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July 16, 2013

City of Ann Arbor  
Procurement Unit, 5<sup>th</sup> Floor  
301 East Huron Street  
P.O. Box 8647  
Ann Arbor, MI 48107

Subject: Proposal to Provide Independent Consultant for Part 12 Inspections and Prepare Consultant's Safety Inspection Reports  
Superior Hydroelectric Project (FERC Project No. 3152)  
Barton Hydroelectric Project (FERC Project No. 3142)

To whom it may concern:

Mead & Hunt, Inc. (Mead & Hunt) is pleased to submit this proposal to the City of Ann Arbor (the City) to provide engineering services for the Part 12 safety inspections of the Superior and Barton Hydroelectric Projects (Projects).

### **Project Understanding**

Our proposal is based on the City's Request for Proposal (RFP 853), which was received by Mead & Hunt on April 11, 2013, and information discussed during a teleconference with Ms. Molly Robinson and Mr. Brian Steglitz of the City on June 4, 2013 to further refine the scope of work.

We understand that the City is requesting Mead & Hunt to provide a proposal to act as their Independent Consultant (IC) for the Part 12 safety inspections of the Projects. We further understand that we will be required to prepare Consultant's Safety Inspection Reports (CSIR) to document the findings of our inspections. The inspection of the Projects will be performed in accordance with Part 12, Subpart D, of the Code of Federal Regulations (revised November 20, 2002). Preparation of the CSIRs will be performed in accordance with Chapter 14 – Dam Safety Performance Monitoring Program, of the FERC's *Engineering Guidelines for the Evaluation of Hydropower Projects* (revised July 1, 2005).

In addition to the inspections and reports, we understand that you would like us to address the following:

- Review the recommendations from the 2008 Part 12 Inspection Reports and confirm if they have been addressed. If there are outstanding recommendations, determine if those recommendations are still valid, and if they remain valid, include the recommendations in the 2013 inspection reports.

- Investigate the cause of the fines migration through several weep drains within the right embankment at Barton Dam and propose remedies if necessary.
- Investigate how the City controls flow through both Projects and provide recommendations on how the City may reduce flow fluctuations downstream.
- Perform soundings upstream and downstream of the spillway and powerhouse structures at both projects and compare with previous river sounding results.
- Perform a detailed inspection of the gates at the Projects. The inspection shall be performed in accordance with FERC guidelines.
- Survey the monuments at the Projects and compare with previous survey results.

We understand that the CSIRs must be complete and submitted to the FERC by December 31, 2013.

### **Professional Qualifications**

Mead & Hunt brings 113 years of experience in dam safety engineering to every Part 12 inspection we perform. You will benefit from having Mead & Hunt on your team as an industry leader in dam safety for FERC-regulated dams. We pride ourselves on having successfully performed over 600 FERC Part 12 inspections since the FERC's Consultant's Safety Inspection process began in 1967.

### **Independent Consultant – Warren Hayden, PE**

Warren Hayden was approved by the FERC as an Independent Consultant (IC) for the Part 12 inspection of the following FERC-regulated projects:

- Cranberry Lake Hydroelectric Project (NY)
- Kayuta Lake Hydroelectric Project (NY)
- Ozark Beach Hydroelectric Project (MO)
- Rhinelander Hydroelectric Project (WI)
- Kaukauna City Plant (WI)
- Lockhart Hydroelectric Project (SC)
- Middle Fork Dam (CA)

Warren has more than 20 years of hydraulic engineering experience analyzing and designing water resources projects. He has provided hydrologic analysis and hydraulic design for dam improvements, flood control, and storm water management facilities. His design experience includes new earthen embankment dams, concrete dam rehabilitation, spillway capacity upgrade alternatives, storm water management facilities, and streambank stabilization revetments. He has conducted more than 40 dam

safety inspections for state-regulated dams and served as the independent consultant for Part 12 safety inspections and potential failure mode analyses at FERC-regulated projects throughout the United States.

Warren's project experience includes dam inspection and rehabilitation, small hydropower design and construction, floodplain modeling and mapping, dam breach modeling and mapping, and hydraulic modeling for highway bridges. He is experienced in rainfall-runoff modeling, including determining the Probable Maximum Flood (PMF) using HMR 51-52 and site specific studies for Wisconsin-Michigan and Nebraska, and hydrologic routing using HEC-1. He has developed dozens of both steady and unsteady one-dimensional hydraulic models using HEC-RAS, DAMBRK, UNET, HEC-2, and WSPRO.

### **References**

Below you will find a list of references for which Mead & Hunt has performed Part 12 inspections in the last 5 years.

- Kaukauna Utilities (Kaukauna City Plant), Mike Pedersen, 920-462-0220
- Gresham Municipal Utilities (Weed Dam), Art Bahr, 718-787-3994
- Lockhart Power Company (Lockhart Hydroelectric Project), Jim Seay, 864-545-2593

### **Detailed Gate Inspection – Jeff Anderson, PE**

Our gate inspection team will be led by Jeff Anderson. Jeff is also a FERC-certified IC and has performed detailed inspections on over 100 gates in a variety of types and sizes throughout the United States. If the inspection identifies issues requiring remediation, Jeff has experience providing reinforcement design. For example, Jeff was responsible for the initial evaluation, reinforcement design and follow-up performance testing of the spillway tainter gates at the Rocky Reach Hydroelectric Project on the Columbia River in Washington. Strain testing data was used to establish "real world" stresses in key structural members, helping evaluate the gates. Jeff presented a technical paper on the benefits of tainter gate testing at the national Waterpower conference in 2009.

Resumes for both Warren and Jeff can be found in Attachment A to this proposal.

### **Work Plan (Scope of Services)**

Mead & Hunt will provide an IC to perform the Part 12 safety inspection of the Projects. We propose Warren Hayden to act as your IC, with Jeff Anderson as an alternate. The resumes of both FERC-certified ICs are presented in Attachment A. After receipt of authorization to proceed, Mead & Hunt will perform the following tasks:

#### **Task 1 – Review Previous Documentation**

Prior to the field inspection, our IC will review and discuss the developed potential failure modes (PFMs) for the Projects with representatives from the City and the FERC-assigned inspector. The purpose of this exercise is to confirm that the existing PFMs are appropriately categorized and that there are no additional PFMs that warrant consideration and development. The PFM review will provide a basis for conversations and observations made during the field inspection.

As a result of the FERC's recent initiative to ensure that each PFM is fully described in development from initiation through to potential loss of the reservoir, and after reviewing the PFM descriptions as they presently exist for both Projects, we have concluded that it will be necessary to more fully describe all of the PFMs at each Project. Our IC will lead a group discussion with representatives from the City and the FERC to revise the PFM descriptions so that they fully describe the mode of failure. We anticipate the effort to revise the descriptions of the PFMs with the group discussions to take approximately eight hours per Project.

Our IC will also review the Supporting Technical Information Documents (STID) for the Projects to verify that the existing analyses conform to the current FERC guidelines. As part of the STID review, the IC will review the Dam Safety Surveillance and Monitoring Reports (DSSMR), maintenance reports, and documents associated with recent improvements at each Project. In addition, the IC will review the recommendations made by previous IC's in the 2008 Part 12 Inspection Reports and confirm that they have been addressed. If there are outstanding recommendations, the IC will determine if those recommendations are still valid and make appropriate recommendations in the 2013 CSIR.

#### **Task 2 – Independent Consultant's Safety Inspections**

The IC will perform the Part 12 safety inspections of the Projects concurrently with, but independently of the designated FERC inspector. During the field inspection, our IC will visually inspect for indications of movement, settlement, cracking, erosion and scouring, undermining, seepage, leakage, general condition of the Project structures, and mechanical and safety equipment operating condition in accordance with FERC requirements. The inspections will also include wading within the interior of each dam to observe the concrete conditions on the interior of the structures. The IC will take digital photographs of the conditions encountered during the field inspections.

The IC will pay particular attention to the seepage drains within the right embankment of Barton Dam. We understand that the City has been experiencing fines migration through a few of the drains. The IC will investigate the cause of the fines migration and identify alternatives for remediation in the CSIR if needed.

#### **Task 3 – Downstream Soundings**

Mead & Hunt will perform soundings downstream of the spillway and powerhouse structures at both Projects. The results of the survey will be compared with previous river soundings to determine if significant changes have occurred.

#### **Task 4 – Monument Survey**

Mead & Hunt will perform a survey of the existing control monuments at both Projects. The results of these surveys will be compared with previous surveys to identify developing trends and determine if significant movement of the water-retaining structures has occurred.

#### **Task 5 – Detailed Gate Inspection**

Mead & Hunt will perform a detailed, up-close inspection of the 11 tainter gates at the Projects. Rock-climbing techniques will be utilized to safely obtain access to the gates to perform our inspections. The scope of these

inspections will be limited to the visible portions of the gates. For safety reasons, we request that the gate inspections be scheduled when the spillway is not in operation.

We will prepare a report summarizing the findings of our inspections of the tainter gates. This report will include an evaluation of the general condition of the gates, as well as our opinion of the structural integrity of the gates based on our review of the available documentation, our inspections, and past experience with similar gates. We will also note any specific observations of conditions that may require remedial repair. Current conditions observed during our inspection of the gates will be documented with digital photographs, which will be included in a CD in the inspection report.

#### **Task 6 – Evaluation of Project Operations**

The IC will discuss current Project operations with the City's operating staff during the Part 12 inspections and provide suggestions in the CSIRs (if any) for altering Project operations to reduce flow fluctuations downstream. The IC will also identify additional studies or analyses that may be used to improve Project operations for this purpose.

#### **Task 7 – Preparation of *Consultant's Safety Inspection Reports***

Our IC will oversee preparation of the CSIRs for the Part 12 inspections of the Projects. The CSIRs will be prepared in accordance with the FERC regulations and guidelines referenced in the Project Understanding section of this proposal. This report will state that we have reviewed the previous analyses' assumptions, methodologies, and conclusions, and whether we agree with their findings. The report will also include our findings from the following:

- Downstream soundings
- Monument surveys
- Detailed gate inspections
- Evaluation of project operations

#### **Task 8 – Analysis of Barton Dam Embankment Fines Migration**

We will engage our staff of geotechnical engineers to review the available documentation related to the original design of the embankment and any modifications made since its original construction. Our geotechnical engineers will review all the analyses, evaluations, investigations, studies, and designs associated with the embankment that the City makes available to us. Following our review of the historical documentation, we will provide a letter report presenting a summary of the known conditions based on the previous investigations, and offer recommendations for further analyses, if warranted.

#### **Task 9 – Updates to the STIDs**

For each Project, we will update Section 1 of the STID to incorporate the revised PFM descriptions developed under Task 1. We will also update Section 10 of the STID for each Project to include pertinent correspondence, furnished to us by the City, since the last revision to the STID.

This Scope of Services assumes the following:

- All previous evaluations of the Project are accepted by the FERC and no additional analyses are required to prepare the CSIR. We will only review the existing analyses included in the STID to confirm that they conform to current guidelines.
- No issues will come to light that will require new investigations or analyses. If additional investigations or analyses are required, we would be pleased to provide the City with a proposal to provide these additional services.

## Deliverables

Mead & Hunt will provide the City with the following deliverables as part of our Scope of Services:

Draft CSIR ..... 2 hard copies and a PDF copy for each Project  
Final CSIR .....6 hard copies and a DVD containing PDF and Word files for each Project  
Analysis of Embankment Fines Migration ..... 1 hard copy and PDF copy of letter report

## Schedule

Mead & Hunt will complete the Scope of Services in accordance with the following schedule:

City Council Authorization ..... August 15, 2013  
Part 12 inspection of Projects ..... October 8, 2013\*  
Draft CSIR to the City for review ..... within 6 weeks of inspection of Project  
Receive the City's comments on draft CSIR ..... within 2 weeks of receiving draft CSIR  
Final CSIR to the City ..... December 6, 2013

\* *Date tentative. Actual inspection date will be mutually agreeable to the City, Mead & Hunt, and the FERC.*

## Responsibilities of the City

Our Scope of Services and Compensation are based on the City performing or providing the following:

- A designated representative with complete authority to transmit instructions and information, receive information, interpret policy, and define decisions.
- A copy of the most recent revision of the STIDs for the Projects (in editable electronic format) at least two weeks prior to the field inspection.
- A copy of the 2008 CSIRs (in editable electronic format) at least two weeks prior to the field inspection.
- Participation in pre-inspection conference calls and the PFM review, as required, to coordinate the inspection.
- Access to the Project sites.

