

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD
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COST (\$ In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	142,648	81,205	38,804	30,388	33,427	12,524	0	0	0	986,275
3085 Guidance Replacement Program (GRP)	76,650	20,492	0	0	0	0	0	0	0	554,993
4210 Propulsion Replacement Program (PRP)	65,998	60,713	30,063	0	0	0	0	0	0	346,202
4788 PSRE Life Extension Program	0	0	8,741	18,448	19,500	12,524	0	0	0	59,213
4823 ECS Replacement Program	0	0	0	11,940	13,927	0	0	0	0	25,867
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

(U) A. Mission Description

(U) ICBM modernization efforts will extend the operational life of the Minuteman ICBM weapon system. The Guidance Replacement Program (GRP) will replace failing Minuteman guidance system electronics. The Propulsion Replacement Program (PRP) will remanufacture all three Minuteman solid fuel stages to correct age-related degradations and maintain existing weapon system reliability. The Propulsion System Rocket Engine (PSRE) Life Extension Program will refurbish the Minuteman post-boost vehicle (PBV) to correct age-related degradations and maintain operational effectiveness. The Environmental Control System (ECS) Replacement Program will refurbish, update, and/or replace components of the Minuteman ECS in the Launch Facilities (LFs) and Missile Alert Facilities (MAFs). Requirements for maintaining the Minuteman Weapon System are defined and validated in current defense planning guidance documentation.

(U) B. Budget Activity Justification:

(U) This program is in Budget Activity 5 - Engineering and Manufacturing Development because the projects are being developed for the Air Force but have not received production approval. Program control is exercised at the project level.

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(U) C. Program Change Summary (\$ in Thousands)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total Cost</u>
(U) Previous President's Budget (FY 1999 PB)	143,913	81,546	38,418	0	911,432
(U) Appropriated Value	152,944	81,546			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions	-5,433	-341			
b. SBIR	-3,598				
c. Omnibus or Other Above Threshold Reprogram	-978				
d. Below Threshold Reprogramming	-287				
(U) Adjustments to Budget Years Since FY 1999 PB			386	30,388	
(U) Current Budget Submit/FY 2000 PB	142,648	81,205	38,804	30,388	986,275

NOTE: In FY99, \$2,577 identified as a source for SBIR.

(U) Significant Program Changes:

(U) FY98 reprogrammings funded higher priority Air Force requirements.

(U) FY00 and FY01 increases funded two new projects: Propulsion System Rocket Engine (PSRE) Life Extension starting in FY00 and Environmental Control System (ECS) Replacement starting in FY01.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 3085
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COST (\$ In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3085 Guidance Replacement Program (GRP)	76,650	20,492	0	0	0	0	0	0	0	554,993

(U) A. Mission Description

(U) Ongoing upgrades are required to extend the service life of the Minuteman weapon system. The Joint Requirements Oversight Council validated the Mission Need Statement for a Future Guidance System for Intercontinental Ballistic Missiles (ICBM) on 5 November 1992. GRP replaces failing guidance system electronics, and preserves the option to configure the missiles with the Peacekeeper Mk 21 reentry vehicle and an advanced inertial measurement unit. The Engineering and Manufacturing Development (EMD) contract was awarded to Rockwell International in August 1993. GRP includes the EMD, production, and installation of replacement guidance components to extend the life of the operational Minuteman force. Funding reflected here is for EMD.

