IMPLEMENTATION REVIEW PLAN

FOR

Mahoning Creek Hydroelectric Project

Federal Energy Regulatory Commission Project No. 12555

Section 408 Report, Construction and Commissioning

Pittsburgh District

MSC Initial Approval Date: *25 January 2011*

Last Approval Revision Date: *8 February 2013*

US Army Corps
of Engineers ®

Mahoning Creek Dam Hydropower Project
Federal Energy Regulatory Commission Project No. 12555
Decision Document
Request for Approval of Modification and Alteration of Mahoning Creek Dam for the Addition of Non-Federal Hydropower under 33 USC 408

EXECUTIVE SUMMARY

In accordance with the license granted to them by the Federal Energy Regulatory Commission (FERC), Project P-12555, the non-Federal entity Mahoning Creek Hydroelectric Company (MCHC) has submitted a request to begin the initial phases of constructing and operating a hydroelectric generation facility downstream of the existing US Army Corps of Engineers (USACE) facility, Mahoning Creek Dam. The initial phase of work would involve preparation of access to the construction site. As described in the license, the facility will ultimately be comprised of a new intake structure attached to the upstream face of the dam equipped with removable trashracks; a new lining on the existing (currently plugged) 108-inch diameter conduit that passes through the dam; a new 108-inch diameter conduit that passes through the dam; a new buried 1090-foot-long 120-inch diameter penstock on the left (south) bank bifurcating into two new 110-foot-long, 96-inch diameter penstocks; a new powerhouse located about 100 feet downstream of the existing stilling basin weir, with two new Kaplan generator units with a total installed capacity of 6.0 megawatts (MW); a new 2.2 mile-long transmission line; a new bridge spanning a small stream connected to a refurbished existing 0.5 mile-long access road on the left bank, and; and appurtenant facilities. In addition, the licensee will install three new real-time, continuously recording water quality monitors as noted in the Operations Plan (Appendix B) of the enclosed "Request for Approval of Modification and Alteration of Mahoning Creek Dam for the Addition of Non-Federal Hydropower under 33 USC 408."

Pittsburgh District (District) fully reviewed the proposed project concept as embodied in draft Design Documentation Reports and draft Specification documents and recommends allowing the modification of Mahoning Creek Dam for this purpose. The District Engineer certified the Section 408 document on 5 November 2012 and the document was delivered by LRD on 13 November 2012.

The original Review Plan (RP) to guide the review of those technical documents was approved by the Lakes and River Division (LRD) on 25 January 2011. The major review activities pertaining to the design documents consisted of Quality Assurance/Quality Control by the licensee's design contractors, Agency Technical Review (ATR) by District staff, technical review by FERC staff, Independent External Peer Review (IEPR) by outside contractors as identified in the original RP and supplemented and agreed to by the District,

review and input from the Corps Risk Management Center (RMC) and a Potential Failure Mode Analysis involving District, RMC, FERC, Licensee and IEPR staffs. This update of the RP describes the review process of the technical documents and increases the scope of review to include construction and commissioning of the hydroelectric project. Comments on the original review plan, the Independent External Peer Review were provided by the Risk Management Center (RMC) at the request of LRD. This updated RP includes District responses to the RMC. This review plan includes two recommendations of the RMC; one that a Potential Failure Mode Analysis (PFMA) be included to ascertain the incremental impact of the hydroelectric project on Mahoning Creek Dam and that the IEPR activities be extended throughout construction and commissioning. In addition, the IEPR team will be revised to include additional disciplines as determined by review carried out do date. Recent discussions involving the District, Division and RMC staffs determined that consultation with the Hydroelectric Design Center will be required in accordance with paragraph 15 of ER 1110-2-1454. That review will be scheduled to occur as soon as possible, as early as February 2013.

LRD is the approving office for the RP; the 408 document will subsequently be transmitted to HQ for review and approval after comments on that document are adequately addressed.

