirements for approval of non-Federal hydroelectric projects are generally described in the referenced policy memorandums and in paragraph 14.a and Appendix A of reference iii. Item (3) of paragraph 14 a. is particularly pertinent to this review plan. It states that "Design, construction, and operation of all power facilities which would affect the structural integrity and operational adequacy of the Federal dam, including construction sequence and procedures, must be approved by the Corps." According to the EC 1165-2-209 SharePoint Site, Frequently Asked Question 2.d, states that these types of activities (modifications of existing Federal Projects to incorporate non-federal hydropower) are not a Corps product and the ATR requirements in the EC do not apply. However, following CECW-PB Policy Memorandum "Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects," dated 17 Nov 2008 the Pittsburgh District will perform an In-house ATR on the Developer's plans. The Developer will document his design in a Design Documentation Report (DDR) following the guidance in ER 1110-2-1150 31 Aug 1999 Engineering and Design for Civil Works Projects. The District PDT believes this is necessary to provide the level of confidence needed in the project modifications to recommend

approval to the District Commander. The District Commander's approval is required for the 33 USC 408 submission to the Chief of Engineers. The District will also review all environmental documentation prepared by the Federal Energy Regulatory Commission in conjunction with the forthcoming issuance of the license.

#### 4. INDEPENDENT EXTERNAL PEER REVIEW

- a. Decision on IEPR. The requirement for an IEPR is found in EC 1165-2-209 Paragraph 13 Special Cases. Based on vertical team discussion and agreements a Type II IEPR, also known as a Safety Assurance Review, applies to modification of existing facilities. The plant location is largely driven by the existence of penstocks that were constructed into Mahoning Dam in expectation of future hydroelectric development. The proposed project, properly designed and constructed will not elevate risk to human life over that which is inherent in the existing project. The IEPR plan need only address the review of critical facilities and will provide an added assurance that the proposed hydropower project will be fully compatible with the existing facilities and operations. It is envisioned that the SAR will include drawings and supporting report information documenting the design of these facilities. The report of the IEPR of the hydroelectric project will be documented in the Section 408 Package.
- b. Products for Review. The Pittsburgh District and applicant will list critical facilities and the documents which cover the design of these facilities for this project. In addition, the IEPR may include environmental considerations.
- c. Required IEPR Expertise. The IEPR panel should consist of at least a three - five person panel with expertise in the following areas: a) structural analysis; b) hydroelectric plant operation; c) geologist; d) engineer with dam safety expertise, and; e) environmental compliance specialist with knowledge of environmental impacts associated with hydropower facilities, and applicable environmental statutes including the National Environmental Policy Act. The Developer is required to use the National Academies of Science (NAS) policy for selecting reviewers and is encouraged to use an Outside Eligible Organization (OEO) for management of the effort. EC 1165-2-209, Appendix E provides information on the selection of panel members. The IEPR panel names were proposed by the applicant to the Pittsburgh District in December 2010. The names and brief synopses of experience of these reviewers are provided as Attachment 4. These reviewers are acceptable to the Pittsburgh District.
- d. Documentation of IEPR. Dr Checks review software will be used to document IEPR comments and aid in the preparation of the Review Report. The IEPR team will prepare a Review Report that will accompany the 408 submittal for the project and shall:
  - \*Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
  - \*Include the charge to the reviewers;
  - \*Describe the nature of their review and their findings and conclusions; and

\*Include a verbatim copy of each reviewer's comments (either with or without specific attributions), along with their resolution.

## 5. MODEL CERTIFICATION AND APPROVAL

- a. Engineering Models. The applicant will specify any engineering models used in the design and evaluation of power plant facilities. During the study phase prior to filing its license application, Mahoning Hydro conducted a hydraulic study using a two-dimensional numerical hydraulic model to evaluate existing and proposed conditions based on operation of the proposed powerhouse on Mahoning Creek downstream from the Mahoning dam stilling basin weir. The model was also used to evaluate the effects of hydro operation on the streambed. No model certification is anticipated.
- b. Environmental Models. The applicant will specify any environmental models used to assess the impact of power plant operation on upstream lake and downstream river water quality and aquatic habitat. To support their water quality analysis, MCHC created a new daily dissolved oxygen simulation model which blends flows through the power house with those released from the dam simulating specific daily conditions as though the plant were in operation between October 1st, 1981 and January 31st, 2007. MCHC also used the results of a 1993 Corps study that in turn used the Corps water quality model CE-QUAL-R1 of the pool and outflow that determined the impacts of the higher elevation withdrawal proposed by an earlier hydropower applicant. The models were apparently deemed acceptable by the FERC. No model certification is anticipated.

## 6. REVIEW SCHEDULE AND COSTS

- a. ATR Schedule and Cost. District review of the DDR will suffice for ATR. Estimated cost is less than \$50,000 to be funded by the Corps.
- b. IEPR Schedule and Cost. To be funded by the licensee. More information will be added when received from the Developer.
- c. Model Certification/Approval Schedule and Cost. Not applicable.