(U) FY 1998 (\$ in Thousands):

- (U) \$48,075 Continued hardware/software development.
- (U) \$5,072 Continued Nuclear Safety Cross Check Analysis and Independent Validation and Verification.
- (U) \$315 Completed ICBM codes development.
- (U) \$1,507 Completed systems engineering and technical support.
- (U) \$6,102 Continued labs and support agencies efforts.
- (U) \$1,629 Continued testing and other engineering support activities. Two flight tests successfully flown.
- (U) \$13,950 Mk 21 activities.
- (U) \$76,650 Total

(U) FY 1999 (\$ in Thousands):

- (U) \$13,935 Complete hardware/software development.
- (U) \$1,400 Complete Nuclear Safety Cross Check Analysis and Independent Validation and Verification.
- (U) \$160 Complete labs and support agencies efforts.
- (U) \$2,420 Complete testing and other engineering support.
- (U) \$2,577 Identified as a source for SBIR
- (U) \$20,492 Total

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 3085
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(U) FY 2000 (\$ in Thousands):

- (U) \$0 EMD Completed in FY99.
- (U) \$0 Total

(U) FY 2001 (\$ in Thousands):

- (U) \$0 EMD Completed in FY99.
- (U) \$0 Total

(U) **B. Project Change Summary - Description of Significant Changes:** For this submission, the FY98 Budget Item Justification was restructured to show specifically how the Congressional add was spent. Funding in FY00 previously identified in FY99 PB submission no longer required to complete RDT&E; funds reallocated to meet other AF needs.

(U) **C. Other Program Funding Summary (\$ in Thousands):**

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
									<u>Compl</u>	<u>Cost</u>
(U) APPN 14, Missiles - AF, BA 3, P-013, MM III Modifications (PE 0101213F, Minuteman Squadrons)	97,323	110,059	146,460	151,097	149,124	167,769	154,139	138,067	623,003	1,807,676

(U) **D. Acquisition Strategy:** An EMD contract was awarded in Aug 93 to develop, test, and replace selected guidance electronics and software. This cost plus-award-fee (CPAF) contract was issued following full and open competition. Low Rate Initial Production (LRIP) contract was awarded in March 1998. The GRP contract will transfer to the Prime Integration Contractor at award of the Full Rate Production (FRP) contract planned for FY00.

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 3085
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(U) E. Schedule Profile

	<u>FY 1998</u>				<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Program Milestones																
Milestone III AFSARC																X
(U) T&E Milestones																
Combined DT&E/IOT&E			*	*	*	X	X									
First Flight Test			*													
Second Flight Test				*												
(U) Contract Milestones																
EMD Contract Completed							X									
Low Rate Initial Production (Start/Complete)		*						X								
Full Rate Production (FRP) Contract Award																X
* - Completed Event																
X - Planned Event																

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE February 1999				
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604851F ICBM EMD			PROJECT 3085				
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>											
				<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>				
(U)	Hardware/Software Development			48,075	13,935						
(U)	ICBM Codes Contract			315	0						
(U)	Nuclear Safety Cross Check Analysis Contract			5,072	1,400						
(U)	Labs/Agencies			5,943	160						
(U)	SETA			1,507	0						
(U)	Mk 21 Activities			13,950							
(U)	Other Engineering Support & Testing			1,788	2,420						
(U)	Identified as a Source for SBIR				2,577						
(U)	Total			76,650	20,492						
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing <u>Activity</u>	Contract Method/Type or Funding <u>Vehicle</u>	Award or Obligation <u>Date</u>	Performing Activity <u>EAC</u>	Project Office <u>EAC</u>	Total Prior to <u>FY 1998</u>	Budget <u>FY 1998</u>	Budget <u>FY 1999</u>	Budget <u>FY 2000</u>	Budget <u>FY 2001</u>	Budget to <u>Complete</u>	Total <u>Program</u>
<u>Product Development Organizations</u>											
Boeing-North American	C/CPAF	Aug 93	437,147	437,147	379,918	45,439	11,790				437,147
Boeing-North American	C/CPAF	Sep 94	4,662	4,662	4,347	315	0				4,662
TRW (Prime)	C/CPAF	Dec 97	3,996	3,996	0	1,931	2,065				3,996
Project 3085											
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Exhibit R-3 (PE 0604851F)											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development					PE NUMBER AND TITLE 0604851F ICBM EMD					PROJECT 3085	
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
<u>Support and Management Organizations</u>											
NSCCA/IV&V	SS/CPAF	Mar 94	20,381	20,381	13,909	5,072	1,400				20,381
TRW (SETA)	SS/CPAF	Jan 94	42,072	42,072	40,565	1,507	0				42,072
CSDL	SS/FFP	Jun 94	5,264	5,264	5,264	0	0				5,264
Other Engineering Support	Various	Aug 93	28,540	28,540	9,756	16,443	2,500				28,699
Identified as a Source for SBIR							2,577				2,577
<u>Test and Evaluation Organizations</u>											
AGMC	PO	Annual	173	173	173	0	0				173
White Sands	PO	Annual	649	649	524	125	0				649
Missile Range											
Vandenberg AFB	PO/MIPR	Annual	6,714	6,714	1,688	5,026	0				6,714
Maxwell AFB	MIPR	Annual	27	27	27	0	0				27
Sandia	MIPR	Annual	2,542	2,542	1,633	749	160				2,542
Physics Int	MIPR	Annual	22	22	22	0	0				22
Little Mountain	PO	Annual	68	68	25	43	0				68
Government Furnished Property: None.											
					Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Subtotal Product Development					384,265	47,685	13,855				445,805
Subtotal Support and Management					69,494	23,022	6,477				98,993
Subtotal Test and Evaluation					4,092	5,943	160				10,195