REVIEW PLAN

Mahoning Creek Hydroelectric Project

Federal Energy Regulatory Commission Project No. 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 (District) Chief of Engineering and Construction is responsible for the review of this project in conjunction with the MSC (CELRD), the Risk Management Center (RMC) as the Review Management Organization (RMO), and the Chiefs of Operation and Project Management. Any proposed modification to an existing Corps project that go beyond those required for normal O&M require approval under 33 USC 408. 33 USC 408 states that there shall be no temporary or permanent alteration occupation or use of any public works without the permission of the Secretary of the Army. Under the terms of 33 USC 408, any proposed alteration or permanent occupation or use of a Federal project will not be injurious to the public interest and will not impair the usefulness of such work. The authority to make this determination and to approve modifications to Federal works under 33 USC 408 has been delegated to the Chief of Engineers. The District Commander's approval of the 408 Report is required for the 33 USC 408 submission to the Chief of Engineers through the Lakes and River Division.

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 were 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.

d. EC 1165-2-209 outlines three levels of review, 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.

i. 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 was performed by the licensee's design contractor Mead and Hunt and Kleinschmidt Associates. 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 Statement of Quality Control/Quality Assurance as provided by a Licensee's contractor is provided as an appendix to the Section 408

Report. The Licensee's QC/AQ team was responsible for a complete review of all documents to assure the overall integrity of the products prior to submission to the District ATR team (See Paragraph ii below). The Licensee's QC teams are shown in ATTACHMENT 1A.

ii. Agency Technical Review (ATR). In accordance with EC 1165-2-209 Frequently Asked Question 2.d, which calls for and allows review by the host district, ATR for this project was a rigorous in-depth review conducted by a qualified team of Pittsburgh District staff. The purpose of this review was 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. 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 Team is shown in ATTACHMENT 1B. The ATR was documented in DrChecks. ATR comments and resolutions of the final review were included in the Section 408 Report.

iii. Independent External Peer Review (IEPR). Based on vertical team discussions and agreements a Type II IEPR, based upon Section 2035 of WRDA 2007, was performed by a team of independent, qualified individuals organized, paid for, and managed by the Licensee. IEPR team comments and Licensee responses were included in the 408 Report. Following Paragraph 13 Special Cases IEPR of EC 1165-2-209 the Developer used the National Academies of Science (NAS) policy for selecting reviewers (conflict of interest forms were completed) and was 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.

iv. Policy and Legal Compliance Review. The Pittsburgh District Office of Counsel performed the policy and legal compliance review of the Section 408 Report and certify legal sufficiency. This compliance review as certified was included in the Section 408 Report.

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) [1] 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 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. Butterfly valve included as redundant closure.
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.

[1] 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.

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 submitted 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 included 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 for critical facilities were developed to a sufficient level for the Section 408 submission, ensuring that sufficient detail was provided to ensure the adequacy of the features/appurtenances provided. The District considers a staged submittal process where less critical submittals could be made subsequent to the development of the Section 408 Report. General discussion was included in the Developer's submittals on construction sequencing of critical facilities. Critical aspects of plant operation were addressed in those submittals including, but 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 Report is complete.

LRP environmental concerns have been documented in many earlier submissions by the Licensee and the FERC, particularly the District April 23, 2010 comments to the Environmental Assessment or EA prepared by the FERC, dated March 2010 (which resulted in the FERC preparing a Supplemental Environmental Assessment or SEA dated October 2010) and November 10, 2010 on the SEA. The EA proposed a minimum flow of 30 cfs through the stilling basin to protect the fishery, however this requirement was not included in the SEA or license issued on 4 March 2011 in response to LRP concerns. FERC stated in the license, "based on the record of this proceeding, including the EA and the comments thereon, that licensing the Mahoning Project as described in this order does not constitute a major federal action significantly affecting the quality of the human environment." District requirements for

water quality were developed in an Adaptive Management Plan as agreed to by the Licensee and are described in the Section 408 Report.

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 performed an In-house ATR on the Developer's plans. In accordance with the requirements noted above, the District ATR team, included engineering, operations, facility, and planning staff. The Developer's design team documented their design in a Design Documentation Report (DDR) and supporting drawings and preliminary plans and specifications generally following the guidance in ER 1110-2-1150 31 Aug 1999 Engineering and Design for Civil Works Projects, and they submitted sufficient details of their proposed operation that were reviewed by district office and project staff. The District PDT deemed these details necessary to provide the level of confidence needed in the project modifications to recommend approval to the District Commander. The Developer's team quality controlled all products before providing them to the District for review. Details of the ATR are provided in the Section 408 submission. The District Commander's approval was obtained prior to submission to the MSC. The District also reviewed all environmental documentation prepared by the Federal Energy Regulatory Commission in conjunction with the forthcoming issuance of the license. As this is a nonfederal project, the District does not perform a BCOE. Documents reviewed by District staff are noted in Attachment 2. District ATR certification of the Section 408 Report is provided herein as Attachment 3.

