

DEPARTMENT OF THE ARMY

COMPLETE STATEMENT

OF

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BEFORE

**THE COMMITTEE ON APPROPRIATIONS
SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT**

UNITED STATES HOUSE OF REPRESENTATIVES

ON

**MAJOR CONSTRUCTION PROJECTS OF
THE DEPARTMENT OF ENERGY**

MARCH 20, 2013

Mr. Chairman and distinguished members of the Subcommittee, I am honored to be testifying before your subcommittee today on behalf of the U.S. Army Corps of Engineers (USACE), on Interagency Support provided to the Department of Energy's Office of Environmental Management (EM), National Nuclear Security Administration (NNSA), and Office of Acquisition & Project Management (APM). My name is Mike Ferguson, and I am the Chief, of Cost & Technical Support Branch in the Huntington District.

INTERAGENCY SUPPORT PROVIDED TO DOE-EM & DOE-NNSA

USACE has historically provided cost engineering Interagency Support to DOE-EM, DOE-NNSA, & DOE-APM via Interagency Agreements and associated Memorandums of Understanding (MOU's) between the agencies. The general types of Interagency Support provided include the following:

- Independent Cost Estimates (ICEs), Schedules, and Cost & Schedule Risk Analyses (CSRAs)
- Cost Estimate Reviews, Assessments, and Validations
- Project Controls support (Earned Value Management System Tracking & Review)

Key interagency cost engineering support efforts that USACE has provided to DOE include the following:

for DOE-EM

- Best-in-Class Project & Contract Management Initiative (BICPM)
- Project Management Partnership (PMP)
- Detailed Staffing Estimates for 4 DOE-EM Capital Construction Projects (WTP, SWPF, U-233, and ETPP)

for DOE-NNSA

- ICE for the Uranium Processing Facility (UPF) project

for DOE-APM

- ICE for the DOE-NNSA's Mixed Oxide Fuel Fabrication Facility (MFFF) - currently in-progress
- ICE for the DOE-EM's Salt Waste Processing Facility (SWPF) project currently in-progress

DOE-NNSA URANIUM PROCESSING FACILITY INDEPENDENT COST ESTIMATE (2009-2012)

DOE-NNSA's Y-12 Site Office (YSO) requested that USACE Huntington District prepare an Independent Cost Estimate (ICE) for the Uranium Processing Facility (UPF) in November 2009. The purpose of the ICE was to assist the UPF federal management team in determining the reasonableness of the management and operating (M&O) contractor's cost estimate and schedule for the project. USACE Huntington District fielded a diverse and experienced team of USACE Federal and AE Contractor cost

engineers, schedulers, risk analysts, and nuclear construction subject matter experts to manage and develop the ICE in late March 2010. The UPF project was approximately 40% design complete at the time of ICE development. This 40% design was the scoping basis of ICE development. The USACE ICE team worked on-site at the DOE-NNSA UPF project office in Oak Ridge, Tennessee for five months to develop the initial ICE. The USACE ICE team completed the development of a detailed cost estimate, project schedule, and risk analysis in September 2010. The UPF ICE results were as follows:

COST ELEMENT	\$ Amount (in Billions)
Base Estimate	\$4.241
Contingency (85% Confidence Level)	\$1.578
<i>Contingency Percent</i>	<i>37.2%</i>
Escalation (4%)	\$1.350
Actual Cost to Date	\$0.217
TOTAL PROJECT COST	\$7.386
Note: USACE ICE assumed FY11 funding of \$115 million and all out-years were Unconstrained Funding case	
SCHEDULED COMPLETION	January 2023
SCHEDULED COMPLETION w/CONTINGENCY	March 2026

In the Fall of 2010, The USACE ICE team then performed a Reconciliation of its ICE to the M&O Contractor's cost estimate for the UPF project as requested by the DOE-NNSA in order to understand where the two differed and why. The point estimates differed as follows:

PROJECT	USACE ICE	M&O Estimate	Cost Variance (\$)	Cost Variance (%)
UPF Base Estimate	\$4,241,383,290	\$3,107,390,130	\$1,133,993,160	26.74%

The greatest variance was in the out year scope for Planning & Readiness. Some key reasons for cost variances included the following:

