

May 1994

STRATEGIC MISSILES

Issues Regarding Advanced Cruise Missile Program Restructuring



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International Affairs Division

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May 31, 1994

The Honorable John Conyers, Jr.
Chairman, Legislation and
National Security Subcommittee
Committee on Government Operations
House of Representatives

The Honorable Charles E. Grassley
United States Senate

In June 1993, you asked us to review the Advanced Cruise Missile (ACM) program and provide information about the program's restructuring, funding, and missile performance. As requested by your offices, we are also providing information on the application of work measurement standards to ACM production contracts and the criteria used in determining progress payments¹ while missile deliveries were suspended to overcome quality problems. On November 16, 1993, and December 7, 1993, we briefed your offices on the results of our review. This report contains the information presented in those briefings.

An additional issue arose during the briefings regarding the adequacy of funds available for the fiscal year 1987 and 1988 efforts before termination. We are addressing this issue as part of our response to a Department of Defense (DOD) Inspector General inquiry concerning the ACM program. We will advise you of the results as soon as it is completed.

Background

ACM is a subsonic, turbofan-powered missile equipped with a nuclear warhead. The Air Force began this program following presidential direction in 1982. ACM is designed to be less detectable and have greater range, accuracy, and operational flexibility than the Air Launched Cruise Missile. Hughes Missile Systems Company (formerly General Dynamics, Convair Division) is the prime contractor, and McDonnell Douglas Missile Systems Company is a build-to-print second source. The ACM program was granted special access status and remained highly classified until the late 1980s.

To meet a presidentially directed initial operational capability by the late 1980s, the Air Force implemented a highly concurrent program. More than

¹Progress payments are a means by which the government provides financing to contractors as work progresses.

25 percent of the originally planned quantity of 1,461 missiles was funded before developmental flight testing was completed. Although some design problems and schedule delays were encountered, the first four flight tests were successfully completed between July 1985 and March 1986. However, 8 of the next 11 flight tests were unsuccessful. As the flight test program began identifying design and manufacturing deficiencies, the program's schedule slipped even further, and projected costs began to increase.

To address the design and manufacturing deficiencies, many changes were made to the missile's guidance set, sensor, actuators, and other subsystems. In addition, Congress and DOD initiated actions to slow the planned procurement rate and improve the missile's quality and reliability. These actions included reducing program funding and annual production quantities, establishing restrictions on the obligation of certain funds until key milestones were met, and establishing a second production source.

Flight test results improved considerably in 1989, but design, quality, and financial problems continued to adversely affect the program. The Air Force suspended deliveries of ACMs from General Dynamics from November 1989 to June 1990 and from April 1991 to October 1991, while the design and quality problems were resolved. Consequently, General Dynamics' projected costs at the completion of its fiscal year 1987 and 1988 efforts rose significantly above the contracts' target cost. Both of these efforts employed fixed-price, incentive-type contracts.

Results in Brief

As of January 1992, the Air Force planned to acquire 1,000 missiles, but a number of factors led the Air Force to dramatically restructure the ACM program. A principal factor was the lack of sufficient funds to cover the projected cost overruns on the fiscal year 1987 and 1988 ACM contracts. This funding problem was a key factor in the Air Force's decision to partially terminate these and subsequent ACM contracts during 1992. Other factors contributing to the restructure and compounding the funding problem included miscommunication between DOD and the Air Force on how to implement changes in funding legislation, the President's decision to end ACM production, and a congressional rescission of ACM funds. In total, restructuring actions affected 790 missiles, including termination of 180 missiles ordered between fiscal years 1990 and 1992.

Of the \$4.8 billion provided to the ACM program between fiscal years 1982 and 1993, about \$2.5 billion was obligated on six production contracts. In total, the Air Force acquired 461 missiles under these contracts. As of

October 1993, approximately 90 percent of the funds obligated on the production contracts had been expended. We found no instance in which funds obligated on the original fiscal year 1990, 1991, or 1992 efforts were applied directly to cover overruns on the fiscal year 1987 or 1988 efforts. Instead, upon partial termination of the fiscal year 1987 and 1988 efforts, the Air Force finished the remaining work on subsequent contracts and paid for the work using available funds. All missiles originally begun in fiscal years 1987 and 1988 were eventually delivered.