- A representative or dam operator during the PFM review and field inspection to discuss Project operations and maintenance.
- Available data and information related to Project operations.
- Ability to lock out tainter gates for the duration of the gate inspections.
- Boat and operator to perform the downstream soundings.
- Ability to adjust flow releases to facilitate the downstream soundings.
- Data plots for all active instrumentation at the Projects formatted in accordance with FERC report submittal requirements.
- Project plan drawings for both Projects (in AutoCAD format if possible) for use as sounding contour base plan.
- Review of the draft CSIR within two weeks of receipt.
- Protection of Mead & Hunt-supplied digital information or data, if any, from contamination, misuse, or changes.

### **Compensation**

The work described under the Scope of Services will be performed on a lump-sum basis. The City of Ann Arbor will pay Mead & Hunt \$53,600 as engineering fees for the work performed under this contract.

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### **Authorization**

The Scope of Services and Compensation stated in this proposal are valid for a period of ninety (90) days from date of submission. If authorization to proceed is not received during this period, this proposal may be withdrawn or modified by Mead & Hunt.

Mead & Hunt is prepared to enter into an agreement to provide these services using the sample contract language provided in the RFP. We will provide certificates of insurance that meet or exceed the minimum requirements identified in the RFP (Sample Agreement Exhibits, Exhibit C, Insurance Requirements).

We appreciate the opportunity to submit this proposal to the City and look forward to assisting you with the continued safe operation of these valuable projects.

Respectfully submitted,

MEAD & HUNT, Inc.



Carson Mettel, PE  
Manager, Water Resources Department  
Vice President

Attachments



**Attachment A. Key Staff Resumes**

## WARREN HAYDEN, PE WATER RESOURCES ENGINEER

Warren Hayden has 19 years of hydraulic engineering experience analyzing and designing water resources projects. He has provided hydrologic analysis and hydraulic design for dam improvements, flood control and storm water management facilities. His design experience includes new earthen embankment dams, concrete dam rehabilitation, spillway capacity upgrade alternatives, storm water management facilities, and streambank stabilization revetments. He has conducted more than 40 dam safety inspections for state-regulated dams and served as the independent consultant for potential failure mode analyses at Federal Energy Regulatory Commission (FERC)-regulated projects.

Warren's project experience includes dam inspection and rehabilitation, small hydropower construction, floodplain modeling and mapping, dam breach modeling and mapping, and hydraulic modeling for highway bridges. His analysis experience includes determining the Probable Maximum Precipitation (PMP) using HMR 51 and 52, rainfall-runoff modeling, dam breach modeling, and hydrologic routing using HEC-1. He has conducted steady flow hydraulic modeling using HEC-RAS, HEC-2, and WSPRO; and unsteady flow hydraulic modeling using HEC-RAS, DAMBRK and UNET.

Warren also has research experience designing physical hydraulic model investigations for control and conveyance hydraulic structures, notably vortex-flow drop structures for deep-tunnel sewer systems.

### RELATED PROJECTS (DAMS & HYDROPOWER)

#### **Black River Falls Hydroelectric Project Black River Falls Municipal Utilities Black River Falls, Wisconsin**

Warren served as project manager for the design of a new gated spillway and addition of a new hydroelectric unit at the Black River Falls Dam. He oversaw preparation of construction plans, technical specifications, and the design report; prepared contract documents; coordinated design activities between civil, mechanical, and electrical disciplines; and served as primary point of contact for project communication with the owner. Warren also coordinated the preparation of an application for a certificate of authority from the Public Service Commission of Wisconsin and addressed design review comments from the FERC. He is currently the project manager and quality control and inspection plan (QCIP) manager for the construction administration of the civil work contract and to two separate equipment procurement contracts.

#### **Part 12D Inspections**

##### **Various Clients**

##### **California and South Carolina**

Warren was approved as an independent consultant for the following FERC projects. He participated in the Part 12D safety inspection and preparation of the Consultant Safety Inspection Report.

- Lockhart Hydroelectric Project, FERC No.2620-SC
- Middle Fork Dam, FERC No. 7506-CA



#### Areas of Expertise

- FERC-approved independent consultant
- New dam design
- Dam rehabilitation design
- Small hydropower design
- Construction plans and specifications
- Dam breach studies
- Hydraulic and hydrologic modeling
- Storm water management design
- GIS floodplain mapping

#### Education

- MS, Civil and Environmental Engineering, Hydraulics, University of Iowa, 1993
- BS, Civil and Environmental Engineering, University of Wisconsin, 1991

#### Registration

- Licensed Professional Engineer – Illinois, Michigan, South Carolina, Virginia and Wisconsin
- National Council of Examiners for Engineering and Surveying (NCEES) Council Record

#### Memberships

- American Society of Civil Engineers
- Association of State Dam Safety Officials

#### Past Employment

- Dewberry & Davis, LLC
- Short Elliott Hendrickson, Inc.

#### No. of Years With Mead & Hunt

- Hired 10/18/04

#### No. of Years With Other Firms

- 11 years

## WARREN HAYDEN, PE (CONTINUED)

### Potential Failure Mode Analyses

#### Various Clients

##### Wisconsin and Michigan

Warren participated in the potential failure mode analysis for the following FERC projects. He toured the site, reviewed available background information, served as an independent consultant for the identification and development of failure modes, and wrote the summary report.

- Rapide Croche Hydroelectric Project – Kaukauna, Wisconsin
- Little Chute Hydroelectric Project – Combined Locks, Wisconsin
- Combined Locks Hydroelectric Project – Kaukauna, Wisconsin
- Kimberly Hydroelectric Project – Kimberly, Wisconsin
- Sturgeon Falls Hydroelectric Project – Norway, Michigan
- Black River Falls Hydroelectric Project – Black River Falls, Wisconsin

### Dam Safety Inspections

#### Various Clients

##### Wisconsin, Virginia, Maryland, Illinois

Warren was the project engineer and inspector responsible for dam safety inspections for the following state-regulated dams. He was responsible for conducting the inspection, performing or overseeing necessary analyses and documenting findings and conclusions in the inspection report.

- Marion – Marion, Wisconsin
- Cadott – Cadott, Wisconsin
- Albany – Albany, Wisconsin
- Brodhead – Brodhead, Wisconsin
- Oxford – Oxford, Wisconsin
- Wood County Park Upper – Wood County, Wisconsin
- Wood County Park Lower – Wood County, Wisconsin
- Dexter – Wood County, Wisconsin
- Angelo – Monroe County, Wisconsin
- Lake of the Woods – Orange County, Virginia
- Keaton's Run – Orange County, Virginia
- Lake Jackson – Prince William County, Virginia
- Goshen – Goshen, Virginia
- Piedmont Virginia Community College – Charlottesville, Virginia
- Prince William Parkway – Prince William County, Virginia
- Northern Virginia Community College Annandale – Annandale, Virginia
- Northern Virginia Community College Woodbridge – Woodbridge, Virginia
- Lake Accotink – Springfield, Virginia
- Lake Fairfax – Fairfax County, Virginia
- Lake Thoreau – Reston, Virginia
- Lake Audubon – Reston, Virginia
- Lake Anne – Reston, Virginia
- Lake Newport – Reston, Virginia
- Indian Creek No. 2 – Prince George's County, Maryland
- Indian Creek No. 3 – Prince George's County, Maryland

## WARREN HAYDEN, PE (CONTINUED)

- Laurel Lakes No. 1 – Prince George’s County, Maryland
- Northampton – Prince George’s County, Maryland
- Grant Lake – Spotsylvania County, Virginia
- Lee Lake – Spotsylvania County, Virginia
- Wilderness Run Lake – Spotsylvania County, Virginia
- Udey – Columbus, Wisconsin
- Neenah – Neenah, Wisconsin
- Wire and Nail – Cedarburg, Wisconsin
- Columbia Mills – Cedarburg, Wisconsin
- Ruck – Cedarburg, Wisconsin
- Woolen Mill – Cedarburg, Wisconsin
- Fish Hatchery – Delafield, Wisconsin
- Nemahbin Roller Mill – Delafield, Wisconsin
- Fourth Street – Stoughton, Wisconsin
- Lake Summerset – Lake Summerset, Illinois

### **Fourth Street Dam Rehabilitation**

#### **City of Stoughton**

#### **Stoughton, Wisconsin**

Warren was the project manager and principal designer for this dam rehabilitation project that involved replacement of two tainter gates and a bulkhead gate as well as extension of a storm drain box culvert, embankment grading, reconstruction of spillway rollways, addition of electric hoists, and concrete patching of the spillway structure. Warren oversaw preparation of construction plans, edited technical specifications, prepared contract documents, and administered the bidding. He also managed the construction administration of the project and provided periodic on-site inspection, addressed contractor requests for information, processed contractor pay requests, conducted final inspection, and oversaw preparation of record drawings.

### **Hatfield Dam Inflow Design Flood and Inundation Mapping**

#### **North American Hydro, Inc.**

#### **Hatfield, Wisconsin**

Warren determined the inflow design flood (IDF) for the Hatfield Hydroelectric Project by modeling failures of the dam using DAMBRK and assessing the incremental hazard downstream at various ratios of the probable maximum flood (PMF). He also produced inundation mapping for the sunny-day and IDF dam failures and wrote Appendix A for the emergency action plan (EAP).

### **Five-In-One Hydroelectric Project Future Disposition Study**

#### **City of Cedar Rapids**

#### **Cedar Rapids, Iowa**

Warren was the project manager for this study to evaluate alternatives for the future disposition of a hydroelectric project that had been damaged by ice and later inundated by flooding. The economic viability of seven alternatives were evaluated based on net present value for assumed City cost shares ranging from 10 to 100 percent.

## WARREN HAYDEN, PE (CONTINUED)

### **Lake Summerset Dam Lake Summerset Association Davis, Illinois**

Warren has conducted the past five annual dam safety inspections of this high-hazard dam. He wrote the inspection reports detailing the findings of the inspection and provided recommendations for maintenance. Reports included photographic documentation and required state dam safety inspection checklist.

### **Willow Dam Road, Tomahawk River Bridge and Approaches Little Rice, Wisconsin**

Warren provided plan review and cost estimates for the construction engineering portion of this project. Mead & Hunt designed a new bridge crossing the Willow Dam, a FERC-regulated high-hazard structure creating the Willow Flowage, a 6,300-acre reservoir at the confluence of three tributaries of the Wisconsin River. Project included bridge and roadway design, dam modifications design, analysis of flood hydraulics of the dam and spillway, geotechnical analyses of the dam and retaining walls and dikes, handicapped trail design compliant with the standards of the Americans with Disabilities Act (ADA), and fence, gate, and stairway design.

### **Natomas Levee Improvement Program (NLIP) Sacramento Area Flood Control Agency (SAFCA) Sacramento, California**

Mead & Hunt is a key design engineer for this \$600 million project. It is one of the largest flood control projects underway in the US. It protects 80,000 people and \$70 billion in infrastructure. Mead & Hunt has a significant role in the project as the designer for the landside facilities and overall project quality control. Our design responsibilities include relocating the impacted conveyance canals and pipelines, modifying several pump stations, replacing two large pump stations, designing and coordinating the borrow sites, controlling quality for the client, and coordinating with major stakeholders. Mead & Hunt is responsible for more than 800 plan sheets, technical specifications, and bid documents for this project. Warren wrote and edited technical specifications for the relocation of private irrigation wells and water distribution piping as part of the NLIP.

