RCS: DD-A&T(Q&A)823-468

B61 Mod 12 Life Extension Program Tailkit Assembly (B61 Mod 12 LEP TKA)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

B61 Mod 12 Life Extension Program Tailkit Assembly (B61 Mod 12 LEP TKA)

DoD Component

Air Force

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Date Assigned: June 30, 2016

References

SAR Baseline (Production Estimate)

Air Force Acquisition Executive (AFAE) Approved Acquisition Program Baseline (APB) dated February 04, 2019

Approved APB

Air Force Acquisition Executive (AFAE) Approved Acquisition Program Baseline (APB) dated February 4, 2019

Mission and Description

The B61 Mod 12 Life Extension Program Tailkit Assembly (B61 Mod 12 LEP TKA) will consolidate Mods 3, 4, 7 and 10 into a single Mod (B61 Mod 12 LEP TKA) while extending the system's service life. B61 Mod 12 LEP TKA is an air-delivered nuclear gravity weapon providing nuclear capability on existing legacy aircraft and dual capable aircraft. The single variant will operate in two modes, System 1 (analog/ballistic mode) and System 2 (digital/guided mode).

The B61 Mod 12 LEP TKA is the enabler for realizing System 2. This is an Air Force led ACAT IC Program. The DoD responsibility is executed by the Air Force Nuclear Weapons Center (AFNWC). In accordance with the Air Force Materiel Command mission assignment memorandum (dated February 11, 2011) and the National Nuclear Security Administration (NNSA)/AFNWC Memorandum of Understanding (dated June 28, 2012), AFNWC/NDB (Eglin) is responsible for the development, acquisition, and delivery of a guided TKA and AFNWC/NTW (Kirtland) is responsible for All Up Round technical integration, system qualification, Operational Safety, Suitability, and Effectiveness and fielding of the B61 Mod 12 LEP TKA variant.

The Department of Energy(DOE)/NNSA is responsible for the B61 Mod 12 LEP TKA Bomb Assembly and all aspects of the nuclear warhead, including design, manufacture, and portions of sustainment. Funding of these activities will be shared between the DoD and DOE.

Executive Summary

Program Highlights Since Last Report

Contracting:

- Awarded an Undefinitized Contract Action (UCA) for Lot 1 production; Lot 2 long-lead material; and production support on April 25, 2019. Face-to-face negotiations began on July 9, 2019.
- Definitized UCA for Lot 0 Initial Nuclear Surety Inspection (INSI) trainers on July 17, 2019.
- The Engineering and Manufacturing Development (EMD) 2 actions closed December 2019. This completes all EMD contract scope aside from the contract closeout process.

Production:

- As of January 15, 2020, eight developmental testing assets to support F-35 flight testing have been delivered; all 30 INSI trainers have been delivered; and 16 Lot 1 TKA trainers have delivered. The First Production Unit (FPU) is forecasted for March 2020 which results in three months of margin from the APB threshold date of June 2020.

Testing:

- Mitigated all cybersecurity vulnerabilities identified by the 47th Cyberspace Test Squadron, resulting in an acceptable low-risk cybersecurity posture and Stand Alone Test Set (SATS) Authority to Operate (ATO) in April 2019. SATS nuclear certification was attained in May 2019.
- Phase 5 cybersecurity testing completed in May 2019.
- Phase 6 cybersecurity testing completed in June 2019.
- Air Force Operational Test and Evaluation Center (AFOTEC) completed Initial Operational Test & Evaluation (IOT&E) flight testing (15 open air drops) on November 19, 2019. The AFOTEC IOT&E report is expected February 2020.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation

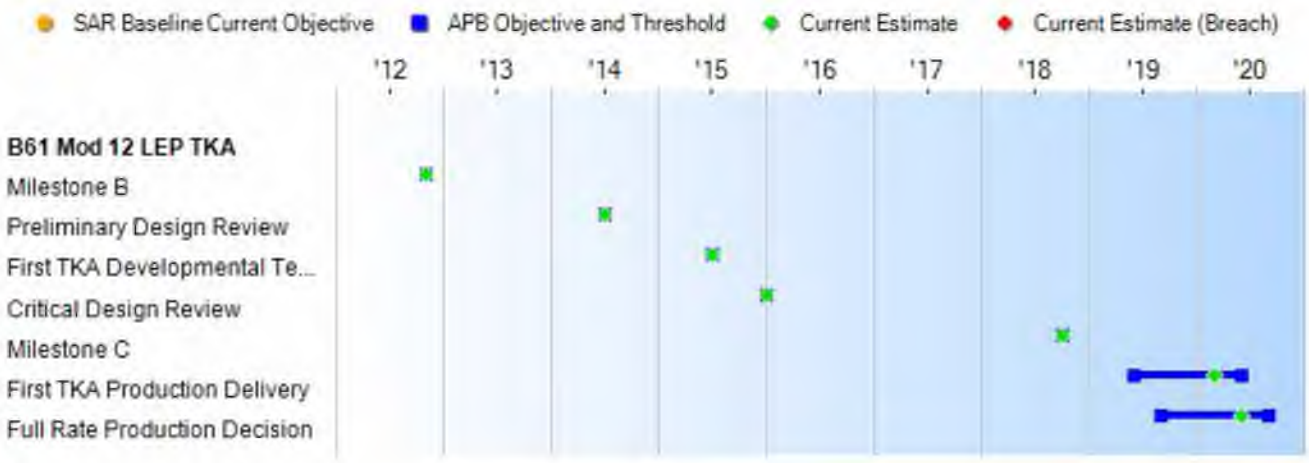
History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
November 2012	Engineering Manufacturing Development Phase 1 contract.
November 2012	Entered into Milestone (MS) B.
July 2014	Preliminary Design Review.
January 2016	Critical Design Review.
May 2016	The program conducted the B61 Mod 12 LEP TKA Preliminary Design Review and Acceptance Group (PDRAAG).
July 2017	Completed Guided Test Vehicle 7 (supporting MS B Waiver against relevant environment)
August 2017	Started Developmental Testing (DT)
June 2018	Completed DT.
October 2018	Entered into MS C.
November 2018	TKA Nuclear Certification
May 2019	Stand Alone Test Set (SATS) Nuclear Certification
November 2019	Completed IOT&E Flight Tests

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
O&S Cost		☐
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Schedule



Schedule Events					
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	
Milestone B	Nov 2012	Nov 2012	Nov 2012	Nov 2012	
Preliminary Design Review	Jul 2014	Jul 2014	Jul 2014	Jul 2014	
First TKA Developmental Test Flight	Jul 2015	Jul 2015	Jul 2015	Jul 2015	
Critical Design Review	Jan 2016	Jan 2016	Jan 2016	Jan 2016	
Milestone C	Oct 2018	Oct 2018	Oct 2018	Oct 2018	
First TKA Production Delivery	Jun 2019	Jun 2019	Jun 2020	Mar 2020	(Ch-1)
Full Rate Production Decision	Sep 2019	Sep 2019	Sep 2020	Jun 2020	(Ch-2)

Change Explanations

(Ch-1) First TKA Production Delivery current estimate changed from October 2019 to March 2020 due to subcomponent delivery delay.
(Ch-2) Full Rate Production Decision current estimate changed from March 2020 to June 2020 due to NNSA capacitor design change on the bomb assembly and DOT&E-directed equivalency testing/analysis on the TKA.

Acronyms and Abbreviations

DOT&E - Director, Operational Test & Evaluation
NNSA - National Nuclear Security Administration

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Aircraft Integration (KPP)				
F-35A and B-21 for System 2 guided delivery; F-16C/D (Blk 40-52), F-16 MLU, and PA-200 for System 1 ballistic delivery.	F-35A and B-21 for System 2 guided delivery; F-16C/D (Blk 40-52), F-16 MLU, and PA-200 for System 1 ballistic delivery.	B61-12 TKA, when mated to the B61-12 BA, shall be integrated on B-2A and F-15E aircraft for System 2 guided delivery.	The program demonstrated the KPP Threshold (F-15E & B-2A) conducting numerous contractor risk reduction flights culminating with a successful completion of twenty two (22) Govt Developmental Testing (DT) flight tests and nine (9) System Qualification flight test in Jun 2018.	B61-12 TKA, when mated to the B61-12 BA, must be integrated on the B-2A, F-15E, F-35A and LRS-B for System 2 guided delivery; F-16C/D (Blk 40-52), F-16 MLU, and PA-200 for System 1 ballistic delivery.
WS3 Vault Compatibility (KPP)				
B61-12 TKA, while mated to the B61-12 BA, shall permit the storage of four (4) B61-12 AURs in a single WS3 vault.	B61-12 TKA, while mated to the B61-12 BA, shall permit the storage of four (4) B61-12 AURs in a single WS3 vault.	(T=O) B61-12 TKA, while mated to the B61-12 BA, shall permit the storage of four (4) B61-12 AURs in a single WS3 vault.	The program demonstrated the KPP Objective, "B61-12 TKA, while mated to the B61-12 BA, must permit the storage of four (4) B61-12 AURs in a single WS3 vault." The program verified this utilizing fit checks conducted at Sheppard AFB, TX on April 9, 2013.	B61-12 TKA, while mated to the B61-12 BA, must permit the storage of four (4) B61-12 AURs in a single WS3 vault.
KPP #5 Nuclear Hardness (Kinetic Survivability)				
B61-12 TKA shall achieve the accuracy requirements of KPP #2 after exposure to one HEMP event, as defined in MIL-STD 2169C and B61-12 STS.	B61-12 TKA shall achieve the accuracy requirements of KPP #2 after exposure to one HEMP event, as defined in MIL-STD 2169C and B61-12 STS.	(T=O) B61-12 TKA shall achieve the accuracy requirements of KPP #2 after exposure to one HEMP event, as defined in MIL-STD 2169C and B61-12 STS.	The program demonstrated the KSA Object/Threshold on 06 July 2017 with the successful completion of Guided Test Vehicle (GTV) 7 flight test utilizing radiation exposed hardware, with a radiation hardened inertial measurement unit. Additionally, the program successfully conducted twenty two (22) Govt Developmental Testing (DT) flight tests and nine (9) System Qualification flight test after being exposed to the HEMP environment in Jun 2018.	B61-12 TKA shall achieve the accuracy requirements of KPP #2 after exposure to one HEMP event, as defined in MIL-STD 2169C and B61-12 STS.

Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

CPD dated October 17, 2018.

Change Explanations

None

Acronyms and Abbreviations

AUR - All Up Round
BA - Bomb Assembly
Blk - Block
HEMP - High Altitude Electro-Magnetic Pulse
MIL-STD - Military Standard
MLU - Mid-Life Upgrade
O - Objective
PA-200 - Panavia Aircraft-200
STS - Stockpile to Target Sequence
T - Threshold
TKA - Tailkit Assembly
WS3 - Weapon Storage and Security System

Track to Budget

RDT&E

Appn	BA	PE
Air Force 3600	05	0101125F

Project	Name
657007	B61 LEP

Procurement

Appn	BA	PE
Air Force 3011	01	0101125F

Line Item	Name
354040	B61

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2019 $M			BY 2019 $M	TY $M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	808.8	808.8	889.7	770.4	787.1	787.1	737.3
Procurement	343.0	343.0	377.3	330.6	360.1	360.1	346.5
Flyaway	--	--	--	330.6	--	--	346.5
Recurring	--	--	--	330.6	--	--	346.5
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1151.8	1151.8	N/A	1101.0	1147.2	1147.2	1083.8

Current APB Cost Estimate Reference

Milestone C SCP dated October 24, 2018

Cost Notes

POE was approved December 16, 2019. The program does not anticipate the need for any additional funding.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	77	77	77
Procurement	813	813	813
Total	890	890	890

Quantity Notes

The October 26, 2018 ADM approved up to an additional 60 TKAs to the program baseline, contingent upon funding of execution, to fulfill the 90/10/2 surveillance requirement as decided at the August 2, 2018 Configuration Steering Board.

Cost and Funding

Funding Summary

Appropriation Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)									
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
RDT&E	700.0	27.6	9.7	0.0	0.0	0.0	0.0	0.0	737.3
Procurement	227.2	80.8	35.7	2.8	0.0	0.0	0.0	0.0	346.5
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	927.2	108.4	45.4	2.8	0.0	0.0	0.0	0.0	1083.8
PB 2020 Total	978.8	108.4	45.4	2.8	0.0	0.0	0.0	0.0	1135.4
Delta	-51.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-51.6

Funding Notes

Funding adjustment's since FY 2020 PB

3011:
-FY 2019 adjusted from $152.223M to $140.107M: $11.9M (FY 2019 Omnibus), $261K MDAP

Quantity Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	77	0	0	0	0	0	0	0	0	77
Production	0	280	533	0	0	0	0	0	0	813
PB 2021 Total	77	280	533	0	0	0	0	0	0	890
PB 2020 Total	77	280	533	0	0	0	0	0	0	890
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	--	--	--	--	81.6
2013	--	--	--	--	--	--	62.4
2014	--	--	--	--	--	--	33.0
2015	--	--	--	--	--	--	108.3
2016	--	--	--	--	--	--	173.1
2017	--	--	--	--	--	--	118.1
2018	--	--	--	--	--	--	81.6
2019	--	--	--	--	--	--	41.9
2020	--	--	--	--	--	--	27.6
2021	--	--	--	--	--	--	9.7
Subtotal	77	--	--	--	--	--	737.3

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2019 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	--	--	--	--	90.3
2013	--	--	--	--	--	--	67.9
2014	--	--	--	--	--	--	35.4
2015	--	--	--	--	--	--	115.1
2016	--	--	--	--	--	--	181.3
2017	--	--	--	--	--	--	121.2
2018	--	--	--	--	--	--	82.0
2019	--	--	--	--	--	--	41.3
2020	--	--	--	--	--	--	26.7
2021	--	--	--	--	--	--	9.2
Subtotal	77	--	--	--	--	--	770.4