The Air Force had obligated approximately \$314 million toward the terminated portions of the fiscal year 1990 to 1993 efforts. Of this amount, we estimate residual material and associated costs accounted for nearly \$227 million. The exact amount of the residual material that can be used for spare parts or for other purposes will not be known for several years. However, we estimate that about \$94 million, or about 41 percent, of the value of residual material could be used as spare parts. Another \$95 million is to be screened for potential government uses, but only a small portion is likely to be used for spares.

The Air Force will incur costs to terminate the contracts and close out the ACM program. We estimate that, as of October 1993, these costs may total about \$56.7 million, including about \$587,000 in administrative costs for restructuring the fiscal year 1987 and 1988 production efforts. These costs will not be known in full until the termination process is complete.

In mid-1992, the Air Force made a special request for an additional \$127.1 million in fiscal year 1993 funds to complete missile production and close out the ACM program. Congress appropriated the requested amount; however, the Air Force overestimated its funding requirement and, as of November 1993, nearly half of these funds were held as management reserve at the program office, withheld at DOD, or reprogrammed.

Though design, quality, and manufacturing problems adversely affected the program for years, factory and field data showed a continued improvement in manufacturing efficiency and quality. Operational testing of ACM showed that the missile generally meets or exceeds the Air Force's performance requirements.

The problems encountered in the ACM program precluded General Dynamics from fully complying with DOD's work measurement standard. Before McDonnell Douglas could fully implement the standard, the Air Force tailored the standard to allow both contractors to use their existing

work measurement systems. The Air Force estimates this action avoided incurring about \$1.4 million in costs. Additionally, the Air Force waived the standard entirely for the ACM guidance set subcontractor, which had refused to implement the standard. The Air Force estimates it received about \$1 million in consideration for this action.

DOD did not reduce progress payments during the period when missile deliveries were suspended. The DOD official responsible for approving such payments stated that if the contractor is not at fault or negligent in its failure to comply with the contract, federal acquisition regulations prohibit reductions of progress payments, other than to correct overpayments. The official told us that General Dynamics was generally meeting contract specifications for quality and performance or was attempting to resolve areas of concern.

Appendixes I through V contain additional details on our findings.

Scope and Methodology

To develop the information for the briefings and this report, we reviewed ACM program management directives, production contracts, termination notices, interim termination settlement proposals, financial status reports, cost performance reports, financial reconciliation records, and field and factory performance data.

We also interviewed officials at the ACM System Program Office, Wright-Patterson Air Force Base, Ohio; the Department of the Air Force, Washington, D.C.; Hughes Missile Systems Company, San Diego, California; the Defense Contract Audit Agency, San Diego, California; and the Defense Contract Management Commands, St. Louis, Missouri, and San Diego, California. We performed our review from June to December 1993 in accordance with generally accepted government auditing standards.

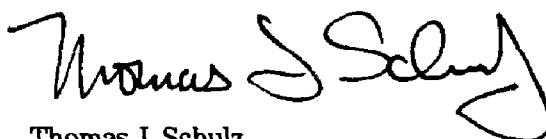
As requested by your offices, we did not obtain written agency comments on this report. However, we discussed a draft of this report with DOD and Air Force officials and, where appropriate, incorporated their comments to improve the report's technical accuracy. DOD and Air Force officials generally agreed with the findings of the report; however, they believed that our characterization of work initiated under the fiscal year 1987 or 1988 efforts as being, in effect, completed under subsequent contracts, was not technically accurate.

DOD and Air Force officials argued that upon contract termination, the unfinished missiles and other work-in-process for the fiscal year 1987 and 1988 efforts became residual government-owned material that was not tied to a specific requirement. Since this material was later furnished to the contractor to be completed under a subsequent contract, they considered completing assembly of the residual material to be new work, not a continuation of the previous effort. Further, they noted that the missiles were delivered under their authorized requirements for fiscal year 1992.