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. There are two types of IEPR, Types I and II. The Type I IEPR applies to the Federal investment decision. Since there is no Federal investment, a Type I IEPR is not required. Type II IEPR, also known as a Safety Assurance Review, applies to modification of existing facilities. The plant location for this project was 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 needed to only address the review of critical facilities as approved by the District and provide an added assurance that the proposed hydropower project will be fully compatible with the existing facilities and operations. The SAR included drawings and supporting report information documenting the design of these facilities. The report of the IEPR of the hydroelectric project has been documented in the Section 408 Report.

b. Products for Review and Charge. The documents reviewed by the original IEPR team are noted in Attachment 2 and the charge is in Attachment 5. The general charge for the Revised IEPR Team, which will be updated as appropriate throughout construction and commissioning, is also provided in Attachment 5. The District approved the list of critical facilities in the IEPR charge and the documents which cover the design of these facilities for this project. These critical facilities are listed in the Peer Initiator (Charge) document provided in the Section 408 Report. In addition, the IEPR included 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) compliance with the National Environmental Policy Act. The Developer submitted the National Academies of Science (NAS) BI/COI Form 3 (Background Information and Confidential Conflict of Interest Disclosure For General Scientific and Technical Studies and Assistance) to the District for all reviewers and did not 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 Original IEPR panel names were proposed by the applicant to the Pittsburgh District and approved in December 2010 as reflected in the original Review Plan. During the review of this plan in November 2012, revisions to the IEPR team was made at the direction of the RMC to replace and supplement the original reviewers for construction and commission activities, herein called the Revised IEPR team. The names and brief synopses of experience of the Original Team and the new members on the Revised Team are provided as Attachment 4. A final report will be prepared by the new team after commissioning.

d. Documentation of IEPR. Dr Checks review software was not used by the Developer to document IEPR comments. The licensee submitted a general description of the IEPR and all comments and responses. The Section 408 report includes::
*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.

e. IEPR activities will continue through construction and commissioning. Details will be confirmed in discussions between staffs of the District, MSC and Risk Management Center. A final report will be prepared by the Revised IEPR team noting that the project has been constructed and is operating property after commissioning.

5. MODEL CERTIFICATION AND APPROVAL

a. Engineering Models. The applicant were required to 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 was necessary.

b. Environmental Models. The applicant was required to 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 was necessary.

6. REVIEW HISTORY

a. Preliminary Technical Documentation. The District provided input on preliminary powerhouse concept drawings in October 2008 and negotiated the Basis of Design in June 2009.

b. ATR. District review of the DDR, plans and specifications, drawings, and Section 408 report comprised the ATR. A rough cost of about $50,000 was funded by the Corps. District review of the DDR (and plans and specifications and drawings) was conducted on 60% and 90% report versions during Oct 2010 – February 2011 and March 2011 – January 2012. The Section 408 Report was reviewed at various times during 2011, with the final review by Planning, Engineering, Operations and Real Estate Divisions for management certification during January and February 2012.

c. IEPR. These reviews have been or will be funded by the licensee, cost unknown. The review by the initial team was conducted during May – August 2011, after the District completed its review of the 60% draft. DrChecks was not used to document comments. Closure of the review by adequate responses to the comments by the original IEPR team are noted by the certification sheet in Attachment 6. The schedule for the revised review team will be worked out in coordination with between the licensee and USACE.

d. FERC Review. In accordance with license article 302, the licensee submitted the DDR, plans and specification documents and drawings that were reviewed by the District to the FERC for their review. These documents included the District review comments. FERC reviewed these documents approximately January – May 2012. Their original correspondence on March 12, 2012 included 11 comments. The licensee replied by letter dated March 27, 2012 and September 11, 2012. The latest correspondence from FERC to the licensee on October 26, 2012 noted their concurrence with all original comments except one concerning the licensee's original proposal to ford two streams along the access road. This comment has been resolved as the licensee has agreed to eliminate the fords and provide two crossings.