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BUDGET ACTIVITY
5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE
0604851F ICBM EMD

Total Project	457,851	76,650	20,492	554,993
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4210
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COST (\$ In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4210 Propulsion Replacement Program (PRP)	65,998	60,713	30,063	0	0	0	0	0	0	346,202

(U) A. Mission Description

(U) The Propulsion Replacement Program will remanufacture all three solid fuel stages to correct age-related degradations, maintain existing weapon system reliability, and support Minuteman life extension. Any of the degradations (propellant cracking, case corrosion, liner deterioration, inhibitor deterioration, and liner debond) can cause catastrophic motor failure and, in turn, mission failure. RDT&E efforts will identify replacement materials that are no longer available or which have become environmentally unacceptable, reduce life cycle costs, and identify corrections to age-related degradations. This project incorporates only changes that can be demonstrated in an appropriate time frame to ensure the Minuteman propulsion system continues to meet existing performance capabilities and remains viable and supportable. The project entered Phase 2 (Engineering and Manufacturing Development) in FY94.

(U) FY 1998 (\$ in Thousands):

- (U) \$51,776 Continued component reuse and materials replacement studies, continued stage design and development to include refurbishment. Continued fabrication, tooling, and waste disposal for change verification motor (CVM) testing. Successfully fired six Stage I, five Stage II, and three Stage III CVMs. Conducted Critical Design Review (CDR).
- (U) \$8,260 Continued integration of program activities such as system engineering, program management, range support, Arnold Engineering Development Center (AEDC) testing, booster disassembly/assembly, booster transportation.
- (U) \$4,038 Continued software modification.
- (U) \$1,924 Continued ordnance development effort.
- (U) \$65,998 Total

(U) FY 1999 (\$ in Thousands):

- (U) \$39,316 Continue component reuse and materials replacement studies, continue stage design and development to include refurbishment. Continue fabrication, tooling, and waste disposal for qualification motor testing.
- (U) \$17,005 Continue integration of program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation.
- (U) \$3,887 Continue software modification.
- (U) \$505 Complete ordnance development effort.
- (U) \$60,713 Total

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4210
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(U) FY 2000 (\$ in Thousands):

- (U) \$19,762 Complete component reuse and materials replacement studies, continue stage design and development to include refurbishment. Continue fabrication, tooling, and waste disposal for qualification motor testing.
- (U) \$8,681 Complete integration of program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation.
- (U) \$1,620 Complete software modification.
- (U) \$30,063 Total