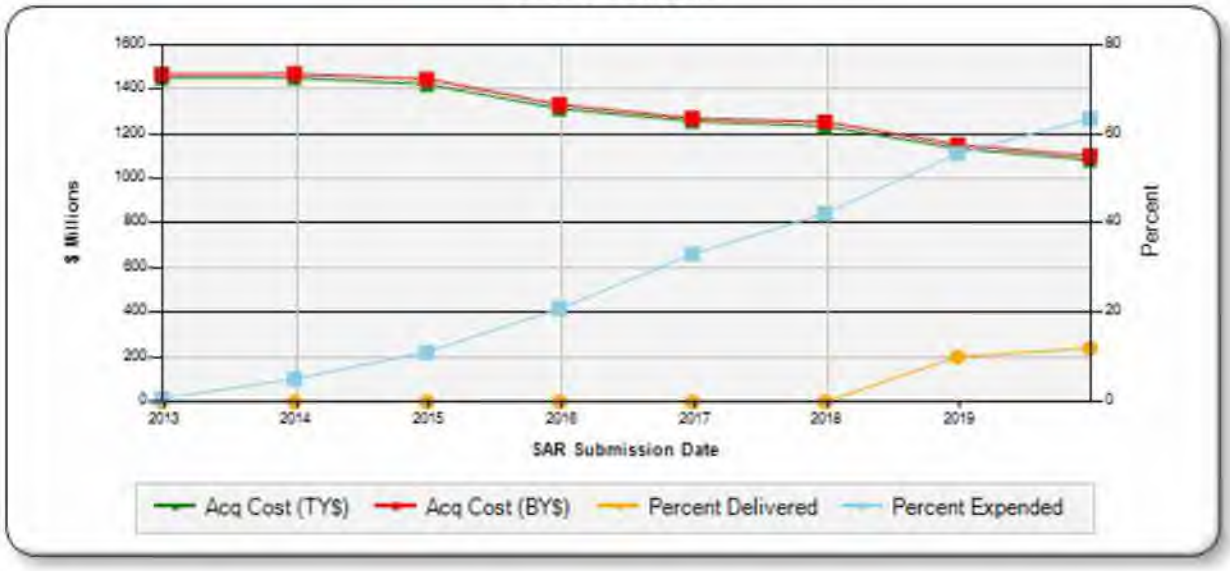
Annual Funding 3011 | Procurement | Procurement of Ammunition, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	--	12.0	--	12.0	--	12.0
2017	--	--	--	--	--	--	--
2018	30	74.9	--	--	74.9	--	74.9
2019	250	140.3	--	--	140.3	--	140.3
2020	533	80.8	--	--	80.8	--	80.8
2021	--	--	35.7	--	35.7	--	35.7
2022	--	--	2.8	--	2.8	--	2.8
Subtotal	813	296.0	50.5	--	346.5	--	346.5

Annual Funding 3011 | Procurement | Procurement of Ammunition, Air Force							
Fiscal Year	Quantity	BY 2019 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	--	12.2	--	12.2	--	12.2
2017	--	--	--	--	--	--	--
2018	30	73.1	--	--	73.1	--	73.1
2019	250	134.2	--	--	134.2	--	134.2
2020	533	75.8	--	--	75.8	--	75.8
2021	--	--	32.8	--	32.8	--	32.8
2022	--	--	2.5	--	2.5	--	2.5
Subtotal	813	283.1	47.5	--	330.6	--	330.6