e. Risk Management Center. As part of the review process for the Section 408 Report, three members of the Risk Management Center (RMC) provided comments on the IEPR process and technical comments. These comments and District responses are included in Attachment 7, along with follow-on correspondence noting RMC member approval by the primary team members. More recent discussion with Enduring Hydro and Mead and Hunt resulted in a memorandum satisfactorily addressing the commissioning issue reiterated by Mr. Todaro in his 29 November 2012 e-mail included in Attachment 7.

f. Potential Failure Mode Analysis. On the recommendation of the Risk Management Center (RMC) of USACE, a Potential Failure Mode Analysis (PFMA) was performed prior to approval of the project for construction. The goal of the PFMA was to identify any failure modes that could be introduced or if existing failure modes could be made more likely by construction or operation of the proposed hydropower facilities. The PFMA was conducted in the offices of the USACE on January 8 and 9, 2013 in Pittsburgh, PA. The PFMA session was primarily conducted in accordance with Chapter 14 of the Federal Energy Regulatory Commission (FERC) Engineering Guidelines for the Evaluation of Hydropower Projects (dated July 1, 2005). One of the failure modes was also categorized following USACE Qualitative Risk Assessment guidance in addition to the FERC categories. The PFMA was a joint exercise involving the USACE, FERC, MCHC, Mead & Hunt, Inc. (the design engineer), Ruhlin (the construction contractor), and the Independent Engineering Peer Review (IEPR) team. The RMC also submitted comments to the District Design team that have been forwarded onto them for their consideration. At the time of this Updated Review Plan, the draft PFMA report is being finalized by the licensee based on comments received from the USACE, FERC and IEPR team members. The IEPR team is expected to provide a letter report noting their

observations and optimally their concurrence with the analysis. Risk reduction measures requiring modifications to project design as a result of this analysis will be addressed in the final plans and specifications of the new facilities.

g. Hydroelectric Design Center. At the request of the RMC in January 2013, the HDC staff was contacted to perform review of items listed under their purview in ER 1110-2-1465, paragraph 15. This review will be scheduled to be completed in February 2013 or as soon thereafter as possible.
h. Model Certification/Approval. 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. The Review Plan was placed on the LRP Review Plan page http://www.lrp.usace.army.mil/pm/review_plans.htm on 28 March 2011, providing the public an opportunity to review. The Revised Review Plan will be placed in the same location.

8. RISK MANAGEMENT CENTER (RMC) REVIEW

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 RMC is the Review Management Office when a Type II IEPR (Safety Assurance Review) is required.

9. MSC APPROVAL

The MSC that oversees the home district is ultimately 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, RMC 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 Business Technical Division,

, Great Lakes and Ohio River Division, Business Technical Division,

, P.E., Risk Management Center, (Review Plan and general questions)

, P.E., Risk Management Center, (Type II IEPR)

ATTACHMENT 1A

DEVELOPER PRODUCTION DELIVERY AND QAQC TEAMS

Production Delivery Team	**QAQC Reviewer**
Kleinschmidt Associates Documents	
Licensing Coordinator	Mahoning Creek Hydroelectric Project
Fisheries Biologist	Senior Project Engineer, Mead and Hunt
Terrestrial Biologist	Senior Licensing Coordinator, Kleinschmidt Associates
Mead and Hunt Documents	
Senior Project Manager	Senior Project Engineer, Mead and Hunt
Civil Engineer	Senior Manager, Mead and Hunt

ATTACHMENT 1B

Mahoning Hydropower Agency Review Team Roster

Discipline	Name	Office/Agency
Civil Engineer (Hydropower Coordinator)		CELRP-BR-EP
Quality Manager		CELRP-TS-DC
Environmental Resource Specialist/NEPA Analysis		CELRP-BR-EE
Environmental Protection Specialist/Cultural Resources		CELRP-BR-EE
Biologist		CELRP-OP-W
Hydraulic Engineer/ Water Management		CELRP-OP-W
Natural Resource Specialist		CELRP-OP-R
Wildlife Biologist		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
Geotechnical Engineer		CELRP-EC-DG
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)		Hydroelectric Design Center

