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ACQUISITION,
TECHNOLOGY
AND LOGISTICS

INFO MEMO

May 18, 2011

FOR: UNDER SECRETARY OF DEFENSE (AT&L)

FROM: GARY R. BLISS, DIRECTOR, PERFORMANCE ASSESSMENTS AND ROOT
CAUSE ANALYSES (PARCA)

GRB 18 May 11

SUBJECT: PARCA Root Cause Analysis for the Assembled Chemical Weapons Alternatives
(ACWA) Program

- This memorandum summarizes PARCA's root cause analysis of the ACWA program's cost growth which triggered a critical Nunn-McCurdy breach as described in the December 2010 Selected Acquisition Report (SAR). That SAR reported a 39.2 percent increase in program acquisition unit cost (PAUC) as compared with current baseline. The PAUC is defined as the total program cost divided by the tons of chemical munitions destroyed.
 - The SAR attributed the cost growth to design immaturity, escalation in costs and quantities of materials, additional cost to prove out first-of-a-kind equipment (FOAK), and a higher assessment of risk.
 - The current program office estimate for PAUC cost growth has increased to 42.7 percent but this does not affect the identification of root causes. The PAUC growth at the site in Bluegrass, Kentucky (BGCAPP) is 45 percent and the PAUC growth at site in Pueblo, Colorado (PCAPP) is 38 percent (both critical breaches).
- About one-quarter of the cost growth is due to factors exogenous to the program. These factors include expanded use of explosive destruction technology at both sites, moving to 24/7 operations, and compliance with a proposed permit modification to treat by-products.
- The root cause of nearly three-quarters of the cost growth is that the government did not follow adequate acquisition rigor to deal with uncertainty and risk inherent in large construction projects, like ACWA, which develop and use new processes, handle dangerous materials, and are subject to comprehensive regulation.
 - The government did not require a design mature enough to develop an accurate cost estimate before establishing a program baseline. Indeed, at the time that the baseline was established in 2007, the PCAPP design was 60 percent complete and the BGCAPP design was only about 13 percent complete.
 - The government did not adequately plan for uncertainty when establishing the baseline. Historically, cost estimates for this type of work are necessarily uncertain.

- Both commercial and government historical data demonstrate that the cost projections for process plant projects are significantly underestimated. The degree of uncertainty is reflected both in the extent to which costs are underestimated but also in the large variation in that underestimate.
 - In addition, based on their historical experience with similar projects, the Department of Energy mandates that designs must be complete before baselines are established and adds 20 percent to the cost of the project for contingencies.
 - As both designs matured, costs grew via two mechanisms.
 - The funding to address and manage risk increased. This includes both estimates of risk and risk mitigation strategies such as increased FOAK testing.
 - There was a better appreciation of the complexity. Most notably, estimates for BGCAPP's facility control system, by itself, accounted for about \$200M of cost growth.
- During execution, lack of acquisition rigor continued to affect program performance.
 - Due to the degree of uncertainty, the contract structure necessarily had a short-term focus. However, the contractor was not incentivized to reduce overall program uncertainty and to control the total program cost.
 - An effective adaptation of EVM for a program, where new content was added continually, was never established.
 - The models used to anticipate the consequences of known risks were optimistic which distorted both the view of total project uncertainty and the uncertainty associated with particular risk elements.
 - Various acquisition processes to enforce rigor were not completed e.g. an acquisition strategy was never signed.
- Although designs are now complete, there is still a great deal of uncertainty in the program. Two particular areas of uncertainty are systemization at BGCAPP and achieving the throughput rates in operations. PARCA will work with the program office to identify assessment methodologies and metrics in these areas.

COORDINATION: NONE

cc: PDUSD AT&L

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