### **Ralston Afterbay Dam Spillway and Tailwater Rating Placer County Water Agency Auburn, California**

Warren managed the project involving preparation of documentation which explained the elements of the Excel spreadsheet developed to compute the spillway discharge rating at the Ralston Afterbay Dam. The project also included developing a tailwater rating for the dam and checking for submergence effects on the spillway discharge rating. Warren acted as liaison between the client and project engineer, and provided final editing and quality assurance of deliverable documents.

### **Hell Hole Dam Spillway Rating Placer County Water Agency Auburn, California**

In response to comments from the FERC on the PMF study for the Hell Hole Dam, Warren researched the origin and evolution of the spillway rating for the Hell Hole reservoir from design documentation to the recent PMF study. Since the existing spillway rating did not extend to the PMF inflow to the reservoir, Warren developed a new spillway rating for the dam based on procedures presented in the Bureau of

## WARREN HAYDEN, PE (CONTINUED)

Reclamation publication, Design of Small Dams. Subsequently updated the spillway rating in the HEC-1 model and routed the PMF through the reservoir to determine the PMF reservoir stage.

### **Gated Spillway Feasibility Study Black River Falls Municipal Utilities Black River Falls, Wisconsin**

Warren served as project manager for this study to evaluate alternatives to rehabilitate or rebuild the gated spillway at the Black River Falls hydroelectric project. The study addressed alternatives to rehabilitate the existing spillway, rebuild a new spillway in the existing location, or rebuild a new spillway downstream of the existing dam using either impoundment draw down or cofferdam diversion schemes. The study also investigated the addition of a minimum flow unit at the spillway to satisfy minimum flow release requirements and increase hydroelectric generation at the project. Following conceptual development of spillway alternatives and layout of the minimum flow unit, opinions of probable cost were developed for all rehabilitation, reconstruction and removal options considered.

### **Fourth Street Dam Evaluation City of Stoughton Stoughton, Wisconsin**

Warren was the project manager for this dam evaluation study. The study included dam and adjacent powerhouse inspection, topographic site survey, hydrologic and hydraulic analysis of the existing spillway, stability analyses of the existing structures and embankments, dambreak modeling and inundation mapping, and investigating necessary repairs to resume hydropower generation at the site.

### **Napa River Comprehensive Flood Protection Project City of St. Helena St. Helena, California**

Warren coordinated preparation of 30, 60, and 90 percent design plans for this flood protection project along the Napa River. The project included a 1,900-foot levee, 2,000-foot floodwall, and interior drainage storm water pond and pumping facility. Warren designed a levee/floodwall profile and edited technical specifications for construction documents.

### **Neenah Dam Rehabilitation Neenah and Menasha Water Power Company Neenah, Wisconsin**

Warren prepared plans and specifications for this dam rehabilitation project. The project involved fabricating and installing five new tainter gates, and resurfacing the fixed-crest overflow spillway. Warren wrote the permit application and coordinated the Wisconsin Department of Natural Resources (DNR) review. He provided assistance during construction including periodic inspecting, overflow spillway crest surveying, responding to contractor's questions, and preparing as-built drawings.

### **Neenah Dam Inspection, Emergency Action Plan (EAP), Operation, Inspection, and Maintenance (OIM) Plan Neenah and Menasha Water Power Company Neenah, Wisconsin**

Warren inspected the dam and wrote a report presenting findings and recommended

## WARREN HAYDEN, PE (CONTINUED)

repairs. He wrote the OIM plan document and oversaw inundation mapping and EAP document preparation.

### **Delafield Dams Rehabilitation Feasibility Study**

**City of Delafield**

**Delafield, Wisconsin**

Warren inspected of the Fish Hatchery Dam and Nemahbin Roller Mill Dam. He oversaw a feasibility study preparation to evaluate repair or replacement alternatives and provided an economic assessment of hydroelectric generation potential at each dam. Inspections at both dam sites included coordinating with a private hydropower developer and equipment supplier to investigate the addition of a hydropower facility.

### **Oconto Falls DAMBRK and Inundation Mapping**

**North American Hydro, Inc.**

**Oconto Falls, Wisconsin**

Warren modeled a sunny-day dam failure of Upper Oconto Falls Dam with domino failure of Lower Oconto Falls Dam using DAMBRK. He prepared inundation maps and helped revise a section of the emergency action plan (EAP).

### **Udey Dam Evaluation**

**City of Columbus**

**Columbus, Wisconsin**

Warren performed a dam inspection and prepared cost estimates to rehabilitate or remove the dam. He oversaw stability analysis preparation and wrote the final evaluation report presenting inspection findings, repair or removal cost estimates, and dam hydroelectric generation potential assessment.

### **Bryzek Dam Record Documents**

**Carl Bryzek Farm, LLC**

**Paddock Lake, Wisconsin**

Warren performed the inspection and coordinated as-built survey of this small, privately owned dam. He wrote the evaluation report and oversaw production of record drawings and stability analysis.

### **Castle Rock Dam Toe Drain Repairs**

**Wisconsin River Power Company**

**Necedah, Wisconsin**

Warren provided on-site consultation for repairs to the clogged toe drain on a portion of the embankment dike. He wrote the summary report chronicling field events from detection of sand in discharge to cleaning and replacing the toe drain.

### **Neenah Dam Control Point Survey**

**Neenah and Menasha Water Power Company**

**Neenah, Wisconsin**

Warren inspected the fixed-crest overflow spillway and surveyed control points along the dam. He wrote the report presenting results of the control point survey.

## WARREN HAYDEN, PE (CONTINUED)

### RELATED PROJECTS WITH OTHER FIRMS

#### **New Big Cherry Dam Town of Big Stone Gap Big Stone Gap, Virginia**

Warren was the project engineer responsible for designing hydraulic components and civil site work associated with a new roller-compacted concrete (RCC) dam. He provided hydrologic analysis, ogee spillway hydraulic design, energy dissipater design, and safe yield reservoir analysis. He designed site access roads, construction staging areas, and the stream diversion concept. Warren prepared construction plans and specifications for site work and stream diversion, and coordinated project plans and specifications preparation with geotechnical, structural, and electrical/mechanical subconsultants. He also conducted a field reconnaissance of the dam site and downstream reaches as part of the initial design phase.

#### **Lake Accotink Dam Repairs Fairfax County Springfield, Virginia**

Warren conducted a concrete delamination survey of the ogee spillway, abutment walls, and stilling basin. He prepared construction plans and specifications for repairing the damaged concrete areas and replacing the flashboard system.

#### **Lake Jackson Dam Prince William County Prince William County, Virginia**

Warren was the project engineer responsible for the dam safety inspection and re-inspection report submittal to the Virginia Division of Dam Safety. He also conducted a subsequent inspection of the spillway concrete surfaces and tainter gate structure and seals. Warren produced construction plans and specifications for painting the gate, repairing concrete surfaces, and replacing gate seals. He also provided submittal reviews and responded to contractor questions during construction.

#### **North Fork Pond 1 Dam University of Virginia Research Park Albemarle County, Virginia**

Warren was the project engineer responsible for hydrologic design of the zoned earthen dam with a drop inlet principal spillway and vegetated earth auxiliary spillway. He designed spillway structures and prepared construction plans for review and permit approval from Virginia Division of Dam Safety.

#### **Northern Virginia Community College Dams Northern Virginia Community College Annandale and Woodbridge, Virginia**

Warren was the project engineer responsible for dam safety inspections of embankment dams on the Annandale and Woodbridge campuses. He directed as-built report production, hydrologic modeling, preliminary dam breach inundation mapping, emergency action plan (EAP), and operation and maintenance (O&M) plan for each dam.



## WARREN HAYDEN, PE (CONTINUED)

### **Goshen Dam**

#### **Boy Scouts of America, National Capital Chapter**

#### **Goshen, Virginia**

In 1998, Warren performed a dam safety inspection and submitted an application package including re-inspection report, emergency action plan (EAP), and operation and maintenance (O&M) plan to the Virginia Division of Dam Safety. He also wrote an O&M manual providing current inspection, operation, and maintenance guidance in one complete document. In 2000 and 2002 performed dam safety inspection, updated EAP and O&M, and submitted application package to Division of Dam Safety.

### **Lake of the Woods (LOW) Dam and Keaton's Run Dam**

#### **Lake of the Woods Association**

#### **Orange County, Virginia**

Warren was the project engineer responsible for dam safety inspections of the LOW Main Dam and Keaton's Run Dam. He performed dam safety inspections and submitted re-inspection reports to the Virginia Division of Dam Safety. He also performed a study of alternatives for increasing spillway capacity at each dam to convey the full Probable Maximum Flood (PMF). Options considered included overtopping protection, principal spillway enlargement, fuse plug, and spillway enlargements in conjunction with a rubber dam. In 2001 and 2003, Warren performed dam safety inspections of Main Dam and Keaton's Run Dam, and prepared application packages including a re-inspection report, and an updated emergency action plan (EAP) and operation and maintenance (O&M) plan. In 2004, he prepared plans and specifications for evaluation and retrofit, or decommissioning of the low-level drain at the Main Dam. He oversaw a study and cost estimate preparation for alternatives to increase spillway capacity at Main Dam.

### **Fawn Lake Dam Breach Analysis**

#### **ECS, Ltd.**

#### **Spotsylvania County, Virginia**

Warren was the project engineer responsible for a dam breach inundation study downstream of this significant hazard dam. He developed the hydrologic and hydraulic models, conducted dam breach modeling, and produced inundation zone mapping using ArcView GIS.

### **Lake Wilderness Dams Breach Analyses**

#### **ECS, Ltd.**

#### **Spotsylvania County, Virginia**

Warren was the project engineer responsible for dam breach inundation study downstream of three significant-hazard dams in series. He developed Probable Maximum Precipitation (PMP) estimates from HMR 51 and HMR 52, oversaw development of hydrologic and hydraulic models, reviewed dam breach modeling, and produced inundation zone mapping using ArcView GIS.

### **Reston Association Dam Inspections**

#### **Reston Association**

#### **Reston, Virginia**

Warren was the project engineer responsible for conducting quarterly dam safety inspections at two high-hazard and two significant-hazard embankment dams owned and maintained by the Reston Association. His inspection duties included completing safety checklists, monitoring water levels within observation wells, and measuring

## WARREN HAYDEN, PE (CONTINUED)

discharges from internal drainage systems. Warren completed and filed re-inspection reports to the Virginia Division of Dam Safety for Lake Thoreau and Lake Newport Dams.

**Burke Centre Ponds Study**  
**Burke Centre Conservancy**  
**Burke, Virginia**

Warren was the project engineer responsible for leading inspections of six impounding structures and overseeing a hydrologic analysis of each pond. He coordinated a bathymetric survey of ponds and wrote a detailed report for each pond outlining results of the hydrologic analysis and spillway capacity determination. The report also identified maintenance items, recommended rehabilitative actions, and estimated implementation costs.

**Bridle Lake Dam Hydrologic Analysis**  
**ECS, Ltd.**  
**Spotsylvania County, Virginia**

Warren was the project engineer responsible for determining existing spillway capacity at this significant-hazard dam. He conducted a hydrologic analysis of the watershed and prepared approximate dam breach inundation zone mapping using ArcView GIS.

**Rock Creek Streambank Stabilization**  
**National Park Service**  
**Washington, DC**

Warren directed a field survey of stream cross sections at six locations exhibiting severe streambank erosion within Rock Creek Park. He prepared construction plans and specifications for armoring the streambank at six project sites, and coordinated plan review and revisions with the National Park Service.

**Oxon Run Streambank Stabilization**  
**National Park Service**  
**Prince George's County, Maryland**

Warren performed field reconnaissance on the reach of Oxon Run exhibiting severe streambank erosion. He prepared construction plans and specifications for armoring the streambank at the project site using gabions. Warren coordinated plan review and revisions with the National Park Service.

**Prince George's County Dam Inspections**  
**Prince George's County**  
**Prince George's County, Maryland**

Warren was the project engineer responsible for inspecting dam safety and reporting findings and recommendations for four dams in Prince George's County. He performed safety inspections and wrote reports for Indian Creek No. 2 Dam, Indian Creek No. 3 Dam, Laurel Lakes No. 1 Dam, and Northampton Dam.