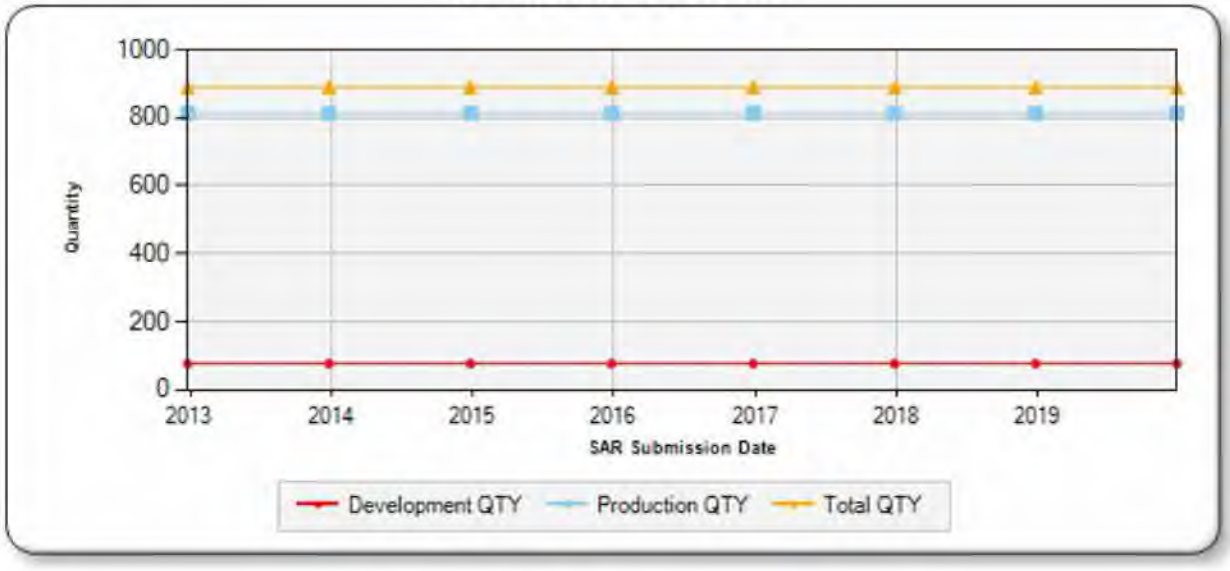
Charts

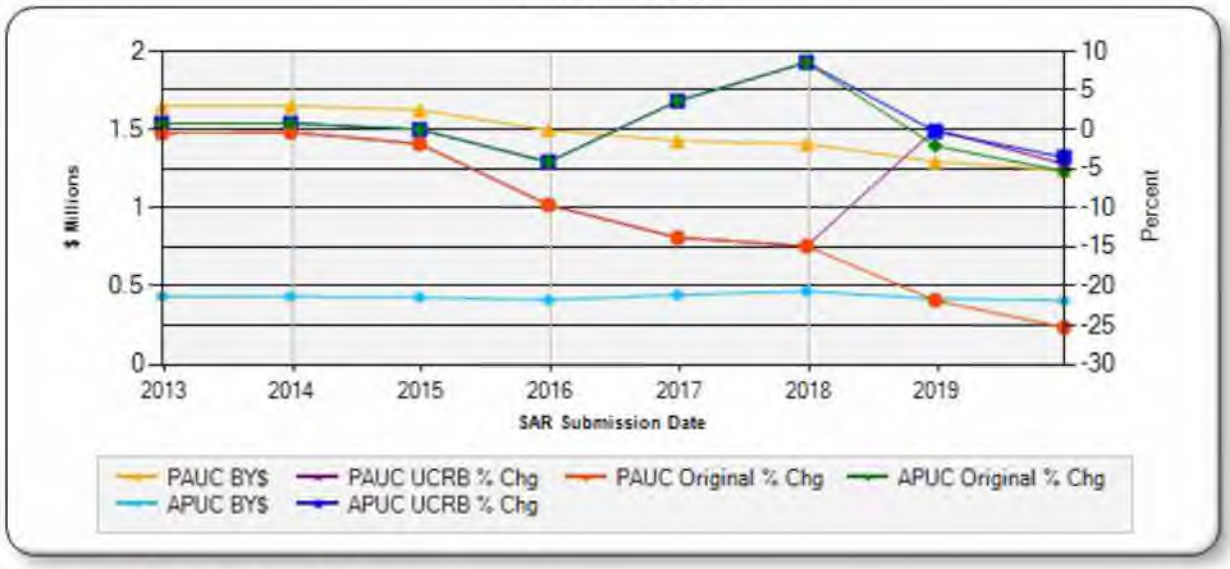
B61 Mod 12 LEP TKA first began SAR reporting in December 2012

Program Acquisition Cost - B61 Mod 12 LEP TKA
Base Year 2019 $M



Quantity - B61 Mod 12 LEP TKA





Unit Cost Reporting Baseline (UCRB)

Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Milestone B (November 2012)	
1.	The B61-12 Tail-Kit Assembly (TKA) program was tracking a risk related to TKA simulator to support Aircraft Operational Flight Program (OFP) Development. (This risk has been retired)
2.	The B61-12 TKA program was tracking a risk related to DoD/DOE Development schedule Alignment. (This risk has been retired)
3.	The B61-12 TKA program was tracking a risk related to TKA compliance with PANTEX Assembly Guidance. (This risk has been retired)
Current Estimate (December 2019)	
1.	The B61-12 program is monitoring a risk related to B-2 Test Asset Availability for Drop Tests. (This risk has been retired)
2.	The B61-12 program is mitigating a risk related to Field Programmable Gate Array (FPGA) Initial Operational Test and Evaluation (IOT&E) Risk. (This risk has been retired)
3.	The B61-12 program is mitigating a risk related to the Stand Alone Test Set (SATS) Window 7 waiver. (This risk has been retired)
4.	The B61-12 program is mitigating a risk related to SATS Windows 10 OS. The Nuclear Authorizing Official (NAO) for non-NC3 nuclear systems signed memo waiving AF Win 10 requirement (Feb 19). (This risk has been retired)

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (February 2019)	
1.	There are no risks identified with the current baseline estimate.
Original Baseline Estimate (December 2012)	
1.	Program APB supports RDT&E requirements at $1,090.7M in TY$ and in Procurement at $361.1M. At this time, the program is not identifying a disconnect based on the FY 2018 PB. Both the program SCP and ICE provide resources to fund one contractor, to be selected through a competitive process, through the EMD and Production phases of the program. Additionally, in the November 2012 Milestone B ICE the following comment was provided, "It is important to note that both costs estimates are based on existing data on JDAM actual costs. The estimates are based on the effort to develop JDAM at the beginning of that program, and they include costs of additional nuclear-hardening efforts. This amount of development effort should allow the reliability of the TKA to meet its requirements given that the current operational JDAM reliability exceeds the requirements for B61 TKA."
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	There are no risks identified with the current baseline estimate.
2.	Program Procurement Cost within APB; executing within threshold and objective values.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	11/19/2012	10/26/2018
Approved Quantity	250	329
Reference	Milestone B ADM	Milestone C ADM
Start Year	2018	2018
End Year	2020	2020

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the need to synchronize DoD deliveries with the Department of Energy B61 Mod 12 Bomb Assembly Program and to facilitate an orderly increase in the production rate for the system leading into full-rate production.