- Different cost estimating methodologies yielded different results
 - USACE ICE used bottoms-up detailed estimating methodologies
 - M&O Estimate used historical unit costs
 - USACE used task-based crews for Planning & Readiness
 - M&O used level-of-effort crews annually for Planning & Readiness

- Different scope assumptions
 - Planning & Readiness (startup, training, testing, commissioning) assumptions
 - USACE included project costs for both capability & capacity
 - M&O included project costs for capability only
 - USACE included some labor categories in crews which were covered in overhead (double-counting, later adjusted in final ICE)
 - USACE estimated double shift operation
 - M&O estimated single shift operation
- Work item misplaced or omissions within the Work Breakdown Structure (WBS) accounted for some smaller variances

The USACE ICE for construction of the UPF project’s foundation, superstructure, glove boxes, equipment, and utilities was only 7% higher than the M&O’s for the point estimate.

In February 2011, the USACE ICE team updated the ICE per the findings of reconciliation where it deemed appropriate. The updated ICE was then fit to the constrained funding profile provided by DOE in August of 2011 and resulted in the following:

COST ELEMENT	\$ Amount (in Billions) 4% Escalation	\$ Amount (in Billions) 1.9% Escalation
Base Estimate	\$4.899	\$4.714
Contingency (85% Confidence Level)	\$1.502	\$1.502
<i>Contingency Percent</i>	30.66%	31.86%
Escalation	\$4.128	\$1.556
Actual Cost to Date	\$0.217	\$0.217
TOTAL PROJECT COST	\$10.746	\$7.989
Note: both are Constrained Funding case		
SCHEDULED COMPLETION	April 2035	July 2031

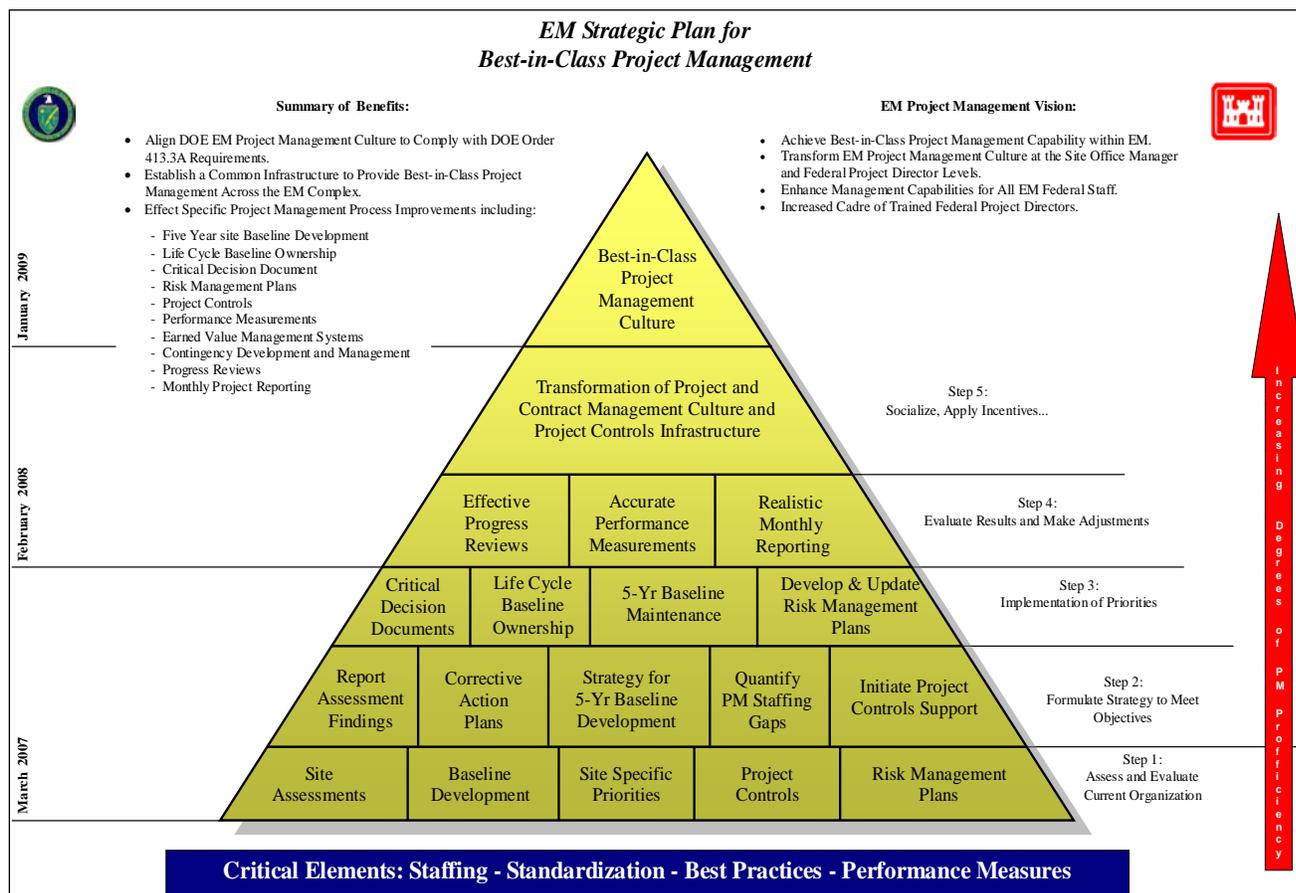
The M&O Contractor used Chief Financial Officer (CFO) escalation rate of 1.9% and the USACE ICE used a local market study rate (ENR) which considered nuclear construction projects.