**Fairfax County Dam Inspections**  
**Fairfax County**  
**Fairfax County, Virginia**

Warren was the project engineer responsible for dam safety inspections of Lake Fairfax and Lake Accotink Dams. He performed a dam safety inspection at each dam and documented his findings and recommendations in re-inspection reports.

## WARREN HAYDEN, PE (CONTINUED)

### **Thompson Lake Dam**

**Virginia Department of Game and Inland Fisheries (VDGIF)**

**Fauquier County, Virginia**

Warren was the project engineer responsible for the dam breach inundation study for this dam owned by the VDGIF. He performed a field reconnaissance and survey, developed a hydrologic model, conducted dam breach modeling, and produced inundation zone mapping.

### **Bark Camp Dam**

**Virginia Department of Game and Inland Fisheries (VDGIF)**

**Scott County, Virginia**

Warren was the project engineer responsible for a dam breach inundation study downstream of this dam owned by VDGIF. He developed a hydrologic model, conducted dam breach modeling, and produced inundation zone mapping.

### **Piedmont Virginia Community College Dam**

**Piedmont Virginia Community College**

**Charlottesville, Virginia**

Warren performed dam safety inspection and provided recommendations to the owner as part of this project to upgrade the conditional dam operational certificate to regular status. He submitted the application package, including inventory report, emergency action plan (EAP), and operation and maintenance (O&M) plan to the Virginia Division of Dam Safety.

### **Prince William Parkway Dam**

**Prince William County**

**Prince William County, Virginia**

Warren performed a dam safety inspection and submitted a re-inspection report to the Virginia Division of Dam Safety.

### **Virginia Gateway Regional SWM Facility**

**The Peterson Company**

**Prince William County, Virginia**

Warren was the project engineer responsible for preliminary design of a regional storm water management facility. He performed hydrologic analysis and dam failure analysis with incremental damage assessment to determine the recommended spillway design flood. Warren provided preliminary design and layout of the drop inlet principal spillway and vegetated earth auxiliary spillway.

### **Ryan Park Center SWM Pond**

**Loudoun County, Virginia**

Warren provided storm water management facility final design, including hydrologic analysis, pond grading, and riser structure design.

### **Farrcroft SWM Pond**

**Fairfax, Virginia**

Warren assisted in designing and preparing plans and specifications for this regional storm water management facility. He also provided comment response and revised plans to incorporate suggested plan changes.

## WARREN HAYDEN, PE (CONTINUED)

### **HEC-IFH Review and Guidance for National Flood Insurance Program (NFIP) applications**

#### **National Flood Insurance Program**

##### **Fairfax, Virginia**

Warren was the project engineer responsible for reviewing the Hydrologic Engineering Center's Interior Flood Hydrology (HEC IFH) computer program, Version 2.01. He evaluated the applicability of the HEC IFH program for interior area studies conducted as part of the NFIP. Warren's tasks included verifying results from runs using HEC IFH 2.01 on case studies that had been created with earlier versions of HEC IFH. He also provided documentation of Version 2.01 limitations and drafted guidance for the Federal Emergency Management Agency (FEMA) on the application of the HEC IFH program for interior area analyses.

### **Wakeman Pond Wetland Mitigation**

#### **The Peterson Company**

##### **Manassas, Virginia**

Warren provided revisions to the design plan set for this project. His responsibilities included island grading, determining quantities, and coordinating production between the engineer, wetland scientists, and drafter.

### **Turnpike Road Drainage Revisions**

#### **Virginia Department of Transportation (DOT)**

##### **Portsmouth, Virginia**

Warren provided revisions to storm drainage design plans in response to review comments from the Virginia DOT. The majority of Warren's effort was resolving utility conflicts with proposed storm sewer outfall.

### **Route 28/Route 29 Interchange SWM Pond**

#### **Virginia Department of Transportation (DOT)**

##### **Fairfax County, Virginia**

Warren provided final design of the storm water management facility for the new interchange project. He performed hydrologic analysis, graded the pond, and designed the riser structure. He also addressed review comments and prepared the comment response.

### **Route 288 SWM Ponds**

#### **Virginia Department of Transportation (DOT)**

##### **Chesterfield County, Virginia**

Warren designed storm water management facilities for this new highway project. He provided basin hydrologic analysis, pond grading, and riser structure design.

### **Marion Dam**

#### **City of Marion**

##### **Marion, Wisconsin**

Warren was the project engineer responsible for hydraulic design and construction document preparation for this dam reconstruction project. The project included hydraulic design of inlet structure and spillway and elimination of leaks identified in a penstock under a state highway. Warren provided construction administration and wrote the OIM manual in addition to the emergency action plan (EAP).

## WARREN HAYDEN, PE (CONTINUED)

### **Dam Failure Analyses**

#### **Wisconsin**

Warren modeled dam failure scenarios using DAMBRK and generated floodplain mapping showing inundation limits downstream for the following Wisconsin dams:

- Angelo Dam – Monroe County
- LaSalle Avenue Dam – Barron
- Cedars Dam – Kimberly
- Oxford Dam – Oxford

### **Cadott Dam**

#### **Village of Cadott**

#### **Cadott, Wisconsin**

Warren was the project engineer responsible for designing and preparing construction documents for this dam rehabilitation project involving concrete repairs to an existing primary spillway and the creation of an earthen auxiliary spillway. He was responsible for identifying concrete repair areas and monitoring quality assurance during construction. Warren provided construction administration and wrote the OIM manual in addition to the emergency action plan (EAP) for this dam.

### **Albany Dam**

#### **Village of Albany**

#### **Albany, Wisconsin**

Warren was the project engineer responsible for designing and preparing construction documents for this rehabilitation project which involved removing old intake bays and installing a new diversion system. He provided construction administration and wrote the OIM manual in addition to the emergency action plan (EAP).

### **Dam Construction Inspection**

#### **Various Clients**

#### **Wisconsin**

Warren provided periodic on-site construction inspection for the Cadott and Marion Dam rehabilitation projects. He also provided continuous on-site inspection for one month during the New Richmond Dam reconstruction project in New Richmond, Wisconsin. His inspection duties included verifying rebar placement, field testing concrete, observing concrete placement, patching concrete, driving sheet pile, dewatering and diversion, compacting backfill, and determining actual construction item quantities.

### **Dam Safety Grant Applications**

#### **Various Clients**

#### **Wisconsin**

Warren wrote grant applications to the State of Wisconsin's dam maintenance, repair, modification, abandonment, and removal aid program for Angelo, La Salle Avenue, Brodhead, and North Wood County Park Upper and Lower Dams. The application package included narrative of dam configuration and operational scheme, description of hydrologic and hydraulic characteristics, determination of design flood and spillway capacity, presentation of dam failure analysis and sensitivity analysis, recommendation of hazard classification, and presentation of conceptual preliminary design and cost estimate for rehabilitation.

## WARREN HAYDEN, PE (CONTINUED)

### **Dam Safety Inspections**

#### **Wisconsin**

Warren performed dam safety inspections for the following Wisconsin dams: Marion, Albany, Cadott, La Salle Avenue, Brodhead, North Wood County Park Upper and Lower, Angelo, Dexter, Ghost Lake, and Oxford Dams.

### **Bridge Hydrology and Hydraulics**

Warren provided hydrologic analyses to determine regional flood flows for 24 bridge replacement projects. He modeled hydraulic characteristics of existing bridges and replacement structures using WSPRO and/or HY-8 for all projects. He wrote hydraulic reports detailing hydrologic and hydraulic investigations for all replacement projects.

### **Flood-Warning System And Tainter Gate Improvements**

#### **Willow River State Park**

##### **St. Croix County, Wisconsin**

Warren provided comment response and revised plans and specifications for the Willow River flood-warning system and tainter gate improvements at Little Falls Dam.

### **Lake Altoona Sediment Reduction Plan**

#### **Lake Altoona Protection and Rehabilitation District**

##### **Lake Altoona, Wisconsin**

Warren wrote an environmental impact report, sized the settling basin for hydraulic dredging, and assisted in preparing plans, specifications, and permit applications for a two-phase sediment removal/dredging project. He provided on site construction inspection and administration for construction of settling basins and outfall.

### **Lake Neshonoc Rehabilitation Plan**

#### **Lake Neshonoc Protection District**

##### **West Salem, Wisconsin**

This project required an evaluation feasibility study and lake dredging design. Warren sized the settling basins for hydraulic dredging, and prepared the cost estimates associated with different dredging scenarios. He investigated using flocculating agents to enhance dredged slurry settling.

### **Water Management Plan**

#### **Town of Kronenwetter**

##### **Town of Kronenwetter, Wisconsin**

Warren performed a feasibility study, which included preparing preliminary plans and cost estimates for a drainage system to alleviate high groundwater flooding problems.

### **Black River Falls Levee Design**

#### **City of Black River Falls**

##### **Black River Falls, Wisconsin**

Warren conducted a coincident frequency analysis to determine interior levee area design rainfall depth and pump station capacity needs. He modified the HEC-2 model for Black River to reflect changes resulting from the levee/floodwall project.

### **Stanley Wastewater Treatment Plant Modifications**

#### **City of Stanley**

##### **Stanley, Wisconsin**

Warren designed influent diversion weirs at the lift station. He also designed the I/I storage tank overflow weir, energy dissipator, overflow piping, and outfall.

## WARREN HAYDEN, PE (CONTINUED)

### **MWCC Chaska Gravity Interceptor Metropolitan Waste Control Commission Chaska, Minnesota**

Warren investigated hydraulic characteristics of design options for a large elevation transition in a gravity interceptor sewer. The options included vortex-flow drop structures, siphon box, cascade, and steep pipe grade transition.

### **Brodhead Dam Village of Brodhead Brodhead, Wisconsin**

Warren wrote a grant application, analyzed hydraulic characteristics for the new auxiliary spillway, and provided hydraulic design of the new box culvert structure.

### **Waupaca River Floodplain Study Waupaca County, Wisconsin**

Warren performed hydrologic analysis of the watershed to determine regional flood discharge at the study site. He modeled hydraulic characteristics of the regional flood using HEC-2, and provided an encroachment analysis and floodplain mapping.

### **Van der Veen Dam Price County, Wisconsin**

Warren investigated hydraulic capacities for design modifications to new and existing spillways. He modified dam failure analysis to reflect new maximum pond elevation.

### **Kwik Trip drainage plan Chippewa Falls, Wisconsin**

Warren provided storm water management computations and designed a dry well infiltration structure.

### **Lake Dexter Dam Gate Repair Wood County Wood County, Wisconsin**

Warren conducted a site inspection, including an inventory of the hoisting system and tainter gate components. He prepared a cost estimate for replacing skin plates on gates using steel or plastic materials.

### **Moccasin Mike Landfill Feasibility Report Superior, Wisconsin**

Warren designed the storm water control plan, including diversion berms, drainage ditches, sedimentation ponds, and outfall structures.

### **Iowa Institute of Hydraulic Research**

As a graduate research assistant, Warren conducted hydraulic model studies and assisted in design refinements of vortex-flow drop structures for a Tokyo deep-tunnel storage project. He also performed a model study of a dual-gated flow control structure for a Milwaukee interceptor sewer. Warren provided report documentation and production of videos for both projects. ■

## JEFF ANDERSON, PE PROJECT ENGINEER

Jeff Anderson has worked exclusively on projects related to water resources, dams, hydroelectric projects and dam safety since joining Mead & Hunt on May 6, 2002. He is experienced in management of projects related to analysis, design and rehabilitation of hydroplants, dams and appurtenant structures. Jeff is intimately familiar with state and federal dam safety regulations. He has assisted Federal Energy Regulatory Commission (FERC) approved dam safety inspectors in more than 35 Part 12 dam safety inspections and more than 20 Potential Failure Modes Analyses (PFMA). Jeff has also been responsible for the preparation of many types of reports related to dam safety including PFMA reports, Consultant's Safety Inspection Reports, Supporting Technical Information Documents, Dam Safety Surveillance and Monitoring Plans and Reports, Quality Control and Inspection Programs, Final Construction Reports and Owner's Dam Safety Programs.