## 7. PUBLIC PARTICIPATION

The public and Governmental agencies have been offered an opportunity to review many of the documents previously prepared and submitted by the applicant and responses to these comments are available in their License Application.

## 8. PCX COORDINATION

Review plans for decision documents and supporting analyses outlined in EC 1105-2-410 are coordinated with the appropriate Planning Center(s) of Expertise (PCXs) based on the primary

purpose of the basic decision document to be reviewed. The lead PCX for this study is the Risk Management Center.

#### 9. MSC APPROVAL

The MSC that oversees the home district is responsible for approving the review plan. Approval is provided by the MSC Commander. The commander's approval should reflect vertical team input (involving district, MSC, PCX, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the review plan is a living document and may change as the project progresses. Changes to the review plan should be approved by following the process used for initially approving the plan. In all cases the MSCs will review the decision on the level of review and any changes made in updates to the project.

#### 10. REVIEW PLAN POINTS OF CONTACT

Questions and/or comments on this review plan can be directed to the following points of contact:

Pittsburgh District Hydropower Coordinator

Great Lakes and Ohio River Division Hydropower Coordinator Manager

Great Lakes and Ohio River Division

Risk Management Center

ATTACHMENT 1

Mahoning Hydropower Corps Team Roster

| Discipline  | Name                   | Office/Agency               |
|---|------------------------|-----------------------------|
| Civil Engineer<br>(Hydropower Coordinator)                |                        | CELRP-BR-EP                 |
| Quality Manager   |                        | CELRP-TS-DC                 |
| Environmental Resource<br>Specialist/NEPA Analysis        |                        | CELRP-BR-EE                 |
| Environmental Protection<br>Specialist/Cultural Resources |                        | CELRP-BR-EE                 |
| Biologist   |                        | CELRP-OP-W                  |
| Hydraulic Engineer/<br>Water Management                   |                        | CELRP-OP-W                  |
| Natural Resource Specialist                               |                        | CELRP-OP-R                  |
| Park Manager/Mahoning                                     |                        | CELRP-OP-SM                 |
| Park Ranger/Supervisory                                   |                        | CELRP-OP-S                  |
| Civil Engineer  |                        | CELRP-OP-MS                 |
| Regulatory Specialist                                     |                        | CELRP-OP-F                  |
| Structural Engineer                                       |                        | CELRP-EC-DS                 |
| Structural Engineer                                       |                        | CELRP-EC-NS                 |
| Civil Engineer  |                        | CELRP-EC-NC                 |
| Geologist   |                        | CELRP-EC-DS                 |
| Hydraulic Engineer  |                        | CELRP-EC-DH                 |
| Electrical Engineer                                       |                        | CELRP-EC-NT                 |
| Mechanical Engineer                                       |                        | CELRP-EC-NT                 |
| Dam Safety Specialist                                     |                        | CELRP-EC-DS                 |
| Real Estate/Mgmt & Acquisition                            |                        | CELRP-EC-RM                 |
| Office of Counsel   |                        | CELRP-OC                    |
| Hydropower Specialist(s)                                  | Will Consult if Needed | Hydroelectric Design Center |

Attachment 2

Documents to be Reviewed

ATR – Tailrace Hydraulic Study (done); Basis of Design (done), DDR, NEPA Documentation,  
Section 106 Programmatic Agreement (done)

IEPR – Section 408 Package including summary of all ATR Reviews

Attachment 3  
ATR Certification Template

## Attachment 4

### Independent External Peer Review Team and Individual Areas of Specialization

#### Areas of Specialization:

Conceptual and final designs for chemical, utility, and municipal solid waste disposal sites including liner systems, leachate management systems, stormwater management systems, operational plans, and capping/closure systems; abandoned mine lands reclamation projects; sludge stabilization and basin/pond closure projects; environmental permitting; hydrologic and hydraulic analyses; quality assurance/quality control monitoring.

#### Areas of Specialization:

Involved with many aspects of civil engineering with a special interest in geotechnical/environmental aspects. Responsibilities have included projects involving Civil Site Design, Geotechnical Design; Solid Waste Management Facility Design including geosynthetic applications; hydrologic, hydraulic design; transportation/highway projects, including geotechnical and right-of-way plans; and municipal water and wastewater projects.

#### Areas of Specialization:

Surface and subsurface hydrology and hydrogeology including contaminant transport and groundwater flow modeling. Hazardous waste remediation, including CERCLA/SARA, RI and FS report compilation. Geological and geotechnical aspects of the siting and design of municipal and industrial waste landfills, foundation recommendations and cut slope designs in soil and bedrock.

**Areas of Specialization:**

Development of baseline recovery and restoration plans, as well as environmental risk assessment (Rosgen trained). Evaluating toxicity data, conducting habitat assessments and biological surveys, conducting biomonitoring and bioaccumulation studies, and NPDES permit development. Review and preparation of environmental assessments, biological assessments, environmental impact studies and other NEPA documents.