We are evaluating the legal basis for the Air Force's actions as part of our response to the DOD Inspector General's inquiry. However, even if from a technical and contractual basis the work can be considered new work, the net effect of the actions was to complete, under subsequent contracts, work that was originally initiated and intended to be completed under the fiscal year 1987 and 1988 efforts. Therefore, we have not revised the report.

Unless you publicly announce this report's contents earlier, we plan no further distribution of this report until 30 days after its issue date. At that time, we will send copies to interested parties and make copies available to others on request.

Please contact me on (202) 512-4841 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix VI.



Thomas J. Schulz
Associate Director, Systems Development
and Production Issues

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Abbreviations

ACM	Advanced Cruise Missile
DOD	Department of Defense
FAR	Federal Acquisition Regulations

Program Restructuring

The term "restructuring" describes the changes in the Advanced Cruise Missile (ACM) program that the Air Force made to address the funding shortfall in fiscal years 1987 and 1988, "M" account¹ and implementing guidance changes, the President's decision to end ACM production, and a congressional rescission of ACM funds.² In total, restructuring actions affected 790 of the 1,000 missiles the Air Force intended to buy as of January 1992, including termination of 180 missiles ordered between fiscal years 1990 and 1992. Restructuring reduced the number of missiles the Air Force eventually acquired to 461. A significant amount of work-in-process for the terminated efforts remains at the prime contractor and numerous subcontractor and vendor plants.

The Air Force will incur costs to settle the contracts and shutdown the program. As of October 1993, we estimate potential contract termination and program shutdown costs to be about \$56.7 million.

Factors Contributing to Restructuring

The Air Force's inability to fund its share of the projected cost overruns on General Dynamics' fiscal year 1987 and 1988 efforts led it to partially terminate those efforts. The overruns, which General Dynamics identified to the Air Force in November 1990 to be about \$40.9 million, increased in 1991 as design and quality problems continued to hamper the production effort. In October 1991, the program office requested \$98.6 million to cover the Air Force's share of the overruns on the fiscal year 1987 and 1988 efforts. In January 1992, this request was increased to \$112.2 million. However, the Air Force did not have sufficient funds remaining in the missile procurement account to fund this request, and, in April 1992, partially terminated the efforts as a result. Later, the Air Force terminated additional missiles from the fiscal year 1988 production buy in October 1992, again citing insufficient funds to complete even the reduced effort.

Other contributing factors to restructuring were changes in the merged, or "M" account legislation enacted in the Fiscal Year 1991 National Defense Authorization Act and miscommunication between the Department of Defense (DOD) and the Air Force on how to implement this legislation. Air Force officials were uncertain whether the fiscal year 1987 and 1988 overruns should be funded using expired fiscal year 1987 and 1988 funds

¹An account into which unexpended funds under an appropriation were transferred from the expired accounts at the end of the second full fiscal year following expiration.

²Our definition of restructuring differs from that used by DOD and the Air Force, which excludes the President's decision to terminate the program and the impact of the congressional rescission.

or whether they could use fiscal year 1992 funds. After months of discussion, on March 27, 1992, the Assistant Secretary of the Air Force (Financial Management and Comptroller) approved the use of fiscal year 1992 funds. Four days later, however, the DOD Comptroller informed the Air Force that its plan to use fiscal year 1992 funds was not appropriate and that such funds could not be used until the Air Force provided additional justification.

Despite the confusion resulting from the changes in legislation and implementing guidance, the Air Force should have been aware of the potential fiscal year 1987 funding problem in September 1989, when the fiscal year 1987 effort was definitized. At that time, the unobligated balance in the Air Force's fiscal year 1987 missile procurement account totaled \$48.6 million. However, the difference between target price and contract ceiling—the point up to which the Air Force is liable under a fixed-price incentive contract—totaled nearly \$76 million. Program officials told us they were unaware of the missile procurement account's balance and did not know that the Air Force would not have been able to fully fund its share of any significant cost overruns. In commenting on this report, DOD and Air Force officials acknowledged that more timely recognition and communication of this potential shortfall might have minimized the impact of restructuring.

