

Lessons Learned on USACE Mega-Project or Program Management



Contact: Johnnie Newson, EM-53 johnnie.newson@em.doe.gov
202-586-8849

Date: 08/25/2016

Statement:

The Office of Environmental Management (EM) maintains a lessons learned program that identifies lessons learned from Construction, D&D, and remediation projects. EM provides a monthly lessons learned bulletin on pertinent project management topics from DOE projects, other federal agency lessons learned, and private industry. This month's lessons learned is on the US Army Corps of Engineers processes for executing large projects.

Discussion:

The United States Army Corps of Engineers (USACE) was established by Congress in 1779. Since this time they have been involved in the construction of coastal fortifications, lighthouses, harbors, inland fortifications, canals, roads, bridges, dams and other construction projects. The USACE hosts a number of Mega Projects. Their Civil Works Division recently completed the Herbert Hoover Dike, Center Hill Dam Safety Modifications, Olmsted Lock and Dam, and their Military Program recently completed the Ft Riley Hospital. They are also completing the Folsom Dam Auxiliary Spillway large project in their Sacramento California district. The USACE has been recognized for their engineering and construction management excellence, and they are called upon to support major civil construction projects in the US and internationally. There are many similar requirements for DOE projects as elaborated in DOE Order 413.3b.

The USACE has identified 8 typical attributes to a Mega Project in their Engineering and Construction Bulletin 2014-14:

1. Cost and Duration -- The cost of the project or program is one of the most significant attributes of a mega-project. Very large-dollar-value projects and programs generally represent more risk in achieving project objectives. Performance periods for mega- projects are generally longer indicating more performance risk.
2. Uniqueness -- One of a kind projects or projects involving unique and highly complex systems, processes and technical challenges may be characteristic of mega-projects.
3. Acquisition Strategy and Delivery Method – The contract type, solicitation, evaluation, and compensation methods allocate risk between the contracting parties. The spectrum ranges from simple design-bid-build, firm fixed price construction contracts to best value or qualifications-based design or design-build contracts. More complexity and pricing flexibility are characteristic of mega projects.
4. National Significance – Projects or programs of national or international significance may be characteristic mega-projects. An example would be projects constructed under the Dam Safety Modification Program.
5. Critical Nature of Completion Date and/or Funding Constraints – Projects or programs with completion dates established in law or treaty; tight or incremental funding requirements; and/or other requirements which dictate close control and projection of ultimate cost and completion, may be mega-projects.
6. Coordination of Multiple Prime Contractors – Projects or programs that require USACE coordination of multiple prime construction contractors conducting significant construction operations concurrently on a project site may be characteristic mega-projects.

7. Coordination of Multiple Design Agents and Stakeholders – Projects or programs requiring the coordination of multiple design agents, multiple USACE Districts and Centers, or multiple Federal agencies, may be characteristic of mega-projects.

8. Overlapping or Dependent Project Phases – Projects where authorization, funds, or physical constraints determine the pace of execution may be characteristic mega-projects.

The USACE reviewed their lessons learned program for a time period of three years ranging from 2011 to 2014 and looked at their mega projects. From that review came 13 tenets for mega project management controls. The intent for them is to be “flexible and scalable to accommodate the type, size, and focus of programs and projects”. Those 13 tenets are:

1. Establish Disciplined and Focused Supplemental Governance Structure

The USACE established a three-tiered governance structure that is established for mega-projects in order to achieve needed accountability, visibility, understanding, and timely decision-making in order to assure effective communication and issue resolution at appropriate levels. This structure would be incorporated into the Project Management Plans and Program Management Plans.

2. Facilitated Partnering

Professionally facilitated formal partnering is an integral element of this mega-project governance process. This requirement is not limited solely to contractors and includes facilitated partnering among USACE elements. The use of a Facilitator Report, Hierarchal Dispute Resolution Matrix and Project Charter identifying common goals are vital in mega projects.

3. Evaluations:

Mega Design-Construction Evaluations are an essential element in the Quality and Project Management aspects of mega-projects. These evaluations can be tailored and should be coordinated with Mega Project teams in advance of critical project milestones.

4. Periodic Updates and IPRs:

Quarterly Mega Update reports are provided to upper management. The Mega Updates address all items identified in any Mega Design-Construction Evaluation Report, including corrective actions planned or taken to address each issue. The Update are included as part of the quarterly Mega Project review.

5. Enhanced Project Management Plans

Mega Project’s vertical teams develop the Project Management Plans which include organizational charts and the credentials for candidates to fill the Project Management, Lead Engineer, Scheduler and Project Controls positions. These document are provided to HQ for formal input, prior to approval by the Project Senior Executive. Project Management Plans are reviewed annually by the original signatories or their successors and revised as appropriate for relevance and soundness of the plan going forward. Project Management Plans are required to be updated prior to the start of design, prior to the start of construction, and annually, at a minimum.