Attachment 2

Documents Reviewed by District and IEPR Teams

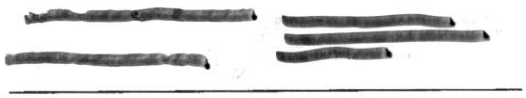
District – Tailrace Hydraulic Study; Recreation Study; Basis of Design , NEPA Documentation, Section 106 Programmatic Agreement, DDR, Plans, Specifications and Drawings, and submittals required by the Construction and Access Memorandum of Agreement (MOA). The following reviews were not completed in DrChecks: Tailrace Hydraulic Study and Recreation Study comments documented in CELRP-OP-R memo dated 25 November 2008; Basis of Design comments documented in MCHC undated MFR. Section 106 Programmatic Agreement comments documented in District letter to FERC dated 19 May 2010, NEPA Documentation in LRP letters to the FERC dated 23 April 2010 (on Environmental Assessment) and 18 November 2010, and MOA submittals, and Construction MOA comments transmitted to Enduring Hydro by e-mail at various times in 2012 and 2013 (reviews are on-going).

IEPR – 408 Report Reference Documents pertaining to the Safety Assurance Review Inclusions listed in the attached Design Memorandum dated May, 2011. The full package submitted by the Applicant for IEPR is in District files and can be furnished upon request.

EXHIBIT 10-3

COMPLETION OF QUALITY ASSURANCE REVIEW AND AGENCY TECHNICAL REVIEW

The District, in coordination with the Mahoning Creek Hydropower Company (MCHC) has completed the Section 408 Package for the Mahoning Creek Hydroelectric Project, Federal Energy Regulatory Commission Project No. 12555, in accordance with the Project Management Plan (March 2011) and Review Plan (January 2011). Notice is hereby given that (1) a Quality Assurance review has been conducted by the applicant and (2) an agency technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. This review included: Design Documentation Report, Technical Specifications, Drawings, and Section 408 material prepared by MCHC, as well as earlier documents including the tailrace hydraulic study, basis for design, license application and environmental assessment prepared either by the applicant or FERC. The in-house agency technical reviews were accomplished by District staff not involved in preparation of the documentation as noted in the Review Plan. Preparation of the Section 408 package required MCHC (Project Sponsor) and District documentation as generally described in the enclosure to CECW-P memorandum dated 17 Nov 2008. All comments resulting from QA and ATR have been addressed adequately by MCHC or District staff. ATR comments and resolutions contained in DrChecks are contained in Section 408 Package Exhibit 10-4.



Hydropower Coordinator

CERTIFICATION OF QUALITY ASSURANCE REVIEW AND AGENCY TECHNICAL REVIEW

The District ATR team has confirmed through review of MCHC materials and discussions that all concerns will be adequately addressed in the final design and other documents to be prepared by MCHC and approved by the District before project construction can commence and the Operations Memorandum of Agreement between MCHC and the District and supporting documents to be prepared by MCHC before operations can commence.

Chief, Planning Programs and Project Management Division

[redacted]

Chief, Engineering & Construction Division

[redacted]

Chief, Operations Division

Attachment 4

Independent External Peer Review (IEPR) Team and Individual Areas of Specialization

, P.E.

Chief Engineer, Licensed Remediation Specialist

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.

, P.E.

Branch Manager

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.

Senior Engineering Associate I, Licensed Remediation Specialist

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.

Senior Scientist I

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.

, P.E.

Areas of Specialization:
Structural design of various residential, commercial, historical renovation, and industrial projects. Supervision of structural steel, footing, backfill, concrete slabs, foundation wall, and overall building inspections. Performs structural evaluations of modifications to existing facilities.

performed the structural analysis and design for the project under subcontract to.

ABOVE REVIEWERS CONSTITUTED THE ORIGINAL IEPR TEAM

Based on recent discussions with LRD and the RMC, only will be carried forward for future IEPR efforts on the Revised IEPR Team, supplemented by the additional staff noted below.

, P.E.

Areas of Specialization:
Geotechnical Engineering Dam Remediation, Structural Engineering Hydraulic Analyses, Civil Engineering Technical Specifications, Bid Document Preparation Construction Cost Estimation and Foundation Recommendations. is an approved FERC Part 12 Inspector, and has conducted a number of dam safety inspections for both Concrete and embankment dams.

, P.E.