Foreign Military Sales

None

Nuclear Costs

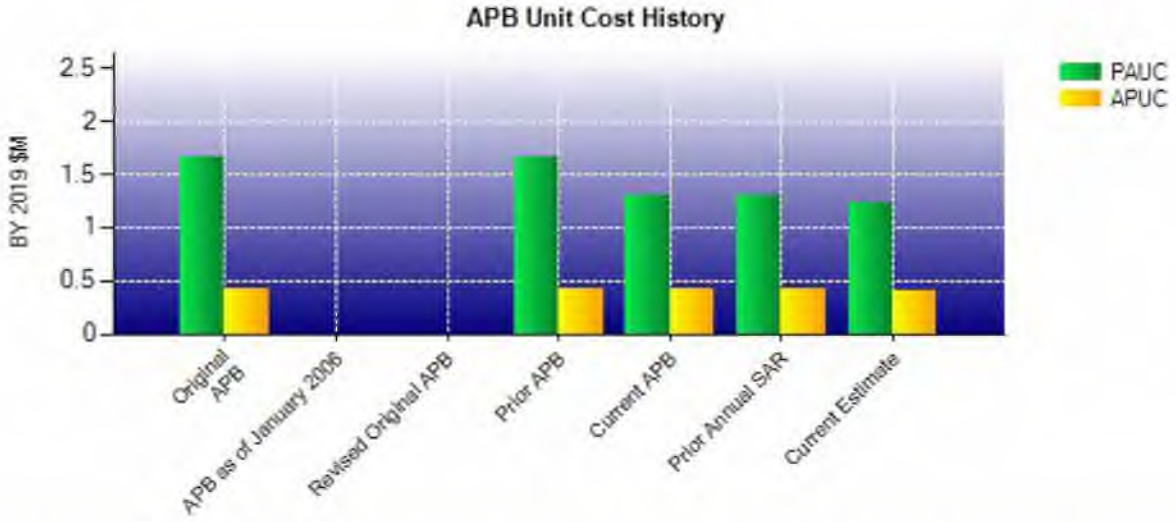
Nuclear costs related to the B61 Mod 12 LEP TKA program are captured in the Department of Energy Bomb Assembly SAR.

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2019 $M Current UCR Baseline (Feb 2019 APB)	BY 2019 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1151.8	1101.0	
Quantity	890	890	
Unit Cost	1.294	1.237	-4.40
Average Procurement Unit Cost			
Cost	343.0	330.6	
Quantity	813	813	
Unit Cost	0.422	0.407	-3.55

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2019 $M Original UCR Baseline (Dec 2012 APB)	BY 2019 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1472.7	1101.0	
Quantity	890	890	
Unit Cost	1.655	1.237	-25.26
Average Procurement Unit Cost			
Cost	349.9	330.6	
Quantity	813	813	
Unit Cost	0.430	0.407	-5.35

Unit Cost Memo



APB Unit Cost History					
Item	Date	BY 2019 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Dec 2012	1.655	0.430	1.631	0.444
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Dec 2012	1.655	0.430	1.631	0.444
Current APB	Feb 2019	1.294	0.422	1.289	0.443
Prior Annual SAR	Dec 2018	1.294	0.421	1.276	0.441
Current Estimate	Dec 2019	1.237	0.407	1.218	0.426

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
1.631	-0.009	0.000	-0.077	0.000	-0.256	0.000	0.000	-0.342	1.289

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
1.289	-0.004	0.000	0.000	0.000	-0.067	0.000	0.000	-0.071	1.218

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.444	0.003	0.000	0.000	0.000	-0.004	0.000	0.000	-0.001	0.443

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.443	0.000	0.000	0.000	0.000	-0.017	0.000	0.000	-0.017	0.426

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	Nov 2012	Nov 2012	Nov 2012
Milestone C	N/A	Apr 2018	Oct 2018	Oct 2018
IOC	N/A	N/A	N/A	N/A
Total Cost (TY $M)	N/A	1451.8	1147.2	1083.8
Total Quantity	N/A	890	890	890
PAUC	N/A	1.631	1.289	1.218

First Tailkit Assembly (TKA) Production Delivery is used as a surrogate for IOC; the Department of Energy is responsible for production integration of the Bomb Assembly/TKA and subsequent All Up Round deliveries to the field for IOC.

