



**US Army Corps
of Engineers®**

ENGINEERING AND CONSTRUCTION BULLETIN

No. 2016-1

Issuing Office: CECW-CE

Issued: 04 Jan 16

Expires: 04 Jan 18

SUBJECT: Construction Liaison Roles and Responsibilities During Construction of Dam Safety Modification Projects

APPLICABILITY: Guidance

1. References:

- a. Engineer Regulation (ER) 5-1-11, U.S. Army Corps of Engineers Business Process, 01 November 2006
- b. ER 10-1-51, Roles and Responsibilities – Dam Safety Modification Mandatory Center of Expertise, 28 September 2012
- c. ER 1110-2-112, Required Visits to the Construction Sites by Design Personnel, 15 April 1992
- d. ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999
- e. ER 1110-2-1156, Safety of Dams – Policy and Procedures, 31 March 2014

2. Background

a. ER 10-1-51 dated 28 September 2012 established the Roles and Responsibilities (RR) for the Dam Safety Modification Mandatory Center of Expertise (DSMMCX). The USACE DSMMCX is a national center of expertise that provides technical advice, oversight review and production capability for concepts, planning, design and construction of all aspects of dam modification projects across USACE. The DSMMCX is responsible for the overall coordination and oversight of the national dam safety modification mission within USACE. ER 10-1-51 requires that the DSMMCX collaborate with the Regional Dam Safety Production Centers (DSPC) for mission execution and focus on improving the effectiveness and efficiency in the delivery of dam safety modification products and services. It assigns the DSMMCX an oversight role in the development of technical products associated with dam safety modifications to include preparation of the decision document, design documentation report, plans and specifications, and engineering and design during construction.

b. The Risk Management Center (RMC), established in 2009, is a center of expertise under the U.S. Army Corps of Engineers (USACE) Institute for Water Resources (IWR). The mission of the RMC is to support Civil Works by managing and assessing risks for dams and levee systems across USACE, to support dam and levee safety activities throughout the USACE, and to develop policies, methods, tools, and systems to enhance those activities.

ECB No. 2016-1

Subject Construction Liaison Roles and Responsibilities During Construction of Dam Safety Modification Projects

c. ER 1110-2-1156 reflects the establishment of the DSMMCX and the RMC, and provides additional guidance on how these organizations are to be included in the project delivery process. ER 1110-2-1156 states “In order to provide the best opportunity for project success, a district should always strive to build a cohesive team built upon the principles in ER 5-1-11. This entire team must be involved in the project from planning, design, and through completion of construction. This includes not only the technical elements within a district and the DSPC (planners, designers, constructors, PMs, etc...) but also the involvement of vertical elements such as the regional/HQ staff, the RMC, and the DSMMCX. While the day-to-day execution of a project remains the responsibility of a district, the RMC and DSMMCX are able to bring an agency-wide perspective to the project to ensure uniformity and adoption of best practices from across USACE. The RMC and DSMMCX fill a vital part of the overall QA function for HQ in dam safety modification projects. Their early and continual involvement as part of the PDT is essential. Involving all elements from the inception of a project will ensure the failure modes are identified, the correct alternatives are evaluated, and that the best project solution is chosen.” ER 1110-2-1156 also states that “The Lead Engineer/PDT shall be actively involved in the confirmation of design assumptions during construction. Frequent and mandatory inspections shall be scheduled during construction to confirm that site conditions conform to those assumed for design or to determine if design changes may be required to ensure risk reduction objectives will be met.” In addition, ER 1110-2-1156 also states “Engineering representatives from RMC, DSMMCX, and MSC office are an integral part of the vertical team and thus should be continually aware of construction progress in order to permit participation by personnel from those offices in field inspections at critical construction stages in accordance with the requirements of ER 1110-2-112 (reference A.46). This involvement, along with Design Construction Evaluation inspections, is a vital part of the QA role associated with MSC/HQ on dam safety modification projects.”

d. ER 1110-2-1150, paragraph 10 states “For analysis of special areas, such as hazardous, toxic, and radioactive waste (HTRW), hydropower, and other functions, assigned to centers of expertise, the districts shall coordinate as needed and comply with the regulation of use of centers of expertise. For unprecedented, complex problems, districts shall consider the use of special consultant teams, which may include engineers from the MSC, HQUSACE, other Districts, other agencies, academia, or private industry.” ER 1110-2-1150, paragraph 15.5 states “Site visits shall verify that conditions match the assumptions used in designing the project features. Site visits may also be necessary to brief construction division personnel on any issues affecting the construction, including aesthetic considerations, which cannot be conveyed via the report on engineering considerations and instructions for field personnel. All field visits shall be well documented and scheduled.”