Jeff is experienced in concrete and steel design, stability and stress analyses, hydraulic computations and data analysis aspects of water resource projects. He has performed more than 60 stability evaluations for various types of water-retaining structures, including those involving concrete gravity, Ambursen, pile-supported structures and timber crib dams, as well as earthen embankment dams.

Jeff is also experienced in the inspection, analysis and design of spillway tainter gates. He has overseen the inspection of more than 100 gates of a wide variety of types and sizes. Jeff was also responsible for the initial evaluation, reinforcement design and follow-up performance testing of the spillway tainter gates at the Rocky Reach Hydroelectric Project on the Columbia River in Washington State. Strain testing data was utilized to establish "real world" stresses in key structural members, aiding in evaluation of the gates. Jeff presented a technical paper on the benefits of tainter gate testing at Waterpower in 2009.

While Jeff's background is primarily in structural engineering, he has a good understanding of the FERC's requirements with respect to issues related to spillway capacity and hazard classification. Jeff has worked closely with hydrologic and hydraulic engineers to determine project spillway capacities, Probable Maximum Flood (PMF) values, and Inflow Design Flood (IDF) values. Jeff has also assisted with the development of inundation maps for Emergency Action Plans (EAP).

### RELEVANT EXPERIENCE

#### **FERC Part 12 Dam Safety Inspections**

Jeff has worked closely with independent consultants on Part 12 dam safety inspections and reports. Inspections include an evaluation of the physical condition of the project structures, data analysis of existing instrumentation, concrete and earthen structural stability evaluations and spillway adequacy studies. Starting in 2003, the FERC's Dam Safety Performance Monitoring Program required FERC-licensed hydro projects to perform a Potential Failure Mode Analysis (PFMA) in conjunction with the Part 12 dam safety inspection. Jeff has participated in the inspection and/or report preparation for the following projects:



#### **Areas of Expertise**

- Project management
- State and federal dam safety regulations
- Tainter gate inspection, analysis and design
- Hydro facility rehabilitation
- Stability and stress evaluation
- Structural analysis and design

#### **Education**

- BS, Civil Engineering, University of Wisconsin – Platteville

#### **Registration**

- Licensed Professional Engineer – Wisconsin

#### **Memberships**

- American Institute of Steel Construction (AISC)
- American Society of Civil Engineers (ASCE)
- Association of State Dam Safety Officials (ASDSO)
- Chi Epsilon – University of Wisconsin – Platteville Chapter
- Society of Military Engineers (SAME)

#### **Technical Papers**

- Waterpower – "The Benefits of Tainter Gate Testing: You Might Not Know What You Think You Know," 2009

#### **No. of Years With Mead & Hunt**

- Hired 05/06/2002

#### **No. of Years With Other Firms**

- None



## JEFF ANDERSON, PE (CONTINUED)

- Alexander (2007)
- Allegheny No. 5 – PFMA (2003)
- Allegheny No. 6 – PFMA (2003)
- Allegheny No. 8 – PFMA (2005)
- Allegheny No. 9 – PFMA (2005)
- Badger Division – PFMA (2008)
- Beardsley (2002)
- Brainerd (2003)
- Cascade – PFMA (2002)
- Cheboygan (2011)
- Cochrane (2008)
- Donnells (2002)
- Du Bay (2002)
- Edenville – PFMA (2005)
- Fairbanks Morse – PFMA (2006)
- Flambeau Hydro (2002)
- Forestport – PFMA (2004)
- French Landing – PFMA (2004)
- Grandmother Falls – PFMA (2003)
- Jackson Bluff – PFMA (2003)
- Kaukauna City Plant – PFMA (2007, 2012)
- Little Falls – PFMA (2005)
- Little Quinnesec Falls (2002)
- Mystic Lake (2008)
- Ninth Street – PFMA (2006)
- Prairie du Sac – PFMA (2006)
- Rhinelander – PFMA (2003)
- Rainbow (2008)
- Rock Island – PFMA (2006)
- Rocky Reach – PFMA (2007)
- Rothschild (2003)
- Sartell – PFMA (2009)
- Thomson – PFMA (2004)
- Tulloch (2002)
- Upper Red Lake – PFMA (2005)
- Weed – PFMA (2005, 2010)

### **Tainter Gate Evaluation and Stress Analysis**

Jeff has participated in several detailed tainter gate inspections and evaluations, including both fieldwork and preparation of the gate evaluation reports. Climbing techniques are often used to provide for an up-close view of the gates. He has performed three-dimensional tainter gate stress analyses using the Visual Analysis and Shapebuilder software programs, along with self-made computational spreadsheets. Jeff has participated in detailed inspections and/or stress analyses for the following projects:

#### *Stress Analysis*

Biron (2003)  
Boney Falls (2005)  
Cascade (2003)  
Fallasburg (2003)  
H. Neely Henry (2002)  
Lay (2002)  
Little Quinnesec Falls (2002)  
Logan Martin (2002)  
Morrow (2003)  
Mitchell (2002)

#### *Inspection*

H. Neely Henry - 6 gates (2002)  
Lay - 26 gates (2002)  
Logan Martin - 6 gates (2002)  
Mitchell - 25 gates (2002)  
Neenah - 5 gates (2005)  
R.L. Harris - 6 gates (2002)  
Wausau - 1 gate (2006)  
Findley Ryther - 2 gates (2006)  
Alexander - 11 gates (2007)  
Wallace - 5 gates (2008)

## JEFF ANDERSON, PE (CONTINUED)

R.L. Harris (2006)	Cochrane - 7 gates (2008)
Rocky Reach (2004-2007)	Kaukauna City Plant - 2 gates (2009)
Rothschild (2003)	Weed - 4 gates (2012)
Sartell (2004)	

### **Tainter Gate Design**

Jeff has participated in tainter gate modification design. This includes conceptual and final design, plan detailing and preparation of design reports. He has been responsible for the design of tainter gates for the following projects:

- Biron (2003)
- Logan Martin (2004)
- Kaukauna City Plant (2009)
- Maumee (2006)
- Neenah (2006)
- Rocky Reach (2007)
- Rothschild (2003)
- Wausau (2007)

### **FERC Dam Safety Surveillance and Monitoring Plans**

Starting in 2006, the FERC's Dam Safety Performance Monitoring Program required FERC-licensed hydro projects to assemble and regularly update a Dam Safety Surveillance and Monitoring Plan (DSSMP) for each licensed project. Jeff was responsible for working with licensees and the FERC to develop and assemble the DSSMP for the projects listed below. Jeff has also prepared the annual Dam Safety Surveillance and Monitoring Reports for the years listed in parenthesis.

- Cloquet (2008)
- Combined Locks (2008, 2010-2012)
- Flambeau Hydro
- Kaukauna City Plant (2008, 2010-2012)
- Kimberly (2011, 2012)
- Grandmother Falls
- Little Chute (2008, 2010-2012)
- Marquette No. 2
- Mosinee (2008, 2010)
- Badger Development (2008, 2010-2012)
- Prairie du Sac (2008-2009, 2011)
- Rapide Croche (2008, 2010-2012)
- Rhinelander (2008, 2010-2012)
- Rothschild (2011, 2012)
- Sartell
- Thilmany
- Upper Red Lake (2010)
- Weed (2010)

## JEFF ANDERSON, PE (CONTINUED)

### CHRONOLOGICAL SUMMARY OF RELEVANT EXPERIENCE

#### **Hatfield Hydro Bypass Unit and Siphon Design (5/7/2002 -1/13/2003)**

**Midwest Hydraulic Company  
Holland, Michigan**

Mead & Hunt was retained by Midwest Hydraulic Company to provide the design for the installation of a low-flow turbine-generator unit at the Hatfield hydroelectric project. Jeff was responsible for the design of the turbine and penstock support structures, thrust block and main access walkway/stairway. He also prepared project construction drawings and performed pertinent structural calculations.

#### **Jeffrey Hydro Bypass Feasibility Study (6/13/2002-11/12/2002)**

**Central Nebraska Public Power & Irrigation District  
Brady, Nebraska**

Mead & Hunt was retained by Central Nebraska Public Power & Irrigation District to perform a feasibility study of flow bypass options at the Jeffrey Hydro Facility for irrigation purposes. Jeff participated in the conceptual design of the intake and diversion structures. He also was responsible for calculating quantities and providing preliminary budget estimates.

#### **Red Rock Feasibility Study (7/3/2002-7/24/2002)**

**Alliant Energy  
Pella, Iowa**

Mead & Hunt was retained by Alliant Energy to perform a feasibility study for the addition of hydroelectric power generation at an existing United States Army Corps of Engineers' (USACE) structure. The proposed upgrades included diamond-cutting holes through an existing gravity section to install two large diameter steel penstocks. Jeff was responsible for performing revised stability analysis calculations, calculating quantities and providing preliminary budget estimates.

#### **Indianford Dam and Powerhouse Repairs (10/17/2002-3/31/2003)**

**Rock County Department of Public Works  
Indianford, Wisconsin**

Mead & Hunt was retained by the Rock County Department of Public Works to perform an inspection of the Indianford Dam and provide design services for the rehabilitation of the project structures. Jeff was responsible for conceptual cofferdam and slide gate modification design, structural stability calculations, calculating quantities and budget estimates and preparation of project construction drawings and technical specifications.

#### **Portage Canal Restoration (11/12/2002-10/28/2005)**

**City of Portage  
Portage, Wisconsin**

Mead & Hunt was retained by the City of Portage to design proposed modifications and improvements for the restoration of the Portage Canal. Restoration included all work within the existing canal, as well as the addition of a bike and pedestrian trail along the canal. Jeff was responsible for conceptual, preliminary and final design of the canal revetment walls, slope stability analysis, structural computations, preparation of construction plans and technical specifications and cost estimating.

## JEFF ANDERSON, PE (CONTINUED)

### **Willow Dam Road Bridge Replacement (1/8/2003-10/31/2005)**

**Town of Little Rice**

**Little Rice, Wisconsin**

Mead & Hunt was retained by the town of Little Rice to perform the design for the replacement of the Willow Dam Road Bridge which lies over the Willow Dam. Jeff was responsible for structural stability analysis of the Willow Dam spillway, including the proposed changes as a result of bridge replacement, slope stability analysis, filter layer design and preparation of construction plans, technical specifications and the quality control and inspection plan.

### **Upper Watertown Spillway Modification (4/2/2003-3/21/2007)**

**Reiss Industries**

**Watertown, Wisconsin**

Mead & Hunt was retained by Reiss Industries to design spillway modifications for the Upper Watertown hydroelectric project. Jeff was responsible for conceptual, preliminary and final design of spillway modifications, structural stability analysis, structural computations, construction plan preparation and design report and technical specifications preparation.

### **Temporary Bracing Design for Biron Spillway Gates (5/14/2003-7/9/2003)**

**Stora Enso North America**

**Wisconsin Rapids, Wisconsin**

Mead & Hunt was retained to design temporary bracing for the tainter gates to allow for modifications to be performed without dewatering. Jeff was responsible for design of temporary bracing, development of a proposed construction sequence, performing a stress analysis to check for adequacy of temporary bracing and preparation of the design report.

### **Mokelumne River Project (5/27/2003-6/19/2003)**

**Pacific Gas and Electric Company (PG&E)**

**Jackson, California**

Mead & Hunt was retained as a subconsultant by Devine Tarbell & Associates to provide civil design for modifications to three existing hydro projects. Jeff was responsible for final design and preparation of construction drawings for discharge modifications to the Lower Bear, Salt Springs Reservoir and Tiger Creek Afterbay projects. He also performed anchorage design, checked the structural stability of the thrust blocks and designed the access stairway for operation and maintenance of the discharge structure at the Salt Springs Reservoir.

### **Mosinee East Spillway Flashboard Design (11/4/2003-10/28/2009)**

**Wausau Paper**

**Mosinee, Wisconsin**

Mead & Hunt was retained by Wausau Paper to design a new flashboard system for the East Spillway at the Mosinee hydroelectric project. Jeff was responsible for material properties research of different species and grades of wood, structural design and plan development for fabrication and installation of the new flashboard system.