Areas of Specialization:
Business Development, Project Management, and Engineering Design for water resources, hydropower, infrastructure, transportation, nuclear power, and other capital projects. Projects have included new hydropower plant planning, licensing, design, and construction management, existing hydro upgrade and relicensing, hydraulic structures, site development, nuclear power plant facilities, and dam inspections and evaluations.

Areas of Specialization:
has 41 years of experience in the Hydro Power Industry. During his time at Voith, served in many functions including those of senior hydraulic design engineer, manager of the hydraulic test laboratory, Vice president of Corporate Research and
Development responsible for design development for Francis turbines, Kaplan turbines, Bulb turbines, Pump Turbines, Pumps and valves. Among key challenges
was the organization of Research and Development programs and teams to achieve defined R&D tool and product needs. was especially active in development of product enhancements to improve the compatibility of hydraulic turbines with the environment. was also active as a principle trouble-shooter in investigating the root causes and finding solutions to turbine and turbine system operational problems in large Francis turbine, Pump Turbine, Impulse turbine, and Kaplan turbine projects.

Attachment 5

Independent External Peer Review Charges

Section 408 Package (Initial Independent External Peer Review Team)

And Construction/Commissioning (Revised Independent External Peer Review Team)

Design Memorandum

Job Name	Mahoning Creek Hydro Project		
Sheet No.	1	of	2
Calculated By	GJK	Date	5/11
Checked By		Date	
Scale	N/A	Job No.	01214-00-10001

Subject: Independent External Peer Review (Initial Team)

1. Overview

According to the USACE's Review Plan for Mahoning Creek Hydroelectric Project – Federal Energy Regulation Commission Project No. 12555 – Section 408 Report – Pittsburgh District, dated January 25, 2011, the following is the USACE's decision on the need for an Independent External Peer Review (IEPR) and a Safety Assurance Review (SAR):

"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 IER, 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 the 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."

EC 1165-2-209, Paragraph 13:

13. Special Cases IEPR.

a. Special cases exist where non-Federal interests undertake the study, design or implementation of a Federal project or a modification to a USACE project. Authorities for such actions include, but are not limited to, 33 USC 408, Sections 203 and 204 of WRDA 1986, Section 206 of WRDA 1992, and Section 211 of WRDA 1996.

b. 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. The non-Federal interest shall make a risk informed decision, as described in paragraph 15 below, on whether to undertake a Type I and/or Type II IEPR. The Federal Advisory Committee Act does not apply to peer reviews undertaken by non-Federal interests. The non-Federal interest is required to use the National Academies of Science (NAS) policy for selecting reviewers and is encouraged to use an OEO for management of the effort.

c. Any IEPR undertaken by a non-Federal Interest shall be submitted as part of the decision package for review by USACE and ultimate action by USACE or Army.

2. Reference Data

A. References

EC 1165-2-209 Water Resources Policies and Authorities - Civil Works Review Policy

B. Reference Documents

The list of critical features that will be included as part of the SAR is based on the following plan set:

- Project Plans - Mahoning Creek Hydroelectric Project, Mahoning Creek, Armstrong County, PA Mead & Hunt, Inc., 4/20/2011, FOR REVIEW ONLY
  - General Sheets: G-001, G-002, G-003, G-004, G-021, G-081, G-082, G-083
  - Geotechnical Sheet: B-051
  - Civil Sheets: C-021, C-022, C-023, C-024, C-025, C-026, C-031, C-032, C-033, C-051, C-101, C-102, C-103, C-104, C-301, C-501, C-502, C-601, C-701, C-702, C-703, C-711, C-712
  - Structural: S-011, S-012, S-013
  - Structural – Trash Rack and Intake Structure: S1-102, S1-103, S1-111, S1-121, S1-131, S1-151, S1-152
  - Structural – Penstock: S2-101, S2-102, S2-103, S2-104, S2-105, S2-106, S2-151, S2-152, S2-191, S2-192, S2-201, S2-211, S2-301, S2-302, S2-401, S2402, S2-501
  - Structural – Stilling Basin Weir South Abutment: S3-101
  - Structural – Powerhouse: S4-011, S4-012, S4-101, S4-102, S4-103 S4-104, S4-105, S4-106, S4-107, S4-108, S4-109, S4-110, S4-111, S4-112, S4-201, S4-202, S4-205, S4-206, S4-301, S4-302, S4-303 S4-304, S4-305, S4-306, S4-307, S4-308, S4-309, S4-310, S4-311, S4-401, S4-402, S4-403, S4-801, S4-802
  - Structural – Retaining Walls: S5-101, S5-111
  - Electrical: E-001, E-011, E4-101, E4-131, E4-141, E0501, E-502, E-701
  - Mechanical: M4-101, M4-131, M4-132, M-501, M-531
- Technical Specifications – Mahoning Creek Hydroelectric Project, updated 4/20/11, FOR REVIEW ONLY
- Design Documentation Report – Mahoning Creek Hydroelectric Project, FERC Project No. 12555, Mahoning Creek, Armstrong County, PA, Mead & Hunt, Inc., updated 4/11/11, FOR REVIEW ONLY