(U) FY 2001 (\$ in Thousands):

- (U) \$0 EMD Completed in FY00.
- (U) \$0 Total

(U) **B. Project Change Summary - Description of Significant Changes:** None

(U) **C. Other Program Funding Summary (\$ in Thousands):**

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>
(U) APPN 14, Missiles - AF, BA 3, P-013, MM III Modifications (PE 0101213F, Minuteman Squadrons)			93,667	140,674	254,881	262,136	269,626	264,573	559,270	1,844,827

(U) **D. Acquisition Strategy:** Planned acquisition will consist of all hardware and software modifications; integration and flight test support; delivery of remanufactured Stage I, II, and III motors; nuclear certification analysis tasks; and independent software certification. The PRP contracts (with the exception of NSCCA and independent software certification) have transferred to the Prime Integration Contractor.

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4210
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(U) E. Schedule Profile

	<u>FY 1998</u>				<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Program Milestones																
Milestone III AFSARC																X
(U) Engineering Milestones																
CDR				*												
(U) T&E Milestones																
Motor Qualification Tests	*	*	*	*	*	X	X	X								
Combined DT&E/IOT&E Flight									X							
Dedicated IOT&E Flight										X						
(U) Contract Milestones																
Low Rate Initial Production									X							
Full Rate Production																X
* - Completed Event																
X - Planned Event																

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4210
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(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
(U) Technology Insertion	56,593	54,330	19,762	
(U) Software	4,038	3,887	1,620	
(U) Other Program Costs	3,352	2,496	8,681	
(U) SETA	2,015	0	0	
(U) Total	65,998	60,713	30,063	

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
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Product Development Organizations

Thiokol	SS/CPAF	Aug 94	56,382	56,382	47,681	8,701	0				56,382
Aerojet	SS/CPAF	Jul 94	51,985	51,985	43,602	8,383	0				51,985
CSD	SS/CPAF	Jul 94	71,009	71,009	55,073	15,936	0				71,009
Thiokol	C/CPAF	Feb 97	2,364	2,364	1,304	1,060	0				2,364
Boeing North American	C/CPAF	Oct 96	2,217	2,217	1,399	818	0				2,217
Logicon	C/CPAF	Oct 96	3,015	3,015	1,482	720	581	232			3,015
GTE	C/CPAF	Oct 96	1,814	1,814	522	505	505	282			1,814
TRW (Prime)	C/CPAF	Dec 97	98,169	98,169	0	25,915	51,616	20,638			98,169

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development					PE NUMBER AND TITLE 0604851F ICBM EMD					PROJECT 4210	
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
<u>Support and Management Organizations</u>											
TRW (SETA) Program Integration	SS/CPAF	Oct 94	21,020	21,020	19,005	2,015					21,020
Other			n/a	7,314	884	510	5,690	230			7,314
			n/a	15,515	15,515	155					15,670
<u>Test and Evaluation Organizations</u>											
AEDC	PO	Periodic	n/a	8,641	2,946	1,201	2,247	2,247			8,641
Vandenberg AFB	PO	Nov 99	n/a	6,587	0	79	74	6,434			6,587
AF Research Lab	PO	As Required	n/a	15	15	0	0				15
Government Furnished Property: None.											
					Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Subtotal Product Development					151,063	62,038	52,702	21,152			286,955
Subtotal Support and Management					35,404	2,680	5,690	230			44,004
Subtotal Test and Evaluation					2,961	1,280	2,321	8,681			15,243
Total Project					189,428	65,998	60,713	30,063			346,202

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4788
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COST (\$ In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4788 PSRE Life Extension Program	0	0	8,741	18,448	19,500	12,524	0	0	0	59,213