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	787.1	360.1	--	1147.2
Previous Changes				
Economic	-3.9	+0.2	--	-3.7
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-6.2	-1.9	--	-8.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-10.1	-1.7	--	-11.8
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-39.7	-11.9	--	-51.6
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-39.7	-11.9	--	-51.6
Total Changes	-49.8	-13.6	--	-63.4
Current Estimate	737.3	346.5	--	1083.8

Summary BY 2019 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	808.8	343.0	--	1151.8
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+0.7	-1.0	--	-0.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+0.7	-1.0	--	-0.3
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-39.1	-11.4	--	-50.5
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-39.1	-11.4	--	-50.5
Total Changes	-38.4	-12.4	--	-50.8
Current Estimate	770.4	330.6	--	1101.0

Previous Estimate: December 2018

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised estimate due to Above Threshold Reprogramming in FY 2019. (Estimating)	-26.0	-26.5
Revised estimate due to Below Threshold Reprogramming in FY 2019. (Estimating)	-9.9	-10.0
Revised estimate due to Small Business Innovation Research in FY 2019. (Estimating)	-3.2	-3.2
RDT&E Subtotal	-39.1	-39.7

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised estimate due to omnibus reprogramming in FY 2019. (Estimating)	-11.4	-11.9
Procurement Subtotal	-11.4	-11.9

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: B61-12 TKA EMD Phase 2
Contractor: Boeing
Contractor Location: Boeing Defense, Space and Security - Weapons and Missile
St. Charles, MO 63301
Contract Number: FA2103-16-C-0061
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: December 17, 2015
Definitization Date: December 17, 2015

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
99.7	N/A	0	128.1	N/A	N/A	128.1	135.1

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to additional scope added to the contract.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/19/2019)	+1.4	0.0
Previous Cumulative Variances	+1.6	-0.5
Net Change	-0.2	+0.5

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to actuals reported by the contractor. See "General Contract Variance Explanation" section for additional information.

The favorable net change in the schedule variance is due to

General Contract Variance Explanation

Schedule Variance - Due primarily to the following:

1) WBS 1.3.1 Launch System IAT&CO (-$368K) - Delays to deliver Lab Tailkit Assembly Weapon Simulator-4 (TAWS-4) units from Boeing to Sandia National Laboratories (delayed by implementation of the ground isolation fix). Also driven by delays in receipt from Tricor of the Flight Line TAWS-4 units because of slower design verification test (DVT) process and extended fabrication for fixing drawing issues. The reporting of the qualification testing is also a driver because of delayed qualification testing.

2) WBS 1.1.6.2 Actuators (-$79K) - Associated with a non-recurring (NRE) incentive cost fee milestone that was baselined in March but cannot be statused until EMD2 baseline effort is complete.

Cost Variance (CV) - Due primarily to the following:

1) WBS 1.8.1.2 Environmental Testing (-$1,798K) - The cumulative CV is negative due to several factors. (1) Additional resources including overtime utilized to recover schedule from the anomaly investigation of the Control Actuator System (CAS)/Battery housing joint and additional hours incurred for re-work required to complete data analysis and documentation of aging tests rejected from the customer. (2) Additional hours/resources to complete qualification test procedures and coordination with customer above what was originally budgeted. (3) Additional hours to work the qualification test failures with very little progress toward completing the tests. 4) Additional resources to support environmental aging recovery plan due to loose bolt issue and CAS/battery housing joint anomaly; 5) Additional support for startup and continuing support of aging testing at National Testing Services above what was originally anticipated and qualification testing; 6) Additional hours for more Test Readiness Reviews (TRRs) than anticipated. This was due to the program decision to have individual TRRs per environment vs. holding one overall TRR to assist with schedule recovery; 7) Additional level of effort (LOE) support for test preparation and report resubmittals; 8) More effort than planned for coordination due to the discrete qualification test schedule delays, and 9) There have been 4 failure investigations that have required support not planned. 10) Additional support from test equipment team to update software to prevent over heating units during qualification and aging thermal testing. 11) Lab personnel worked 2 shifts and overtime to complete Electromagnetic Environmental Effects (EEE) qualification testing and overtime to complete the pressure qualification testing and the test setup for the ice testing to recover schedule. The overtime and 2 shifts resulted in some inefficiencies due to additional personnel being new to the program and requiring some training to conduct testing. 12) Completion of the War Reserve EEE report and security coordination issues with the EEE Joint Test Assembly (JTA) testing has resulted in more hours needed. 13) Overtime needed to complete Electromagnetic Interface/Electromagnetic Compatibility (EMI/EMC) and Environmental test reports along with Vibration and Mechanical Shock testing due to the complexity with the Communications Security (COMSEC) setup which will require additional staff to support the testing

2) WBS 1.1.6.2 Actuators ($1,710K) - The cum positive cost variance is related to Woodward HRT (WHRT) recurring material costs. The EMD2 recurring baseline value for WHRT was based on an exercised option that was negotiated back in 2013. At that time conservative assumptions were made in the estimate based on JDAM mechanical and electronic components since the B61 definition was still ongoing. Once the B61 definition was understood and EMD2 hardware was being delivered, WHRT was able to perform its recurring work at a cost less than what was originally estimated/assumed back in 2013. The original EMD2 option value was not updated once B61 definition was better understood, so the baseline had to reflect the option value. In addition, FY rate updates lowering the actuals have also contributed. The most recent contributor is the WHRT CAS effort associated with TAWS-4 modifications and deliveries. TAWS controllers and Lot 1 controllers were ordered at the same time which lowered TAWS price due to the Higher

volume.