The President's decision in January 1992 to end ACM production canceled the production efforts for fiscal year 1993 and beyond, eliminating 360 missiles from the program. Based on this action, DOD eliminated all outyear missile procurement funding for the ACM program. Program officials told us the absence of funding in DOD's outyear budgets in mid-1992 contributed to their decisions to terminate the fiscal year 1990 to 1992 production efforts. DOD subsequently restored some of the outyear funding.

Finally, the June 1992 congressional rescission of \$344 million of fiscal year 1992 ACM funds further contributed to the restructuring. The rescission, along with the absence of funding in DOD's outyear funding plans, led program officials to believe that they would not have sufficient funds to acquire support equipment, establish a depot repair capability, and pay for program shutdown costs. Consequently, program officials terminated the 60 missiles ordered from General Dynamics in the fiscal year 1990 and 1991 production efforts.

**Impact of
Restructuring on
Production Efforts
Planned as of
January 1, 1992**

Table I.1 shows the Air Force's planned production efforts before the President decided to end ACM production and the Air Force terminated the various production efforts. Restructuring did not affect General Dynamics' fiscal year 1985 and 1986 efforts or McDonnell Douglas' fiscal year 1990 and 1991 production efforts.

**Table I.1: Planned Production Efforts
as of January 1, 1992**

Fiscal year	Number of missiles authorized	Number of missiles planned as of January 1, 1992	Contractor	
			General Dynamics	McDonnell Douglas ^a
1985	10	10	10	0
1986	100	100	100	0
1987	150	150	150	0
1988	100	100	100	0
1990	100	75	25	50
1991	100	85	35	50
1992	120	120	^b	^b
1993-1995 ^c	0	360	^b	^b
Total	680	1,000	420	100

^aMcDonnell Douglas' first production contract was fiscal year 1990.

^bAs of January 1992, the Air Force had not determined the number of missiles to be awarded to each contractor in fiscal year 1992 and was planning a winner-take-all competition for the outyear production.

^cIn fiscal year 1992, Congress had authorized advanced buy funding for 102 missiles in fiscal year 1993; however, authorization and appropriation of the funds to complete these missiles had not occurred prior to the decision to terminate outyear production.

Even though Congress authorized the Air Force to acquire 100 missiles in each of fiscal years 1990 and 1991 and the Air Force initially had provided long lead funds for them, the Air Force only ordered a total of 160 missiles—100 from McDonnell Douglas and 60 from General Dynamics—since the contractors' proposed costs were higher than initially estimated.

For fiscal year 1992, the Air Force received funds to acquire 120 missiles to be competitively awarded between General Dynamics and McDonnell Douglas. As of January 1992, the Air Force had provided \$80.3 million to

**Appendix I
Program Restructuring**

General Dynamics and \$76.6 million to McDonnell Douglas, but it had not yet determined the exact number of missiles to be acquired from each contractor. The Air Force issued a stop-work order to both contractors in February 1992 and officially terminated the efforts for 120 new missiles in May 1992.

For fiscal years 1993 to 1995, the Air Force was planning to conduct a winner-take-all competition between the two contractors. The Air Force had provided about \$16.5 million in advance buy funding to General Dynamics and McDonnell Douglas for the fiscal year 1993 effort when the effort was terminated in February 1992.

Table I.2 shows the number of missiles delivered for each production effort that was affected by restructuring. A total of 461 production missiles were delivered: 250 missiles begun in fiscal years 1987 and 1988, 210 missiles under the contracts not affected by restructuring, and 1 additional missile delivered by General Dynamics under the fiscal year 1988 production effort to replace a missile used in development testing. However, none of the 60 missiles begun under General Dynamics' fiscal year 1990 or 1991 production efforts, nor any of the 120 missiles originally planned for fiscal year 1992, will be delivered.