### **Rockville Dam Repairs (11/14/2003-7/12/2004)**

**Rockville Mill Pond Management District**

**Rockville, Wisconsin**

Mead & Hunt was retained by the Rockville Mill Pond Management District to assess the condition of the Rockville Dam and provide a design for proposed repairs. Jeff was

## JEFF ANDERSON, PE (CONTINUED)

responsible for conceptual, preliminary and final design of proposed repairs, structural stability analysis, structural computations, preparation of construction plans and preparation of the design report and technical specifications.

### **Natomas Fish Screen Project (2/3/2004-3/19/2004)**

#### **Natomas Mutual Water Company**

#### **Sacramento, California**

Mead & Hunt was retained by the Natomas Mutual Water Company to provide consulting services and to design fish screens for five diversions on the Sacramento River totaling 630 cubic feet per second (cfs). Jeff was responsible for preparing preliminary and final layouts, preparation of construction plans and field measurements.

### **Rocky Reach Tainter Gate Testing and Evaluation (5/10/2004-1/29/2007)**

#### **Public Utility District No. 1 of Chelan County**

#### **Columbia, Washington**

Mead & Hunt was retained by Public Utility District No. 1 of Chelan County (Chelan PUD) to develop and oversee a testing program to assess the adequacy of the tainter gates and the condition of the trunnion bushings at the Rocky Reach Hydroelectric Project. We were also responsible for developing of a long-term monitoring program for the bushings and working with Chelan PUD to prioritize future gate reinforcements. Jeff was responsible for tainter gate stress analysis, long-term bearing monitoring program research and development, in-house program development to convert measured strains to applied forces, evaluation of the structural adequacy of the gates, and preparation of the tainter gate testing and evaluation report.

### **Wire and Nail Factory Dam (5/18/2004-10/7/2004)**

#### **Mercury Marine**

#### **Cedarburg, Wisconsin**

Mead & Hunt was retained by Mercury Marine to perform an inspection of the Wire and Nail Factory Dam and provide design for dam repairs. Jeff was responsible for assisting in the inspection of the dam, performing sounding investigations of the downstream channel and conceptual, preliminary and final design.

### **Zietlow Dam Removal (6/22/2004-11/6/2006)**

#### **City of La Crosse**

#### **La Crosse, Wisconsin**

As a result of recommendations made following an inspection of the dam, Mead & Hunt was retained to provide plans for removal of the Zietlow Dam. Jeff served as project manager and engineer and was responsible for coordination with the City of La Crosse and the Wisconsin Department of Natural Resources to devise a plan for sediment sampling, contracting with subconsultant to provide services for sediment sampling, civil design and preparation of construction plans and technical specifications to remove the dam and restore the area, minimizing future erosion.

### **Ninth Street Tainter Gate Stress Analysis (7/15/2004-8/2/2004)**

#### **Thunder Bay Power**

#### **Alpena, Michigan**

Mead & Hunt was retained to perform a revised tainter gate stress analysis to consider the effects of trunnion pin friction. Jeff served as project manager and engineer and was responsible for three-dimensional modeling of the tainter gates, tainter gate stress analysis and preparation of the stress analysis report.

## JEFF ANDERSON, PE (CONTINUED)

### **Fox Locks Rehabilitation Study (10/15/2004-1/25/2005)**

#### **Fox River Navigational System Authority**

##### **Appleton, Wisconsin**

Mead & Hunt was retained to perform an inspection of 17 lock structures along the Fox River and provide an updated opinion of probable costs for rehabilitation of each of the structures. Jeff was responsible for assisting in the inspection of the lock structures, preparing the updated rehabilitation study report and providing research, design and installation of a lock wall monitoring system.

### **Prairie du Sac Fish Passage (12/2/2004-3/7/2005)**

#### **Alliant Energy**

##### **Prairie du Sac, Wisconsin**

Mead & Hunt was retained to provide conceptual, preliminary and final design for a fish screen at the Prairie du Sac hydroelectric project. Jeff was responsible for performing upstream soundings and preliminary intake velocity measurements.

### **Cascade Stability and Stress Analysis (1/24/2005-2/10/2005)**

#### **STS HydroPower**

##### **Cascade, Michigan**

Mead & Hunt was retained by STS HydroPower to perform structural stability analyses and a finite-element analysis of the project's Ambursen arch dam. Jeff was responsible for performing a quality control check of the structural stability analyses and the finite-element analysis and assembling the report for submittal to the Federal Energy Regulatory Commission (FERC).

### **Udey Dam Repair/Abandonment Study (6/7/2005-8/4/2005)**

#### **City of Columbus**

##### **Columbus, Wisconsin**

Mead & Hunt was retained by the City of Columbus to inspect the Udey Dam and provide cost estimates and recommendations for the proposed repair/abandonment of the structure. Jeff was responsible for assisting with the on-site inspection, performing structural stability analyses for the project's water-retaining structures and providing recommendations for repair and future testing to resolve stability issues.

### **Fish Hatchery and Nemahbin Dam Feasibility Study (7/19/2005-7/28/2005)**

#### **City of Delafield**

##### **Delafield, Wisconsin**

Mead & Hunt was retained by the City of Delafield to perform inspections of the Fish Hatchery and Nemahbin Dams and provide cost estimates for repair, removal and repair with additional hydropower capacity options. Jeff was responsible for preliminary repair and upgrade designs, estimating quantities and preliminary cost estimates for several repair options.

### **Boney Falls Tainter Gate Stress Analysis (8/23/2005-9/20/2005)**

#### **Upper Peninsula Power Company**

##### **Green Bay, Wisconsin**

Mead & Hunt was retained by the Upper Peninsula Power Company to perform a revised stress analysis for the Boney Falls tainter gates. Jeff served as project manager and engineer and was responsible for updating the existing tainter gate model, performing revised stress analyses to include the effects of trunnion pin friction,

## JEFF ANDERSON, PE (CONTINUED)

assessing the adequacy of pertinent gate member connections and preparing the stress analysis report for submittal to the Federal Energy Regulatory Commission (FERC).

### **R.L. Harris Tainter Gate Analyses (2/15/2006-3/24/2006)**

**Alabama Power Company  
Randolph County, Alabama**

Mead & Hunt was retained by Alabama Power Company to address issues brought up during the Potential Failure Modes Analysis (PFMA) session regarding the R.L. Harris tainter gates. We evaluated the adequacy of the tainter gates assuming increased hydrostatic pressures and dynamic overtopping forces representative of reservoir levels 3.5 feet higher than the top of the gates. In addition, the structural adequacy of the piers between gate bays were evaluated for differential loading which would result from one gate being open while the adjacent gate was closed. The ability of operators to install stoplogs under flowing conditions was also evaluated. Jeff was responsible for performing these structural analyses and developing a report for submittal to the Federal Energy Regulatory Commission (FERC).

### **Maumee Tainter Gate Design (2/20/2006-4/3/2006)**

**Gerig-Ottenweller Contracting, LLC  
Fort Wayne, Indiana**

Mead & Hunt was retained by Gerig-Ottenweller Contracting, LLC to design a single steel tainter gate for the Maumee Dam. Jeff served as project design engineer and was responsible for preliminary and final design, structural analysis and drawing and technical specification development for gate fabrication and installation.

### **Neenah Dam Spillway Rehabilitation and Tainter Gate Design (3/10/2006-6/1/2006)**

**Neenah & Menasha Water Power Company  
Neenah, Wisconsin**

Mead & Hunt was retained by Neenah & Menasha Water Power Company to provide spillway rehabilitation and tainter gate design services for the Neenah Dam. Jeff was responsible for site inspection and evaluation, preliminary and final design, development of a 3-D Visual Analysis gate model, creation of a construction cost estimate, design reports, technical specifications and bid document preparation and plan preparation assistance.-

### **Thomson Dambreak Analyses & Inundation Map Updates (3/28/2006-1/9/2008)**

**Minnesota Power  
St. Louis River, Minnesota**

Mead & Hunt was retained by Minnesota Power to perform dambreak studies for failure of three dams at the Thomson Hydroelectric Project. We were also responsible for developing inundation maps for these failure scenarios for inclusion in the EAP. Jeff was responsible for evaluation of breach parameters, working closely with the hydraulic engineer responsible for the dambreak analyses, and peer review of the dambreak study report and inundation maps.

### **Kilbourn Debris Boom (4/21/2006-5/8/2007)**

**Alliant Energy  
Wisconsin Dells, Wisconsin**

Mead & Hunt was retained by Alliant Energy to design a new debris boom to replace the existing system at their Kilbourn hydroelectric project. The existing system required

## JEFF ANDERSON, PE (CONTINUED)

a relatively high degree of maintenance and controlling debris was often difficult and unsafe for operating personnel. Jeff served as project manager and engineer and was also responsible for preliminary and final design and the development of plans and specifications for fabrication and installation of the new debris boom.

### **Findley Ryther Tainter Gate Inspection and Evaluation (6/19/2006-11/21/2006)**

#### **Bibb County**

#### **Bibb County, Georgia**

Mead & Hunt was retained to perform an up-close inspection of their tainter gates to determine the source and cause of a knocking noise heard during gate operation. We also provided an evaluation of the electric gate hoist and bottom seal configurations. Jeff was responsible for the up-close inspection of the tainter gate, which included visual, audible and vibration measurements. He also evaluated the hoist and bottom seal configurations and developed a report discussing the results of our findings.

### **Wausau Tainter Gate Inspection and Evaluation (7/10/2006-7/28/2006)**

#### **Wisconsin Public Service Corporation**

#### **Wausau, Wisconsin**

Mead & Hunt was retained by Wisconsin Public Service Corporation to perform an up-close inspection of one of the tainter gates at their Wausau hydroelectric project. Jeff served as project manager and engineer and was also responsible for up-close inspection of the tainter gate, evaluation of existing conditions and preparation of a report to present our findings and recommendations for gate rehabilitation.

### **Oconomowoc Flume Inspection and Evaluation (12/27/2006-1/19/2007)**

#### **City of Oconomowoc**

#### **Oconomowoc, Wisconsin**

Mead & Hunt was retained by the City of Oconomowoc to perform an inspection and evaluation of a flume structure and provide recommendations for repair. Jeff served as project manager and engineer and was responsible for up-close inspection of the flume structure and preparation of a report to present our findings and recommendation for rehabilitation.

### **Flambeau Hydro Tainter Gate Rehabilitation (2/2/2007-12/4/2007)**

#### **Dairyland Power Cooperative**

#### **Ladysmith, Wisconsin**

Mead & Hunt was retained by Dairyland Power Cooperative to design new gate seals as part of rehabilitation of the three tainter gates at the Flambeau Hydro Station. Jeff served as project manager and engineer and was also responsible for researching gate seal options and protective paint coating finishes, design of side and bottom gate seal arrangements which included minor structural modifications to the bottom of the gates and the development of plans and technical specifications for rehabilitation of the tainter gates.

### **Rocky Reach Tainter Gate Reinforcement and Bushing Replacement (3/5/2007-12/15/2008)**

#### **Public Utility District No. 1 of Chelan County**

#### **Columbia River, Washington**

Mead & Hunt was retained by Public Utility District No. 1 of Chelan County (Chelan PUD) to design arm strut reinforcements and procedures for bushing replacement for the tainter gates at the Rocky Reach Hydroelectric Project. Arm reinforcement was



## JEFF ANDERSON, PE (CONTINUED)

determined to be necessary as a result of the tainter gate testing and evaluation program developed and implemented by Mead & Hunt from 2004-2006. Bushing replacement will be initiated as needed based on the long-term monitoring program developed by Mead & Hunt and implemented by Chelan PUD. As part of this work, we provided Chelan PUD with detailed plans and technical specifications for arm strut reinforcement and bushing replacement. Jeff was responsible for design of the arm strut reinforcements and assisted with the development of procedures for bushing replacement. He was also responsible for researching replacement bushing alternatives and overseeing preparation of the drawings and technical specifications.