In April 2012, DOE-APM requested the USACE ICE Team develop a Rough-Order-of-Magnitude (ROM) Estimate for the accelerated construction of the UPF project to support DOE’s CD-1 reaffirmation process. The USACE ICE Team updated the revised UPF ICE Point Estimate from February 2011 for non-9212 building capabilities deferral. The ROM Estimate for accelerated construction and non-9212 capabilities deferral of the UPF project results are:

COST ELEMENT (UPF w/Building 9212 Capabilities only)	\$ Amount (in Billions)
Base Estimate	\$2.935
Base Estimate Accuracy Uncertainty	\$0.363
Contingency (85% Confidence Level)	\$0.782
<i>Contingency Percent</i>	26.6%
Escalation (4%)	\$1.371
Actual Cost to Date	\$0.399
TOTAL PROJECT COST	\$5,581
Note: Constrained Funding case	
SCHEDULED COMPLETION (CONSTRAINED w/CONTINGENCY)	May 2027

DOE-EM Best-in-Class Project & Contract Management Initiative (2007-2009)

In early 2007, the Assistant Secretary for Environmental Management summarized the Strategic Plan for achieving the BICPM/CM vision using the following graphic:



In February of 2007, DOE-EM requested Interagency Support from USACE Huntington District aimed at developing Best-in-Class project and contract management capabilities for all EM sites. DOE-EM developed a five-phased approach to accomplish this goal with support from USACE which included the following:

1. Develop Assessment Criteria & Work Plan
2. Perform EM site assessments and complete assessment report
3. Develop a Corporate Implementation Plan (CIP)
4. Implement the BICPM/CM Initiative Corporate Implementation Plan
5. Institutionalizing the BICPM/CM Initiative

Phase 2 Assessments of 16 EM sites were performed in 2007 and evaluated strengths and weaknesses in 12 key Project Management capabilities and three contract management benchmarks. The results of the Phase 2 assessment are contained in the following figure:

The results of these Assessments confirmed the results of other reviews, including the National Academy of Public Administration’s (NAPA’s) management review of the

	EM Complex	CBFO	EMCBC	ICP	LASO	PPPO	ORO	ORP	RL	NSO	SRSO	BNL	GJO	OAKLAND	SPRU	WVDP
Compliance with DOE Order 413.3A																
Cost Estimating																
Scheduling																
Baseline Management																
Project Controls																
Risk Management			n/a													
Engineering and Subject Matter Expertise																
Integrated Project Team			n/a													
Contracting and Acquisition																
Project Management Tools																
Training and Professional Development																
Internal Organization Structure																
Composite Site Scores:																

Best-in-Class
 Superior
 Adequate
 Less than Adequate
 Inadequate

DOE EM Program and the DOE Office of Management’s Root Cause Analysis of Project and Contract Management. In each of these reviews, the shortage of qualified resources dedicated to supporting Federal management functions was identified as a primary cause for Project Management and Contract Management difficulties within DOE EM. The Assessments identified more than 150 specific positions that are

necessary to achieve BICPM/CM. These positions are summarized in the Error! Reference source not found.