Table I.2: Status of Missiles Affected by Program Restructuring

Fiscal year	Contractor	Number of missiles planned	Production lot missiles delivered under					Total
			Fiscal year					
			1987	1988	1990	1991	1992	
1987	General Dynamics	150	54	0	0	0	96	150
1988	General Dynamics	100	0	52	15	9	24	100
1990	General Dynamics	25	0	0	0	0	0	0
1991	General Dynamics	35	0	0	0	0	0	0
1992	^a	120	0	0	0	0	0	0
1993-1995	^a	360	0	0	0	0	0	0
Total		790	54	52	15	9	120	250

^aAs of January 1992, the Air Force had not determined the number of missiles to be awarded to each contractor.

Impact of Restructuring on
the Fiscal Year 1987 and
1988 Efforts

The Air Force eventually acquired all 250 missiles begun under the fiscal year 1987 and 1988 production efforts, though the missiles were delivered under five different production lots. Air Force analyses showed that the Air Force paid no more for the fiscal year 1987 and 1988 missiles delivered under the restructured contracts than it would have paid if the original fiscal year 1987 and 1988 efforts had been continued uninterrupted.

The Air Force terminated work on the fiscal year 1987 effort on April 6, 1992, and immediately thereafter issued a new 1992 letter contract for the same number of missiles that had been canceled. Because the assets from the terminated contract were used as government furnished material for the new 1992 effort, the net effect of this action was to complete work on the terminated missiles using 1992 funds. At contract termination, General Dynamics had delivered 54 ACMS; the remaining 96 were completed under the new contract. In January 1993, the Air Force and General Dynamics established a firm fixed price of \$33.7 million to complete production of the 96 missiles.

The Air Force also recognized that available funds were insufficient to pay its share of the projected cost overruns on the fiscal year 1988 effort and concluded it would eventually need to address this condition as well. Consequently, the Air Force partially terminated the fiscal year 1988 effort on April 9, 1992, by reducing the quantity from 100 to 76 missiles. The Air Force amended the 1992 letter contract awarded 3 days earlier to include completion of these 24 missiles.

The Air Force terminated work on another 24 fiscal year 1988 missiles in October 1992, again citing insufficient funds to complete the remaining 76 ACMS. To resolve this problem, as well as provide funds to fully support the weapon system in the field, the Air Force terminated 60 missiles that were being produced under General Dynamics' fiscal year 1990 and 1991 efforts and amended the contract for those efforts to include completion of the 24 terminated fiscal year 1988 missiles. Overall, 48 missiles that were ordered in fiscal year 1988 were completed under the fiscal year 1990, 1991, or 1992 production efforts, at a total cost of \$32 million.

Impact of Restructuring on
Terminated Fiscal Year
1990 to 1993 Efforts

The Air Force had obligated approximately \$314 million toward the terminated portions of the fiscal year 1990 to 1993 efforts. Unlike the fiscal year 1987 and 1988 efforts, however, none of the terminated missiles begun in fiscal years 1990 to 1993 will be completed. Consequently, a

significant amount of work-in-process for the terminated efforts remains at the prime contractor and numerous subcontractor and vendor plants.

The residual material from these efforts will be disposed of according to Federal Acquisition Regulations (FAR), with high-value items likely to be used for spares, and the remainder sold for its salvage value. We estimate residual material and associated costs account for nearly \$227 million. We also estimate that about \$94 million, or about 41 percent, of the value of residual material could be used for spare parts. The exact amount will not be known for several years. There is also an estimated \$95 million of material to be screened by government users. According to Air Force officials, only a small portion of this material could be used for spare parts.

Disposition Process

Under FAR, the contractor must provide a termination settlement proposal to the government, including a complete inventory of all work-in-process, costs incurred, and termination expenses. FAR requires the contractor to make an effort to use all common material on other programs and credit the contract for the material's value. The contractor must require subcontractors and vendors to make similar efforts. To ensure no parts are scrapped unnecessarily, the remaining work-in-process will be offered to the ACM spare parts managers, other military services, or any qualified government agency. After this effort is completed, the contractor is to sell the remaining parts and materials and credit the sale price or salvage value back to the contract.