(U) A. Mission Description and Budget Item Justification

(U) The Propulsion System Rocket Engine (PSRE) Life Extension Program will refurbish the Minuteman post-boost propulsion system. This refurbishment will correct age-related degradations, maintain existing weapon system reliability, reduce life cycle costs, and support Minuteman life extension. Deficiencies identified (e.g., relief valve aging, titanium pressure sensing (PC) tube cracking, and fuel flex line cracks) may cause system failure/loss of performance and, in turn, potential mission failure. Other deficiencies (e.g., staging connector aging and actuator motor performance) will impact weapon system availability in addition to reducing system performance. RDT&E efforts will identify replacement materials for those no longer available or which have become environmentally unacceptable. The program will then design/develop components and manufacturing processes necessary to correct the identified deficiencies.

(U) FY 1998 (\$ in Thousands):

- (U) \$0 EMD begins in FY00.
- (U) \$0 Total

(U) FY 1999 (\$ in Thousands):

- (U) \$0 EMD begins in FY00.
- (U) \$0 Total

(U) FY 2000 (\$ in Thousands):

- (U) \$4,877 Begin design/development of components requiring refurbishment or replacement.
- (U) \$3,864 Begin design/development of necessary support equipment.
- (U) \$8,741 Total

(U) FY 2001 (\$ in Thousands):

- (U) \$7,545 Continue component design/development of components requiring refurbishment or replacement.
- (U) \$5,664 Continue support equipment design/development of necessary support equipment.
- (U) \$5,239 Begin test and evaluation efforts.
- (U) \$18,448 Total

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(U) **B. Program Change Summary - Description of Significant Changes:** New start initiated with this President's Budget submission and beginning in FY00.

(U) **C. Other Program Funding Summary (\$ in Thousands):**

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Compl</u>	<u>Total Cost</u>
(U) APPN 14, Missiles - AF, BA 3, P-013, MM III Modifications (PE 0101213F, Minuteman Squadrons)						8,961	20,379	20,700	79,523	129,563

(U) **D. Acquisition Strategy:** . The PSRE Life Extension Program will be conducted under the ICBM Prime Integration Contractor unless other strategies are deemed more appropriate.

(U) **E. Schedule Profile**

	<u>FY 1998</u>			<u>FY 1999</u>			<u>FY 2000</u>			<u>FY 2001</u>		
	1	2	3	4	1	2	3	4	1	2	3	4
(U) Engineering Milestones												
PDR									X			
CDR												X
(U) T&E Milestones												
Re-certification												(FY02)
(U) Contract Milestones												
EMD Contract Award									X			
* - Completed Event												
X - Planned Event												

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE February 1999					
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development					PE NUMBER AND TITLE 0604851F ICBM EMD				PROJECT 4788		
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>											
					<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>			
(U)	Component Design/Development						4,877	7,545			
(U)	Support Equipment Design/Development						3,864	5,664			
(U)	System Test and Evaluation							5,239			
(U)	Total						8,741	18,448			
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
TRW (Prime)	C/CPAF	Oct 99	TBD	53,113				8,591	16,963	26,372	51,926
<u>Support and Management Organizations</u>											
SPO Support	TBD	TBD	TBD	993				150	301	542	993
<u>Test and Evaluation Organizations</u>											
AEDC	PO	As Required	TBD	6,294					1,184	5,110	6,294
Government Furnished Property: None											
Project 4788					Page 15 of 22 Pages				Exhibit R-3 (PE 0604851F)		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE February 1999	
BUDGET ACTIVITY			PE NUMBER AND TITLE			PROJECT	
5 - Engineering and Manufacturing Development			0604851F ICBM EMD			4788	
	Total						
	<u>Prior to</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>	<u>Total</u>
	<u>FY 1998</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>	<u>Program</u>
Subtotal Product Development				8,591	16,963	26,372	51,926
Subtotal Support and Management				150	301	542	993
Subtotal Test and Evaluation					1,184	5,110	6,294
Total Project				8,741	18,448	32,024	59,213