3. SAR System Inclusions

The following systems are deemed as critical facilities are subject to the SAR:

- Stability Analysis
- Geotechnical Investigation
- Trash Rack
- Intake Gate and Gate Operator Support System
- Upstream Vent
- Bellmouth
- Power Conduit Liner
- Butterfly Valve Closure
- Downstream Vent
- Valve Vault/Thrust Restraint
- Hydraulic/Electrical Controls for Gate and Valve

- Penstock
- Penstock Underdrain
- Soldier Pile Wall
- Slope Support (Shotcrete)
- Velocity Meter Vault
- Stilling Basin Abutment Penetration
- Penstock Access
- Bifurcation
- Thrust Blocking/Concrete Bedding
- Turbine Shutoff Valves

Revised Review Team

General Charge Requirements

1) The IEPR panel shall continue IEPR through construction and commissioning.

2) When the details of the commissioning test are provided, the IEPR panel will ensure that emergency closure is required for the upstream wheel gate and butterfly valve. The Commissioning Test Plan should be submitted for review and approval by the District, technical reviewer Sal Todaro of the RMC, the HDC, and the IEPR.

3) The Type II IEPR panel shall review and comment upon any shop drawings, as necessary, to ensure performance of the project and contractor's commissioning plan, as well as typical construction and commissioning visits.

4) At the end of the construction and commissioning phases the IEPR panel shall certify that the project is safe to assume normal operations, looking closely at the design elements, construction activities and shop drawings for the gates and valves, penstock, reaction blocks, and appurtenant works to ensure they are adequate.

5) The IEPR panel must provide a letter report to USACE each time it convenes.

6) The IEPR panel shall confirm that any design modifications that might be required as a result of the PFMA/Risk Assessment, are incorporated into the final plans and specifications.

7) The charge will be updated as necessary throughout construction and commissioning.

Attachment 7

Risk Management Center Endorsement of Revised Plan

And Resolution of Comments

, Risk Management Center East

, Risk Management Center West

DEPARTMENT OF THE ARMY
RISK MANAGEMENT CENTER, CORPS OF ENGINEERS
13952 DENVER WEST PARKWAY SUITE 200
GOLDEN, CO 80401

REPLY TO
ATTENTION OF
CEIWR-RMC-WD

CEIWR-RMC 13 December 2012

MEMORANDUM FOR: Commander, Pittsburgh District, ATTN: CELRP-PM-EF

SUBJECT: Risk Management Center Endorsement – Mahoning Creek Section 408 Hydroelectric Project Review Plan

1. The Risk Management Center (RMC) has reviewed the Review Plan (RP) for the Mahoning Creek Section 408 Project, revised 12 December 2012, and concurs that this RP provides for an adequate level of peer review and complies with the current peer review policy requirements outlined in EC 1165-2-209 "Civil Works Review Policy", dated 31 January, 2010.

2. This review plan was prepared by the Pittsburg District, reviewed by the Great Lakes and Ohio River Division and the RMC, and all review comments have been satisfactorily resolved.

3. The RMC endorses this document to be approved by the MSC Commander. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander's approval memorandum, and a link to where the RP is posted on the District website to Tom Bishop, RMC Senior Review Manager (@usace.army.mil).

4. Thank you for the opportunity to assist in the preparation of this RP. Please coordinate all aspects of the Type II IEPR. For further information, please do not hesitate to contact me at .

Sincerely,

Senior Review Manager
Risk Management Center

CF:
CEIWR-RMC-ZA ()
CELRD (Division Quality Manager)