Among these residual assets are thousands of individual parts, (some complete and some in various stages of manufacture); various raw materials; and significant quantities of bench stock, such as nuts, bolts, bushings and seals. According to program officials, the high-value parts, such as guidance sets, sensors, altimeters, and arm/disarm devices, will likely be used as spares. Small amounts of low-value parts may also be used as spares. The remaining parts and materials are likely to be sold for their salvage value.

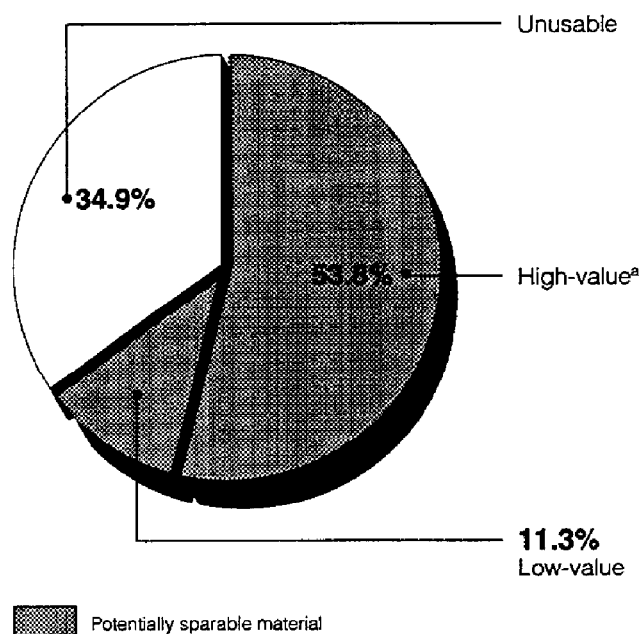
Fiscal Year 1990 and 1991 Efforts

When the Air Force terminated General Dynamics efforts in October 1992, it had obligated approximately \$335.7 million toward the fiscal year 1990 and 1991 efforts. Of this amount, approximately \$155.7 million had been obligated toward the work eventually terminated, which was associated with the production of the 60 missiles on contract.³ Of the \$155.7 million obligated for the terminated work, approximately \$107.5 million, or

³The non-terminated work included such tasks as sustaining engineering and design agent support.

69 percent, remained as residual parts. These parts range from bolts to partially machined castings to completed subsystems, such as guidance sets and actuators. According to program officials, most of the residual parts manufactured for the fiscal year 1990 and 1991 missiles were complete when the contracts were terminated and some of these parts are likely to be used for spares. Figure I.1 shows our estimate of the percentage by value of parts that could be used as spares on ACM or other programs. The actual number of parts used as spares and the value of those parts will not be known until the termination process is completed.

Figure I.1: Potential Use of \$107.6 Million in Fiscal Years 1990 and 1991 Residual Material by Value of Material



^aIncludes guidance sets, sensors, altimeters, and arm/disarm devices.

Of the remaining \$48.2 million, the Air Force used approximately \$13.8 million to complete the 24 fiscal year 1988 missiles terminated in October 1992, another \$8.5 million for additional design engineering, retrofitting previously built missiles, and other purposes, and reserved about \$25.9 million for contract termination or program shutdown costs.⁴

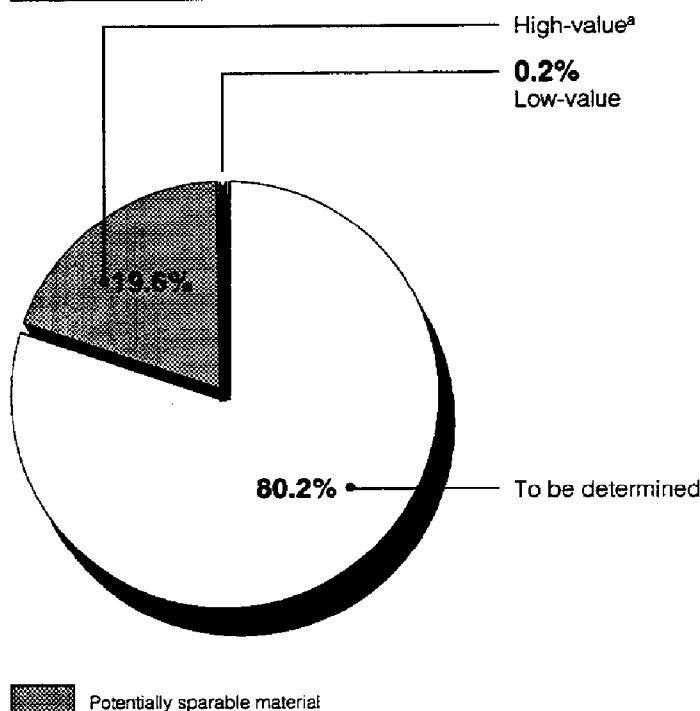
⁴As of September 1993, the Air Force had reduced the amount available for contract termination and program shutdown costs to about \$19.7 million.