Summary of Personnel Needs to Achieve BICPM

	EMCBC	LASO-EM	PPPO	ORO	ORP	RL	SRSO	All Others	Total
Project Controls	2	2	5	4	3	6	11	11	44
Cost Engineer	5	1	3	4	1	2	4	3	23
Scheduler		1	3	4		2	4	1	15
Risk Analyst	2	1	1	1	2	5	2	4	18
Other PM		12			1	8		3	24
Property Mgmt Spec	2		1		2	2	2		9
Cost/Price Analyst	3		1	1	2	2	2	1	12
Contract Spec	2		2		2	3	5		14
Total	16	17	16	14	13	30	30	23	159

The BICPM/CM Corporate Implementation Plan (CIP) identified 18 Recommended Priority Actions (RPAs) that DOE EM should undertake to address these challenges and to implement BICPM within DOE-EM. The 18 RPAs are as follows:

1. Assign Leadership for BICPM Implementation.
2. Provide Additional Project Management Resources.
3. Provide Additional Contract Management Resources.
4. Address Unresolved Baseline Change Proposals and Request for Equitable Adjustments.
5. Develop and Improve Federal Work Plans at Each Site.
6. Provide Project Management and Contract Management Capability Reinforcements.
7. Complete DOE EM Project Management Guidance.
8. Clarify Roles and Responsibilities between Project Management and Contract Management Organizations.
9. Update and Implement Human Capital Plans.
10. Establish a Standardized and Integrated Change Control Process.
11. Establish Standards for DOE EM Management Products and Practices.
12. Implement Enterprise Project Management Software Solutions.
13. Streamline Critical Decision Document Review and Concurrence.
14. Complete and Utilize Federal Risk Management Plans.
15. Maintain Validated Federal Five-Year Baselines and Out-Year Planning Estimate Ranges.
16. Implement Surveillances of Contractor Earned Value Management Systems.
17. Identify Site-Specific Best Practices and Adopt across the Complex.
18. Prioritize Training and Professional Development.

Two additional RPA's were later identified and added to the above list:

19. Cost Pricing Data
20. Program Level Risk Analysis

USACE provided support on most of the Recommended Priority Actions (RPAs) listed above with the exception of 4, 5b, 17, and 18, resulting in increased PM/CM capabilities within DOE-EM. The USACE support on RPA's 2 and 3 were intended to be a capability gap bridge until DOE-EM hired federal staff to perform these functions. In July of 2009, per the request of EM-1, USACE performed an "Assessment of the BICPM/CM Performance and Resource Utilization". The three key recommendations of this assessment were as follows:

1. Sustain PM Strengths to date by a "tailored" extension of USACE resources
2. Build a strong training, lessons learned, and mentoring program beyond what was designed in RPAs 17 and 18.
3. Address and assess "total" federal field construction project staffing needs

At the time of this assessment, DOE-EM had backfilled approximately two-thirds (109) of the FTE capability gaps with either full-time federal employees or contractor support personnel. It is unknown whether or not the hiring freeze at the time of the assessment was eventually lifted and additional federal staff hired and trained to meet the capability gaps that remained for approximately 50 FTE's.

DOE-EM & USACE – the Project Management Partnership (2009 – Present)

In October of 2009, USACE and DOE-EM transitioned from the BICPM/CM Initiative into the Project Management Partnership (PMP). Under this PM Partnership, USACE has continued to provide some basic level of either discrete or steady-state support to DOE-EM under recommendation one above. Based upon recommendation number three above USACE provided its in-house construction and project management expertise and awarded two Project & Construction Management AE support contracts per DOE-EM's request. DOE-EM has not requested support for recommendation number two to date. USACE has provided additional support under the PM Partnership to DOE-EM for Project Peer Reviews on several projects for cost, scheduling, project management, risk analysis, and nuclear safety subject matter expertise.