3. Role of the Construction Liaison

a. As discussed in paragraph 2, ER 1110-2-1156 outlined the requirement and need for additional and supplemental efforts for dam safety assurance projects, while maintaining the district’s role for the primary execution of the construction project. The role of the Construction Liaison (CL) is intended to supplement the Lead Engineer (LE), and engineering and

ECB No. 2016-1

Subject Construction Liaison Roles and Responsibilities During Construction of Dam Safety Modification Projects

construction elements of the Districts, MSCs, and HQ in their accomplishment and oversight of quality management activities.

b. The knowledge and experience that a CL brings to a dam safety related construction project is enhanced by their involvement with other projects. For example: foundation grouting lessons learned from Center Hill dam can be shared with East Branch; cutoff wall construction techniques from Wolf Creek Dam can be shared with Bolivar etc. The CLs serve as the DSMMCX representative in sharing lessons learned and promoting efficiency and effectiveness on dam safety modification projects.

4. Duties of the Construction Liaison

a. Construction Liaisons are specialists in areas of dam and levee design and construction. Selection and appointment of CLs are joint responsibility of the DSMMCX, RMC, and HQUSACE Engineering & Construction Division. CLs support engineering risk assessments, and dam and safety modifications performed as part of USACE dam safety program. Levee risk management activities may also be included in CL responsibilities, subject to project specific assignments. In addition to supporting quality management activities on Dam Safety Projects, CLs:

(1) Serve as advisors on technical issues with respect to designs, plans and specifications, and dam safety risk management issues for USACE.

(2) Review design and construction activities associated with dams and levees.

(3) Evaluate and provide support for district efforts to implement interim risk reduction measures.

(4) Evaluate the constructability of study level designs.

(5) Review recommendations made in DSM studies, and make recommendations to the districts, DSMMCX, and RMC management concerning the adequacy and technical aspects of the proposed actions.

(6) Evaluate and support district activities related to implementing permanent risk reduction measures.

(7) Evaluate constructability of engineering plans and specifications.

(8) Serve on technical selection committees for potential offerors for dam safety modification projects.

(9) Evaluate the construction risk related to life safety and occupational safety for planned risk reduction measures.

ECB No. 2016-1

Subject Construction Liaison Roles and Responsibilities During Construction of Dam Safety Modification Projects

(10) Perform agency technical review of major rehabilitation of dams, and dam safety modification studies for USACE districts.

(11) Assure national consistency in Dam Safety modification products through performance, review, and oversight of all design, analysis, and construction activities.

b. In support of, and in conjunction with HQ, MSCs, Resident, and LEs, CLs provide the following support for construction management and quality management activities:

(1) Evaluate schedules, budgets, and costs of risk reduction measures which are prescribed in the project planning and design documents.

(2) Review construction management (government QA/QC) activities that are prescribed in the project Quality Management, Quality Assurance, Quality Control, or Construction Management documents.

(3) Troubleshoot highly specialized and technical projects that may require him/her to develop new inspection or quality control procedures.

(4) Monitor overall construction progress and addresses potential problem areas as they relate to the achievement of risk reduction

(5) Review design and construction analyses, studies, and other technical products prepared by the DSMMCX and the RMC, A-E firms, or other professional contractors.

5. Communication, Coordination, Command and Control

a. The CL effort is focused on achieving the risk reduction objectives when dams are modified. This effort is intended to supplement, not supplant, the primary construction and engineering QA roles of Districts, MSCs, and HQ.

b. Project specific roles and responsibilities for the CL are to be generally detailed in the Project Management Plan, and fully described in the quality management or assurance plans for design and construction. Level of effort for CLs must be mutually discussed and agreed between District, MSC, HQ, PCX, and DSMMCX and funding provided based on agreements reached. Site visits by CLs are anticipated to be made on bi-monthly to quarterly bases, depending on the specifics of the project. Additional visits may be required for critical project milestones and issues. These visits will be coordinated and agreed to by the District and the DSMMCX. The DSMMCX will coordinate CL visits with the annual MSC DCE schedules (submitted to HQ Chief of Construction) to promote consistency and collaboration with DCE activities.

c. The overall governance and responsibility for the project will remain with the District and the CL will operate and communicate with that understanding. The CL will communicate primarily with the LE and the Resident Engineer (RE). Coordination for project funding will be coordinated through the PM and other PDT members. Site visits by the CL will be coordinated through the Project Manager (PM), LE, and the RE with a specific agenda. During construction,