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4823
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COST (\$ In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4823 ECS Replacement Program	0	0	0	11,940	13,927	0	0	0	0	25,867

(U) A. Mission Description and Budget Item Justification

(U) The Minuteman Environmental Control System (ECS) provides cooling airflow to launch-critical ICBM ground equipment. The ECS was deployed in the 1960s. Key ECS components include brine chillers, fans, and pneumatic control systems. The brine chillers were renovated in the mid-1980s; however, those units and the pneumatic control systems have reached the end of their design life and need to be replaced. Aging and obsolete ECS components are adversely affecting weapon system availability, and operating and support costs, due to increased failure rates, non-availability of replacement parts, inefficient diagnostic capabilities, and related supportability and system performance problems. This program will fix the existing ECS in all Minuteman Launch Facilities (LFs) and Missile Alert Facilities (MAFs) as well as test equipment and trainers to benefit from updated technologies to support Minuteman life extension.

(U) FY 1998 (\$ in Thousands):

- (U) \$0 EMD begins in FY01.
- (U) \$0 Total

(U) FY 1999 (\$ in Thousands):

- (U) \$0 EMD begins in FY01.
- (U) \$0 Total

(U) FY 2000 (\$ in Thousands):

- (U) \$0 EMD begins in FY01.
- (U) \$0 Total

(U) FY 2001 (\$ in Thousands):

- (U) \$3,940 Develop engineering design for replacement of existing brine chillers with state-of-the-art brine chillers.
- (U) \$3,701 Design digital control system to replace existing pneumatic control system.
- (U) \$1,075 Design new digital technology remote monitoring system.
- (U) \$3,224 Develop engineering design to correct age-related supportability and performance deficiencies with ECS components including LF emergency air conditioner, launch tube heater and instrument air compressor, and resolve launch control center air quality problems.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)							DATE February 1999					
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development				PE NUMBER AND TITLE 0604851F ICBM EMD			PROJECT 4823					
- (U) \$11,940 Total												
(U) B. <u>Program Change Summary - Description of Significant Changes:</u> New start initiated with this President's Budget Submission which will begin in FY01.												
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>												
			<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To</u>	<u>Total</u>
(U)	APPN 14, Missiles - AF, BA 3, P-013, MM III							18,333	46,173	57,506	<u>Compl</u>	<u>Cost</u>
	Modifications (PE 0101213F, Minuteman Squadrons)										145,842	267,854
(U) D. <u>Acquisition Strategy:</u> The ECS Replacement Program will be conducted under the ICBM Prime Integration Contractor unless other strategies are deemed more appropriate.												
Project 4823			Page 18 of 22 Pages			Exhibit R-2A (PE 0604851F)						

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4823
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(U) E. Schedule Profile

	<u>FY 1998</u>				<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Contract Milestones																
EMD Contract Award															X	
(U) Engineering Milestones																
PDR																X
CDR (3 rd Qtr, FY02)																
* - Completed Event																
X - Planned Event																

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4823
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A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
(U) Contractor Engineering Support				11,740
(U) Program Management Support				200
(U) Total				11,940

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604851F ICBM EMD	PROJECT 4823
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(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
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Product Development Organizations

TRW (Prime)	C/CPAF	Oct 00	n/a	25,467					11,740	13,727	25,467
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Support and Management Organizations

Various	Various	Oct 00	n/a	400					200	200	400
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Test and Evaluation Organizations: None

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE February 1999	
BUDGET ACTIVITY			PE NUMBER AND TITLE			PROJECT	
5 - Engineering and Manufacturing Development			0604851F ICBM EMD			4823	
Government Furnished Property: None							
	<u>Total</u>						
	<u>Prior to</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>	<u>Total</u>
	<u>FY 1998</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>	<u>Program</u>
Subtotal Product Development					11,740	13,727	25,467
Subtotal Support and Management					200	200	400
Subtotal Test and Evaluation							
Total Project					11,940	13,927	25,867