### **Wausau Tainter Gate Design (6/4/2007-12/13/2007)**

#### **Wisconsin Public Service Company**

##### **Wausau, Wisconsin**

Mead & Hunt was retained by Wisconsin Public Service Company to provide tainter gate design services for the Wausau hydroelectric project. Jeff served as project design engineer. He was responsible for preliminary and final design of the Wausau tainter gates. Jeff was also responsible for preparation of the tainter gate design report, as well as technical specifications and quality control and inspection plans for fabrication and installation of the new tainter gates.

### **Alexander Part 12 Safety Inspection (6/7/2007-10/31/2007)**

#### **Wisconsin Public Service Company**

##### **Merrill, Wisconsin**

Mead & Hunt was retained by Wisconsin Public Service Company (WPSC) to serve as independent consultant for the Potential Failure Modes Analysis (PFMA) and Part 12 safety inspection of the Alexander Hydroelectric Project. As part of inspection of this project, Mead & Hunt was also responsible for horizontal and vertical control monument surveys, up-close inspection of the project's 11 tainter gates and oversight of the underwater inspection of the project's water-retaining structures. Following completion of the PFMA and Part 12 safety inspection of the project, Mead & Hunt prepared the PFMA report, Supporting Technical Informational Document (STID), Consultant's Safety Inspection Report (CSIR) and a detailed report summarizing our evaluation of the project's tainter gates. Jeff served as lead engineer in charge of inspection and evaluation of the project's tainter gates and was responsible for preparation of the tainter gate inspection report. Jeff also assisted in preparation of the STID and CSIR.

### **Jackson Bluff Auxiliary Spillway (7/16/2007-8/28/2007)**

#### **City of Tallahassee**

##### **Lake Talquin, Florida**

This project consisted of constructing an 825-foot-long auxiliary spillway with a concrete chute along with a hydraulic jump stilling basin designed to pass a discharge of 69,900 cfs. Jeff was responsible for evaluating the structural stability of the proposed improvements and for peer review of the structural design computations.

### **Marseilles Hydroelectric Project Rehabilitation (10/9/2007-10/25/2007)**

#### **North American Hydro Power**

##### **Marseilles, Illinois**

Mead & Hunt was retained by North American Hydro to provide engineering services to rehabilitate this project on the Illinois River. This project uses the head created by a United States Army Corps of Engineers (USACE) lock and dam. Mead & Hunt was responsible for hydraulic and generation studies and project improvements design. We

## JEFF ANDERSON, PE (CONTINUED)

also prepared the design report, technical specifications, design drawings and quality control and inspection plan for project rehabilitation. Major rehabilitation work included installing turbine/generator units and electromechanical equipment, fabricating two new dewatering bulkheads, installing a new trash rack system, constructing two new sections of retaining walls along the power canal, raising the canal walls to provide adequate freeboard and providing miscellaneous powerhouse improvements for structure stability. Jeff served as project design engineer and was responsible for all civil aspects of rehabilitation design. He was also responsible for assessing the powerhouse's structural stability to meet Federal Energy Regulatory Commission (FERC) guidelines and developing stabilizing measures. Jeff was also responsible for preparing the design report and assisting in design drawings preparation.

### **Wallace Tainter Gate Inspection & Evaluation (11/15/2007-3/19/2008)**

**Georgia Power Company  
Oconee River, Georgia**

Mead & Hunt was retained by Georgia Power Company to perform an up-close inspection and evaluation of the five 42-foot-wide by 44-foot-high tainter gates at the Wallace Dam. Jeff served as lead engineer in charge of inspection and evaluation of the project's tainter gates. He was also responsible for preparation of the tainter gate inspection report.

### **Black River Falls Hydroelectric Project (5/29/2008-12/9/2008)**

**Black River Falls Municipal Utilities  
Black River Falls, Wisconsin**

Mead & Hunt was retained by Black River Falls Municipal Utilities to prepare the design of a new gated spillway and addition of a new hydroelectric unit at the Black River Falls Dam. Jeff was responsible for overseeing design of the six 27-foot-wide by 14.25-foot high steel tainter gates. He was also responsible for evaluation of the structural stability of the new spillway structure.

### **Dam Safety Independent Consulting Services (7/11/2008-2/20/2009)**

**PPL Montana  
Montana**

The Federal Energy Regulatory Commission (FERC) requires hydroelectric project owners to have their structures inspected every five years and their gates inspected every 10 years for safety compliance. PPL Montana contracted Mead & Hunt to perform inspections on three structures: Cochrane Dam, Mystic Lake Hydroelectric Project and Rainbow Hydroelectric Project. The projects presented unique challenges for Mead & Hunt engineers. The Cochrane Dam is located in a river canyon on the Missouri River. The gate inspection at the Cochrane Dam required using rope climbing techniques to scale the 40-foot-wide by 25-foot-high gates. The Mystic Lake Hydroelectric Project is a high elevation arch dam only accessible by tram up the penstock to the flowline, then a three-mile walk along the flowline to the dam. Jeff served as project manager for the overall project and also acted as lead engineer for the tainter gate inspections at Cochrane Dam. He was also responsible for assisting the independent consultant during the Part 12 inspections of the Cochrane and Rainbow projects. Jeff oversaw preparation of the draft and final Consultant's Safety Inspection Reports (CSIR) for all three projects.

## JEFF ANDERSON, PE (CONTINUED)

### **Rocky Reach Tainter Gate Acceptance Testing & Evaluation (8/20/2008-present) Public Utility District No. 1 of Chelan County Columbia River, Washington**

Mead & Hunt was retained by Public Utility District No. 1 of Chelan County (Chelan PUD) to develop and oversee the acceptance testing program for the Rocky Reach tainter gates following arm strut reinforcement. The primary purpose of this program was to assess the effectiveness of the arm strut reinforcement work and evaluate the structural adequacy of the recently-strengthened tainter gates. Jeff served as project manager and lead engineer for this project. He was responsible for overseeing on-site acquisition of strain data during acceptance testing, revised tainter gate stress analyses using the data collected in the field, and development of a comprehensive tainter gate testing and evaluation report.

### **Prairie du Sac Spillway and Apron Resurfacing (3/12/2009-11/1/2010) Alliant Energy Wisconsin River, Wisconsin**

Mead & Hunt was retained by Alliant Energy to design concrete surface repairs for the ogee spillway and downstream apron at the Prairie du Sac Hydroelectric Project. Jeff served as project manager and lead engineer. He was also responsible for overseeing development of the concrete resurfacing plans, quality control and inspection program (QCIP), and final construction report.

### **Weed Dam PMF Study (6/17/2009-present) Gresham Municipal Utilities Red River, Wisconsin**

Mead & Hunt was retained by Gresham Municipal Utilities to determine the value of the Probable Maximum Flood (PMF) for the Weed Dam. This project was challenging because of general lack of useful information for the Red River drainage basin. Jeff worked closely with hydrologic engineers and participated in several meetings and teleconferences with representatives of the FERC to establish suitable analysis techniques and parameters to be used in development of the PMF.

### **Kaukauna City Plant Tainter Gate Rehabilitation (6/22/2009-4/5/2010) Kaukauna Utilities Fox River, Wisconsin**

Mead & Hunt was retained by Kaukauna Utilities to design repairs for two 30-foot-wide by 8.8-foot-high tainter gates at the Kaukauna City Plant. Jeff served as project manager and lead design engineer. He was also responsible for development of a quality control and inspection program (QCIP) for the project, overseeing preparation of the rehabilitation drawings, inspection of the completed rehabilitation work following construction, and development of the final construction report.

### **Flambeau Hydro EAP Map Updates (7/23/2009-12/18/2009) Dairyland Power Cooperative Ladysmith, Wisconsin**

Mead & Hunt was retained by Dairyland Power Cooperative (DPC) to assist them in preparing revised inundation maps for an EAP update for the Flambeau Hydro Station. Jeff served as project manager and was also responsible for coordination of the inundation map updates with DPC's project manager.

## JEFF ANDERSON, PE (CONTINUED)

### **Inspection of Monterey Dam (10/9/2009-11/13/2009)**

#### **City of Janesville**

#### **Rock River, Wisconsin**

Mead & Hunt was retained by the City of Janesville to perform an inspection of the Monterey Dam to satisfy the requirements of the Wisconsin Department of Natural Resources (DNR). Jeff served as project manager and lead engineer for the on-site evaluation of the project's water-retaining structures. He was also responsible for development of an inspection report for submittal to the DNR.

### **Prairie du Sac Stability Analyses (10/21/2009-6/4/2010)**

#### **Alliant Energy**

#### **Wisconsin River, Wisconsin**

Mead & Hunt was retained by Alliant Energy to evaluate that structural stability of the gated spillway and navigational lock at the Prairie du Sac Hydroelectric Project. Both of these structures are founded on timber piles. Jeff served as project manager and lead engineer. He was responsible for evaluating the structural stability of the pile-supported structures and development of a report summarizing the findings of these analyses.

### **Prairie du Sac Access Road Design (11/19/2009-present)**

#### **Alliant Energy**

#### **Wisconsin River, Wisconsin**

Mead & Hunt was retained by Alliant Energy to design an roadway to provide access for construction equipment to the west side of the navigational lock for construction of a fish passage structure in the powerhouse tailrace. Key elements of the access road design included concrete pavement design and design of anchored sheet pile retaining walls with heights varying from 7 feet to as much as 26 feet for the temporary construction loading condition. Jeff served as project manager and lead design engineer. He was also responsible for overseeing all aspects of the pavement and retaining wall design, including preparation of the quality control and inspection program (QCIP), construction plans and specifications, and the final construction report.

### **Hydro Development Feasibility Study for Mississippi Lock and Dam Nos. 20, 21 and 22 (4/20/2010-1/24/2011)**

#### **Klingner & Associates, P.C.**

#### **Quincy, Illinois**

Mead & Hunt conducted a feasibility study to assess the technical and economic viability of constructing hydroelectric generating facilities at three sites on the Mississippi River. The generating facilities would utilize the Mississippi River flows and head created by the navigation locks and dams operated by the United States Army Corps of Engineers (USACE). Jeff was responsible for development of the conceptual layout, final design of the pile-supported turbine-generator structures, evaluation of structural stability and constructability, and assisting with development of the supporting design report and construction drawings on Lock and Dam No. 21.

### **Brainerd Spillway Apron Modifications (9/27/2010-present)**

#### **Wausau Paper Mills, LLC**

#### **Mississippi River, Minnesota**

Mead & Hunt was retained by Wausau Paper Mills, LLC to design spillway apron modifications at the Brainerd Hydroelectric Project. The primary purpose of the spillway apron modifications was to provide for energy dissipation to improve downstream scour

## JEFF ANDERSON, PE (CONTINUED)

characteristics. Mead & Hunt's design engineers overcame several challenges associated with the configuration and foundation support of the existing gated spillway and apron structures to provide the client with an innovated and cost-effective solution. Jeff served as project manager and lead design engineer. He was responsible for overseeing all aspects of the structural design and stability evaluation and participated in a supplemental Potential Failure Modes Analysis (PFMA) for the project. Jeff was also responsible for preparation of the 60% and final supporting design reports, quality control and inspection program (QCIP), and overseeing development of the construction plans and specifications.

### **Cheboygan Part 12 Safety Inspection (4/18/2011-9/27/2011)**

#### **Great Lakes Tissue Company**

#### **Cheboygan River, Michigan**

Mead & Hunt was retained by Great Lakes Tissue Company to serve as independent consultant for the Part 12 safety inspection of the Cheboygan Hydroelectric Project. Following completion of the Part 12 safety inspection of the project, Mead & Hunt prepared the Consultant's Safety Inspection Report (CSIR) for submittal to the FERC. Jeff served as project manager and was also responsible for working with the independent consultant to prepare the draft and final CSIR.

### **Forestport Inundation Map Revisions (6/6/2011-8/25/2011)**

#### **Algonquin Power Systems, Inc.**

#### **Black River, New York**

Mead & Hunt was retained by Algonquin Power Systems, Inc. (Algonquin Power) to assist them in preparing inundation map updates for the Forestport Hydroelectric Project. Through participation in joint discussions between Algonquin Power and the FERC, we were able to identify an innovative solution that satisfied the FERC's requirements for the inundation map revisions and saved our client money. Jeff served as project manager and participated in joint discussions between the FERC and Algonquin Power.