6. Enhanced Project Delivery Team

Multi-disciplined Project Delivery Team are assigned early in the project design phase to be responsible and accountable for the project until completion. Selection of team members are based on competencies established by the Senior Project Executive and may require resourcing the Project Delivery Team from outside. Non-technical competencies are recognized as equally important to technical competencies. Team building and partnering exercises are initiated early and often in the project life cycle, and are documented in annual updates of the Project Management Plan.

7. Use of Lessons Learned

Best practices are used to inform the development of future mega- project management plans in particular, and to inform revisions to the USACE Project Management Business Process. Project Delivery Teams populate the Enterprise Lessons Learned system on a regular and recurring basis for all projects with special emphasis on mega-projects.

8. Project Senior Executive Accountability

The Senior Executive Staff leader is accountable to the Director for project/program success. He or she will provide guidance and mentoring to the Mega Project Delivery Team. The Project Delivery Team is held accountable to the Project Senior Executive.

9. In-Progress Reviews (IPRs)

The Project Senior Executive and Senior Executive Staff may add to the basic minimum format, and chair the quarterly Mega Project In-Progress Reviews. These reviews serve as both information and decision-making forums (if needed). The Project Senior Executive, Senior Executive Staff, hold an internal project review, if the Director does not want one provided to HQ.

10. Integrated Master Project Schedule, Cost Estimate, Risk Analyses, and Earned Value

USACE mega-project teams prepare and maintain an Integrated Master Schedule, Cost and Schedule Risk Assessments/Registers, and Earned Value Models throughout the life of the project. The Project requires trained and experienced personnel to be assigned to formulate and update these tools. These personnel must be on staff at the early stage of the project life cycle to prepare and status the Integrated Master Schedule. The Integrated Master Schedule includes planning, programming, procurement, design and construction phase activities and are updated with actual dates and remaining durations at least monthly. As project phases become more certain (e.g., contracts awarded, milestones missed/met, baselines adjusted, etc.), the Integrated Master Schedule will provide a hierarchical “rolling window” focus on details which are important and understandable to the three-tiered mega-project management structure. The Integrated Master Schedule informs the entire team about activities that are on and near the critical path each month. Mega-project cost estimates and schedules are integrated at either the project or program level, utilizing Earned Value Management System principles. The Project Manager utilizes the capabilities of a stand-alone commercial off the shelf software program for monitoring and reporting cost and schedule metrics during the entire project/program life cycle. Risk analyses are performed for the project/program.

11. Project Controls Sub-Team and Metrics

Each mega-project Project Delivery Team establishes a project controls sub-team at the project or program level. This sub-team is staffed with experienced personnel responsible for: managing project and integrated program schedules; project and program budgets; and document and communication controls. The sub-team composition will change over time and includes staff with specialized expertise in project control functions including cost and schedule risk analysis. At least one member of this sub-team will be a Government employee that is experienced in cost and schedule risk analysis, cost estimating and network scheduling. The Senior Project Executive Staff set metrics for monitoring and evaluating performance of all phases of the mega-project, and ensures timely and accurate reporting by the Controls Sub-Team. Cost and schedule metrics should employ Earned Value Management principles and technical metrics will follow existing program requirements.

12. Enhanced Recruitment and Staffing of Project Team Members

A mega-project may adversely impact any District’s manpower and personnel management when the project office is initially stood up and when it shuts down. Standard HR processes are not designed for standing up and closing down a large office in a timely and orderly fashion, so additional planning and incentives may be required to ensure that the best and brightest Project Delivery Team members from across the Command are recruited, selected, assigned, retained and/or returned to their home station .

13. Certified Project Managers

The Project Manager must have sufficient technical experience in the appropriate engineering and/or construction function. These minimum qualification levels are demonstrated by certification, licensure, and experience as listed in the Project Management Plan and determined by the Senior Project Executive.

APPLICABILITY:

Although these USACE practices apply to civil engineering projects, they are also relevant for all EM projects including D&D and Remediation projects.

ACTION:

Site Managers and Field Project Directors should review these 13 USACE project tenets and apply them as applicable and within the context of DOE Order 413.3B requirements:

1. Establish Disciplined and Focused Supplemental Governance Structure
2. Facilitate Partnering
3. Evaluations
4. Periodic Updates and In Project Reviews
5. Enhanced Project Management Plans
6. Enhanced project Delivery Team
7. Use of Lessons Learned
8. Project Senior Executive Accountability
9. MSC Mega In-Progress Reviews
10. Integrated Master Project Schedule
11. Project Controls Sub-Team and Metrics
12. Enhanced Recruitment and Staffing of Project Team Members
13. Certified Project Managers

Critical Decision(s): CD-0 to CD-4

Facility Type(s): All

Work Functions(s): Project/Program Management

Technical Discipline(s): All

References:

1. United States Army Corps of Engineers, "USACE Mega-Project or Program Management: Additional Program, Project, Engineering and Construction Management Controls" *Engineering and Construction Bulletin*, No. 2014-14, CECW-CE (4 June 2014)