ECB No. 2016-1

Subject Construction Liaison Roles and Responsibilities During Construction of Dam Safety Modification Projects

communication with field engineers, QA personnel, and inspectors will be necessary but only with the knowledge and consent of the RE and LE. The primary responsibility for, and the contractual authority to administer design and construction contracts resides only in the geographic district. No directives will be made by the CL. Recommendations concerning jobsite conditions, construction progress, schedule, or other aspects of the project will be made to the RE and LE. These recommendations will be made verbally immediately and made a part of the out brief to the RE and LE, and documented in a trip report. The trip report will be drafted by the CL, reviewed by the RE, LE, and PM before finalization. The trip report will be furnished to the RE, LE, PM, as well as DSMMCX and RMC. Samples of a trip report and out brief are enclosed as Appendix A.

d. Conflicts or disagreements between the CL and RE/PE will be resolved at the lowest possible level while recognizing and maintaining the USACE governance and command and control structure. If it is not possible to resolve issues at the project level they will be elevated to the Chief(s) of Engineering and Construction at the District for resolution. Should that fail to resolve the conflict, the Director of the DSMMCX and RMC will coordinate resolution with the MSC and/or HQ Chief of Construction.

6. **Update.** All new requirements will be included in the next appropriate policy document update prior the expiration of this ECB.

7. **Points of Contact.** HQUSACE points of contact for this ECB are Mr. James Moore, CECW-CE, (570) 615-6321 and Steven P. Morgan, DSMMCX, (304) 399-5221.

Encl

//S//
JAMES C. DALTON, P.E.
Chief, Engineering and Construction
U.S. Army Corps of Engineers

Appendix A
TRIP REPORT
Bluestone Dam
Construction Liaison Site Visit

Date: April 9, 2013
Time: 0800-1600
Weather: Sunny, 75°F
Attendees: RMC's Matt Sheskier, Barney Davis, Sal Todaro, Dave Carlson, Steve Townsley; DSMMCX's Pat Morgan, Kim Davidson, Mike McCray, Jeff Rakes, Rob Reed, LRH's Lisa Morgan, Nancy McIntosh, Steve Porter; Bluestone RE Office's Paul Carr, Sandy Nesmith, Coen Bauders.

Purpose: Site visit was to introduce and provide a project orientation to RMC's Construction Liaison Engineers in support of ongoing and future engineering and construction activities to modify Bluestone Dam to mitigate existing dam safety deficiencies.

Project Description and Information: Bluestone Dam is a gated concrete dam. Several significant potential failure modes have been identified at Bluestone Dam including overtopping, sliding and scour. As result of significant potential for loss of life downstream, the dam has been rated as a DSAC II dam. Construction has been underway in phases since early 2000's. At time of the visit, Phase 3: Penstock Scour Protection contract was under construction and Phase 4: Anchoring contract had been awarded and start of its construction was eminent pending approval of upfront submittals.

Summary: The visit began at the RE Office with a briefing by LRH PM Lisa Morgan and MCX Director Pat Morgan. The briefing provided a history of the dam safety evaluations and the construction mitigations to date as well as schedule for future activities. Following the briefing, RE Paul Carr and Project Engineer Sandy Nesmith lead the group on a tour of the site and explained the ongoing activities and site constraints. At the time of the visit, the Phase 3 contractor was in process of constructing training wall monoliths to left and right of penstocks in auxiliary stilling basin. Activities included batching and placing mass concrete, preparing previously placed concrete surfaces for subsequent placements, and forming for future concrete placements.

Following the site visit, the group reconvened at the RE Office where the RMC personnel sat down with RE staff to discuss Phase 3's Engineering Considerations for Field Personnel and the Quality Assurance Plan, and briefly reviewed the construction schedule for both Phase 3 and Phase 4.

Observations and Recommendations:

a. Integration: It appears the District has been successful in building a cohesive engineering and construction team. Project construction staff, namely the RE and the Project Engineer, has been active members of the PDT and have aided significantly in developing the various phases. The Lead Engineer Nancy McIntosh and Project Geologist, Mike McCray make frequent visits to the site to ensure the intent of the design are being met during construction.