### **Monterey Dam Modifications (7/18/2011-12/21/2011)**

#### **City of Janesville**

#### **Rock River, Wisconsin**

Mead & Hunt was retained by the City of Janesville to design modifications for the Monterey Dam. Modifications included construction of a new water-retaining structure across the existing impoundment to reduce the size of the impoundment and the length of the dam by approximately two thirds. Mead & Hunt developed an innovative and cost-effective solution, using rock fill retained by anchored vinyl sheet pile walls. This project was also noteworthy because of the aggressive construction schedule and extent of coordination required among multiple entities. The City had obtained a grant to cover a portion of the construction cost with the stipulation that construction had to be complete by the end of 2011 (approximately 5 months after Mead & Hunt received authorization to proceed). Mead & Hunt facilitated coordination with the Wisconsin Department of Natural Resources (DNR), United States Army Corps of Engineers (USACE), and local railroads to obtain the necessary permits to complete construction in the time permitted. Jeff served as project manager and lead design engineer. He was also responsible for overseeing preparation of the bid and construction documents and development of the joint permit application to the DNR and USACE.

## JEFF ANDERSON, PE (CONTINUED)

### **Rhineland Canal Wall Repairs (12/7/2011-6/25/2012)**

#### **Wausau Paper Mills, LLC**

#### **Wisconsin River, Wisconsin**

Mead & Hunt was retained by Wausau Paper Mills, LLC to design repairs to a portion of the steel sheet pile wall that lines the east side of the power canal at the Rhineland Hydroelectric Project. The solution provided by Mead & Hunt included installation of a waler along the canal-side of the wall to distribute the load, tie-back anchors with concrete deadmen, and grout-filled bags along the base of the sheet pile wall to prevent the toe from kicking out. Mead & Hunt also provided construction administration services. Jeff served as project manager and was also responsible for peer review of all aspects of the design, coordination with the FERC, and overseeing preparation of the final construction report.

### **Minnesota Falls Dam Rehabilitation Study (1/13/2012-6/6/2012)**

#### **Granite Falls Energy, LLC**

#### **Minnesota River, Minnesota**

Mead & Hunt was retained by Granite Falls Energy, LLC (GFE) to determine the extent of repairs required to bring the Minnesota Falls Dam into compliance with Minnesota Department of Natural Resources (DNR) dam safety regulations. We were also responsible for development of the joint permit application to the DNR and United States Army Corps of Engineers (USACE) to authorize transfer of ownership of the dam to GFE. Jeff served as project manager and was also responsible for coordination with the current dam owner and agencies, preparation of preliminary drawings showing the proposed repairs to the dam, and preparation of the joint permit application.

### **Mitchell Mill Powerhouse Concrete Repairs (2/21/2012-5/31/2012)**

#### **Mitchell County Conservation Board**

#### **Osage, Iowa**

Mead & Hunt was retained by the Mitchell County Conservation Board to design concrete repairs for the downstream face of the powerhouse at the Mitchell Mill Dam. Jeff served as project manager and lead design engineer. He was also responsible for development of the quality control and inspection program (QCIP) and provided oversight for all aspects of the design, including the construction plans and specifications.

### **Kaukauna City Plant Part 12 Safety Inspection (3/30/2012-present)**

#### **Kaukauna Utilities**

#### **Fox River, Wisconsin**

Mead & Hunt was retained by Kaukauna Utilities to serve as independent consultant for the Part 12 safety inspection of the Kaukauna City Plant. Following completion of the Part 12 safety inspection of the project, Mead & Hunt prepared the Consultant's Safety Inspection Report (CSIR) for submittal to the FERC. Jeff served as project manager and was also responsible for assisting the independent consultant during the Part 12 safety inspection and with preparation of the draft and final CSIR.

### **Weed Tainter Gate Stress Analysis and Inspections (4/11/2012-6/25/2012)**

#### **Gresham Municipal Utilities**

#### **Red River, Wisconsin**

Mead & Hunt was retained by Gresham Municipal Utilities to perform the stress analysis and initial up-close inspection of the four 14-foot-wide by 5-foot-high tainter gates at the Weed Dam. Jeff served as project manager and lead engineer for the gate

## JEFF ANDERSON, PE (CONTINUED)

inspections. He was also responsible for peer review of the stress analysis computations and tainter gate stress analysis and inspection report.

### **Owner's Dam Safety Programs (5/3/2012-present)**

#### **Multiple Clients**

On May 3, 2012, the Federal Energy Regulatory Commission (FERC) issued a letter to owners and licensees of significant and high hazard dams directing them to develop and formally submit an Owner's Dam Safety Program (ODSP). While the ODSP requirement was not new, formal submittal of documentation was previously required only on a case-by-case basis. Mead & Hunt worked with several dam owners to develop an ODSP that would not only satisfy the FERC's requirement, but also help their organizations deal with issues related to dam safety in a proactive manner by having a framework in place to deal with these issues. Jeff served as project manager and was responsible for preparation of ODSP's for the following clients:

- City of Tallahassee (Florida)
- Kaukauna Utilities (Wisconsin)
- South Sutter Water District (California)
- Turlock Irrigation District (California)
- Wausau Paper Mills, LLC (Wisconsin)

### **John Street Safety Inspection (7/13/2012-present)**

#### **Kaukauna Utilities**

#### **Fox River, Wisconsin**

Mead & Hunt was retained by Kaukauna Utilities to perform an inspection of the John Street Hydro to satisfy the requirements of the Wisconsin Department of Natural Resources (DNR). Jeff served as project manager and lead engineer for the on-site evaluation of the project's water-retaining structures. He was also responsible for development of an inspection report for submittal to the DNR.

### **De Pere Spillway Repairs (8/1/2012-present)**

#### **Thilmany, LLC**

#### **Fox River, Wisconsin**

Mead & Hunt was retained by Thilmany, LLC to provide design and construction administration services for concrete surface repairs to the overflow spillway at the De Pere Dam. Jeff served as project manager. He was also responsible for preparation of the joint permit application to the Wisconsin Department of Natural Resources (DNR) and United States Army Corps of Engineers (USACE), the quality control and inspection program (QCIP), and peer review of all aspects of the design, including the construction plans and specifications. ■

**Attachment B. Required information to be included in proposal**



**Exhibit B**  
**Required Information to be included in Proposal**

**Professional Qualifications**

- List of three references for which you have completed FERC Part 12 inspections and safety reports within the last 5 years, including contact name and phone number.
- List of staff members proposed to work on this project and description of relevant experience.
- Resume of the proposed independent consultant. This information will be submitted to FERC for approval prior to making any determination to select and award the contract. It is expected that FERC approval will take a minimum of 90 days.

**Proposed Work Plan and Schedule**

- Description of scope of work that complies with FERC Part 12 requirements and includes additional items listed in Section II of this RFP.
- Schedule for completing inspection and report by established deadline.
- Identification of resources to be provided by the City of Ann Arbor to assist in completion of the Part 12 Inspection and generation of the final report to FERC.

**Fee Proposal**

- Fee schedule for performing identified work.
- Completed Fee Proposal Form

**Appendices**

- Completed Human Resources Contract Compliance Forms
- Completed Declaration of Compliance with Living Wage Ordinance

**Attachment C. City of Ann Arbor Living Wage Compliance Form**

ATTACHEMENT C

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE
DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that employers providing services to the City or recipients of grants for financial assistance (in amounts greater than \$10,000 in a twelve-month period of time) pay their employees who are working on the City project or grant, a minimum level of compensation known as the Living Wage. This wage must be paid to the employees for the length of the contract/project.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from the Ordinance. If this exemption applies to your firm, please check below:

This company is exempt due to the fact that we employ or contract with fewer than 5 individuals.
This non-profit agency is exempt due to the fact that we employ or contract with fewer than 10 employees.

The Ordinance requires that all contractors/vendors and/or grantees agree to the following terms:

- a) To pay each of its employees performing work on any covered contract or grant with the City, no less than the living wage, which is defined as \$12.52/hour when health care is provided, or no less than \$13.96/hour for those employers that do not provide health care.
b) Please check the boxes below which apply to your workforce:
Employees who are assigned to any covered City project or grant will be paid at or above the applicable living wage without health benefits Yes No
OR
Employees who are assigned to any covered City project or grant will be paid at or above the applicable living wage with health benefits Yes X No
c) To post a notice approved by the City regarding the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
d) To provide the City payroll records or other documentation as requested; and,
e) To permit access to work sites to City representatives for the purposes of monitoring compliance, investigating complaints or non-compliance.

The undersigned authorized representative hereby obligates the contractor/vendor or grantee to the above stated conditions under penalty of perjury and violation of the Ordinance.

Mead & Hunt, Inc.
Company Name
Signature of Authorized Representative: Wendy K. Culver
Type or Print Name and Title: Wendy K. Culver, SPHR
Date signed: 05/03/2013

6501 Watts Rd. Madison, WI 53719
Address, City, State, Zip
(608) 273-6380
Phone (area code)
wendy.culver@meadhunt.com
Email address

Questions about this form? Please contact:
Procurement Office City of Ann Arbor
Phone: 734/794-6500

**Attachment D. Human Rights Contract Compliance Forms**

**CITY OF ANN ARBOR PROCUREMENT OFFICE  
HUMAN RIGHTS CONTRACT COMPLIANCE FORM**  
*Entire Organization (Totals for All Locations where applicable)*

**Form #1**

Name of Company/Organization Mead & Hunt, Inc. Date Form Completed May 3, 2013  
 Name and Title of Person Completing this Form Wendy Culver, HR Director and AA/EEO Officer Name of ~~President~~ <sup>CEO</sup> Rajan I. Sheth, PE, SE  
 Address 6501 Watts Rd. Madison WI 53719 County Dane Phone # (608) 273-6380  
(Street address) (City) (State) (Zip) (Area Code)  
 Fax# (608) 273-6391 Email Address wendy.culver@meadhunt.com  
(Area Code)

**EMPLOYMENT DATA**

Job Categories	Number of Employees (Report employees in only one category)												TOTAL COLUMNS A-L
	Male						Female						
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native	
A	B	C	D	E	F	G	H	I	J	K	L		
Exec/Sr. Level Officials	6		1				2						9
Supervisors	36						14						50
Professionals	171		5	4			53		3		2		238
Technicians	85	1	2	3			10						101
Sales													
Admin. Support	4	1			1		31	2	1	2	1		43
Craftspeople													
Operatives													
Service Workers													
Laborers/Helper													
Apprentices													
Other													
<b>TOTAL</b>	302	2	8	7	1		110	2	4	2	1	2	441
PREVIOUS YEAR TOTAL													

**CITY OF ANN ARBOR PROCUREMENT OFFICE**  
**HUMAN RIGHTS CONTRACT COMPLIANCE FORM**  
 Local Office (Only those employees that will do local or on-site work, if applicable)

Form #2

Name of Company/Organization Mead & Hunt, Inc. Date Form Completed May 3, 2013  
 Name and Title of Person Completing this Form Wendy Culver, HR Director and AA/EEO Officer Name of ~~President~~ <sup>CEO</sup> Rajan I. Sheth, PE, SE  
 Address 6501 Watts Rd Madison WI 53719 County Dane Phone # (608) 273-6380  
 (Street address) (City) (State) (Zip) (Area Code)  
 Fax# (608) 273-6391 Email Address wendy.culver@meadhunt.com  
 (Area Code)

**EMPLOYMENT DATA**

Job Categories	Number of Employees (Report employees in only one category)													
	Male						Female						TOTAL COLUMNS A-L	
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native		
A	B	C	D	E	F	G	H	I	J	K	L			
Exec/Sr. Level Officials														
Supervisors														
Professionals	2													
Technicians	2													
Sales														
Admin. Support							1							
Craftspeople														
Operatives														
Service Workers														
Laborers/Helper														
Apprentices														
Other														
TOTAL	4						1							
PREVIOUS YEAR TOTAL														