3) Radiation Testing ($1,050K) - The positive cost variance has multiple drivers: 1) Efficiencies gained in High Altitude Electromagnetic Pulse (HEMP) aging testing by co-locating HEMP testing next to production. 2) Efficiencies realized in Radiation aging testing by being able to age two assets vs. one asset at a time. 3) HEMP/Radiation aging testing has required less oversight than planned due to more experienced engineers performing the tests and testing itself overall has taken less time than anticipated. 4) Intrinsic Radiation (INRAD) testing was performed more efficiently than planned. Parts were combined in test chamber to complete the testing more efficiently, testing was performed more parallel than serial, and the test schedule at Boeing Radiation Effects Lab (BREL) for radiation testing was condensed and completed without additional resources.

Notes

This contract is more than 90% complete; therefore, this is the final report for this contract.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	77	77	77	100.00%
Production	42	30	813	3.69%
Total Program Quantity Delivered	119	107	890	12.02%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	1083.8	Years Appropriated	9
Expended to Date	687.6	Percent Years Appropriated	81.82%
Percent Expended	63.44%	Appropriated to Date	1035.6
Total Funding Years	11	Percent Appropriated	95.55%

The above data is current as of February 10, 2020.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	October 26, 2018
Source of Estimate:	SCP
Quantity to Sustain:	824
Unit of Measure:	Tailkit Assembly (TKA)
Service Life per Unit:	20.00 Years
Fiscal Years in Service:	FY 2019 - FY 2044

- Unit of Measure = Tailkit Assembly (TKA)
- Total Quantity = 824
  -- Production quantity: 813
  -- Development Trainers: 11
- 77 test assets in RDT&E are expended; not sustained. The 11 development trainers are not included in this number.
- Estimate assumes wooden round -- Production Lifetime Sparing Concept
- Contractor services retained for failure analysis, test support, logistical support, destructive testing, etc.
- Projected contractor labor rates are through FY 2044
  -- Used 4% increase in base pay rate to account for differences in contractor inflation versus OSD published inflation
- Continental United States (CONUS) shipping costs for Weapon System Evaluation Program assets paid by the Department of Energy
- Personnel Outside of the CONUS locations exist solely to support this weapon

Sustainment Strategy

B61 Mod 12 LEP TKA Sustainment Strategy is based on system reliability requirements/projections. Planned Material Availability is sustained through a 20-year service life spares buy that is included in the TKA production quantities. Air Force Materiel Command (AFMC) has determined no organic depot level repair requirements at this time. Organizational/Intermediate level maintenance is limited to replacement, inspection, disassembly/reassembly of TKA from All Up Round (B61-12 All Up Round). A TKA Business Case Analysis was conducted in 2016 to evaluate cost effectiveness of selecting an optional warranty, organic, or Contractor Logistics Support (CLS) based on final reliability projections, test set design, support equipment, and engineering requirements. The results and recommendations of this analysis are reflected in the Life Cycle Sustainment Plan.

Antecedent Information

No Antecedent

Annual O&S Costs BY2019 $K		
Cost Element	**B61 Mod 12 LEP TKA Average Annual Cost Per Tailkit Assembly (TKA)**	**No Antecedent (Antecedent) N/A**
Unit-Level Manpower	86.159	--
Unit Operations	0.898	--
Maintenance	6.195	--
Sustaining Support	16.032	--
Continuing System Improvements	0.000	--
Indirect Support	44.569	--
Other	0.018	--
Total	153.871	--

Item	Total O&S Cost $M			
	B61 Mod 12 LEP TKA			No Antecedent (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	2535.5	2789.1	2535.5	N/A
Then Year	3370.6	N/A	3370.6	0.0

Equation to Translate Annual Cost to Total Cost

BY 2019 $M Average Annual Unitized Cost = (Total O&S Cost/Quantity)/(Service Life plus trainer lead-in time) = ($2,535.5M BY$2019/824/20)=$0.154M BY$2019/TKA/year

O&S Cost Variance		
Category	**BY 2019 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2018 SAR	2535.5	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	2535.5	

Disposal Estimate Details

Date of Estimate:	December 16, 2019
Source of Estimate:	POE
Disposal/Demilitarization Total Cost (BY 2019 $M):	0.3

$0.476M in TY dollars