b. Quality Assurance: The RE Office consists of 9 full-time staff (RE Paul Carr, Project Engineer Sandy Nesmith, Geologist Coen Bauders, 4 Con Reps, 1 Material Tech, and 1clerk). The staff is very experienced in the various types of work ongoing and planned/future. The staffing level is adequate for the current Phase 3 schedule (essentially a 40-hour single-shift, work week). RE expects the current staff to also cover Phase 4 anchoring which once begun, will be concurrent with Phase 3 through a good part of 2016. Staffing level concerns would certainly arise should either contract opt to “double shift” or when critical activities (inevitably) occur simultaneously. Means to provide adequate staffing was briefly discussed and included “DSAC University” TDY positions and TDY assignments from LRH. RE is in process of evaluating Phase 3 and Phase 4 schedules for staffing impacts.

c. Contract Administration: The contract management is performed by the RE Paul Carr with assistance from the Project Engineer and others. There was some discussion that with the additional contract starting and the importance of timely response to RFIs, submittals, schedules, and progress payments that this could become more difficult with existing staff. The RE stated that this would be monitored and that additional assistance from LRH would be requested if needed.

d. Foundation Approval: Field Geologist, Project Geologist and LRH staff geologists map final foundation surfaces and prepare documentation for approval of the individual monolith foundations prior to concrete placement.

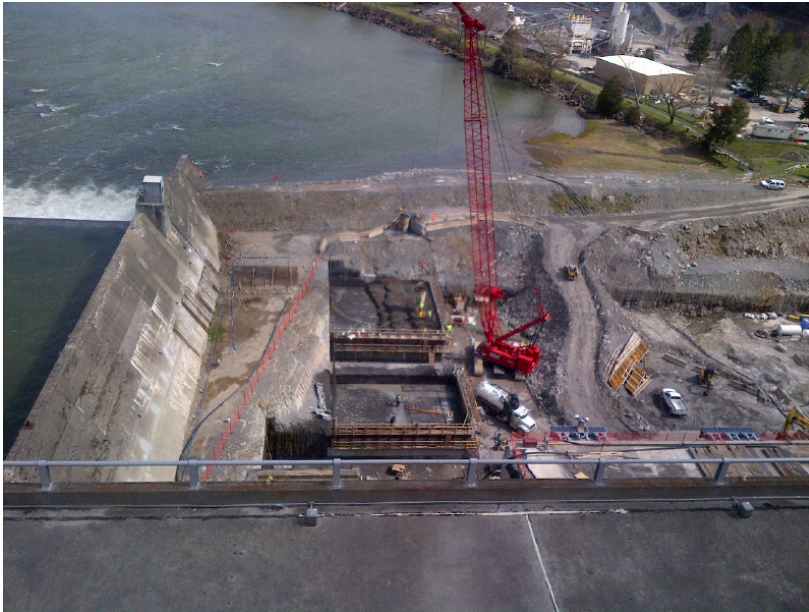
e. Instrumentation: Most critical instruments are automated, thresholds have been set and alarm notifications are automatic. System includes some manually read instruments for redundancy. Review of readings appears to be excellent, and performance to date has not indicated any detrimental movements as result of construction activities. The District is currently exploring means to enter all info into GIS-type system similar to Wolf Creek and has scheduled to meet with LRN staff for ideas on how to implement a system.

f. Schedule: Phase 3 contractor is currently on schedule to complete in 2016, however a significant modification is pending which will increase stilling basin excavation and concrete thicknesses. This mod has not yet been negotiated nor have impacts, if any, to current approved schedule been ascertained. Phase 4 contract cleverly required the contractor’s baseline schedule be approved prior to receiving NTP for onsite construction. Currently the Phase 4 baseline has been approved with contract completion estimated in 2020 and onset of construction is currently pending approval of several other critical upfront submittals. Of note the District has hired a consultant (Management Solutions) to help evaluate schedules for both Phase 3 and Phase 4. Future Phase 5 work (scour of main stilling basin and apron uplift) is currently being evaluated and BCRA is scheduled to go before the SOG in July 2013 with the DSMR scheduled for 2015.

g. Progress Meetings: RE staff meets weekly with contractor to coordinate activities and to discuss status of submittals and modifications.

h. Future Visits: Discussions for future visits indicated the next visit would likely occur in/around Oct 2013 when both Phase 3 and Phase 4 were expected to be underway with significant anchoring activity. The RMC travelers reiterated their offer to assist in any way needed during design and construction, and their offer was well received.

Photographs: The following are photos taken during visit on 4/9/2013.



View of the left training wall construction showing existing wall, new construction, and excavation for stilling basin.



View of the closure gates on the existing penstocks.



Monolith construction of the right training wall.



View of the stilling basin excavation. Work in center of picture is a fault that runs upstream to downstream. The fault is being excavated and filled with concrete.

Submitted by: Barney Davis, Matt Sheskier, Sal Todaro