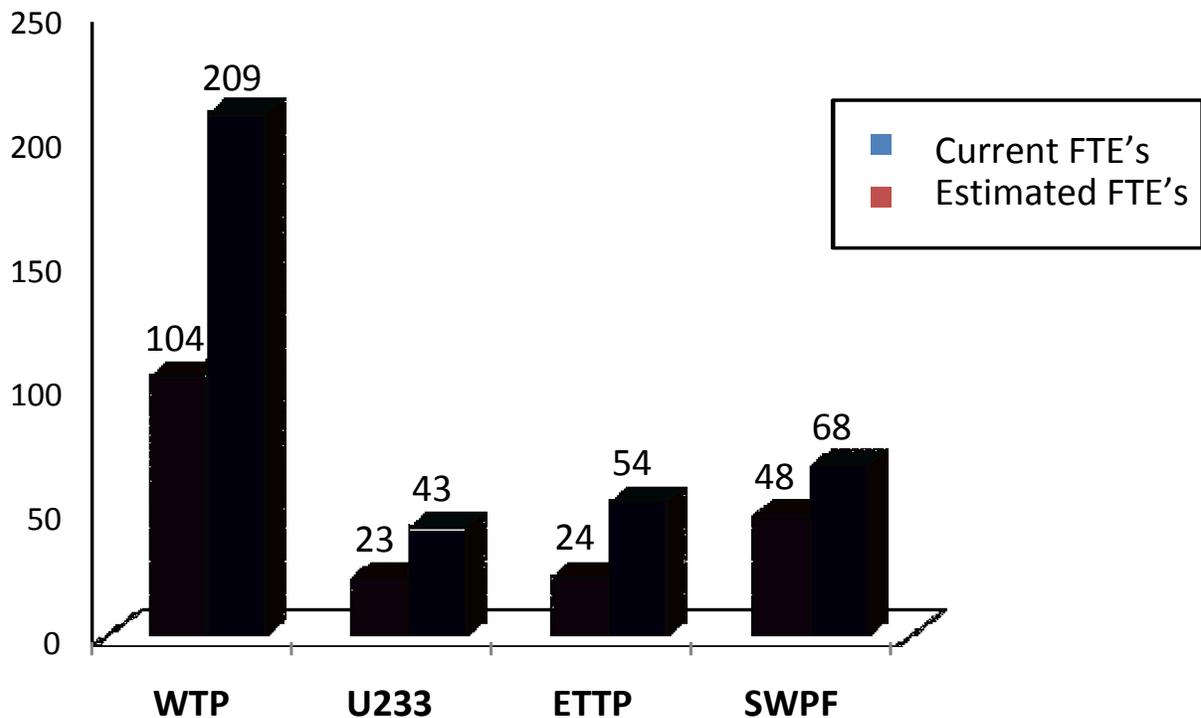
The performance of EM projects continued to be under scrutiny from various organizations in the 2009-2010 timeframe with numerous studies from both internal and external teams and organizations. Working under the Project Management Partnership (PMP) with DOE-EM in May 2010, USACE was requested to develop requirements-driven, activity based, detailed staffing estimates for four capital construction projects. These estimated specific functional position types, composition, and numbers of staff required for the management and oversight of the following four DOE-EM projects:

1. Waste Treatment Plant (WTP) in Hanford, WA
2. Salt Waste Processing Facility (SWPF) in Aiken, SC

3. Uranium-233 Downblend (U-233) in Oak Ridge, TN
4. East Tennessee Technology Park (ETTP) in Oak Ridge, TN

The results of the Detailed Staffing Estimates for these projects were developed to be reasonable, traceable, credible and defensible and support DOE-EM's Human Capital Management. Resource requirements were divided into the following ten categories: Acquisition, Contract and Subcontract Management; Project Planning, Control, and Management; Science, Engineering, and Design Support; Construction Oversight and Management; Environment, Safety and Health; Quality Assurance; Finance and Administration; Safeguards and Security; Startup and Commissioning; and Public Affairs and Stakeholder Relations. However, the recommended staffing levels would not address the impact of an incomplete design on the ability to properly manage the cost and schedule performance.

The following figure illustrates the Detailed Staffing Estimate results versus actual staffing levels in FTE's at that time for the four capital asset construction projects.



In closing, I would like to thank our partners in the Department of Energy for requesting and utilizing Interagency support from USACE. The USACE cost engineering community of practice and I appreciate the opportunity to serve DOE in support of their ongoing mission.

Thank you, Mr. Chairman and members of the Subcommittee. This concludes my statement. I will be happy to answer any questions.