Fiscal Year 1992 and 1993
Efforts

As of November 1993, approximately \$159 million had been obligated toward the terminated fiscal year 1992 and 1993 efforts. On the basis of our discussions with officials from General Dynamics, McDonnell Douglas, and the Defense Contract Management Command that are responsible for evaluating the termination proposals, we currently estimate that about \$119 million of the \$159 million is for subcontractor material and associated costs. Our review of McDonnell Douglas' interim termination proposal indicated that a portion of the subcontractors' claims were for termination expenses. However, the exact allocation between residual parts, termination costs, and other costs cannot be determined until the full termination settlement is completed.

Unlike the fiscal year 1990 and 1991 efforts, however, only about 20 percent of the parts manufactured for the fiscal year 1992 or 1993 efforts were complete when these efforts were terminated. Consequently, the amount and value of the residual material that can be used for spares is expected to be low, as shown in figure I.2.

Figure I.2: Potential Use of \$119 Million in Fiscal Years 1992 and 1993 Residual Material and Associated Costs by Value of Material



^aIncludes guidance sets, sensors, altimeters, and arm/disarm devices.

Status of Contract Terminations

Settlement of the terminated contracts has been delayed by the complex interrelationships of the contracts, subcontractor accounting problems, and termination settlement issues. The termination contracting officers estimate full settlement of these contracts may take another 2 to 3 years.

Because the Air Force's contracting practice was to place more than one production effort on a single contract, the terminations affected some portions of a contract and not others. The contractors' submission of settlement proposals was also delayed by accounting problems encountered by a key subcontractor who had difficulty separating the inventory and associated costs for the two prime contractors.

Disposition of the residual assets was delayed by the lack of demilitarization codes on ACM parts. These codes are required to ensure that parts having a potential military use are not sold to an unauthorized

buyer. The Air Force did not originally require the contractors to mark each part with the appropriate code, and following termination the contractors have argued that the Air Force should incur the cost of having each part marked. Consequently, the termination settlement process has been delayed until the issue is resolved. Disposition of residual assets was also delayed by the need to use some of the assets to retrofit 55 of the early ACMS to an upgraded production configuration. Until these retrofits were completed in late 1993, General Dynamics was not able to prepare a final inventory of the residual assets.

Until the termination process is complete, we are unable to determine the exact number of residual parts from terminated contracts that either will be placed into the Air Force spare parts inventory, sold, or scrapped. A final disposition of this inventory will also be needed before we can determine the amount of credit applied to the terminated contracts.

Potential Contract Termination and Program Shutdown Costs

Due to the termination of the ongoing production efforts and the truncation of the program, the Air Force will incur costs to settle the contracts and shutdown the program. We estimated potential contract termination and program shutdown costs to be about \$56.7 million as of October 1993, as shown in table I.3. As we used the terms, contract termination costs are those costs that were incurred specifically due to termination of specific contractual efforts. Program shutdown costs are those costs that would, to some extent, be incurred whenever a program is completed. Such costs include those for undepreciated capital equipment, unexpired leases, and other costs.

**Appendix I
Program Restructuring**

Table I.3: Potential Contract Termination and Program Shutdown Costs as of October 1993

Dollars in millions

Contractor	Primary efforts (fiscal year)	Administrative restructure^a	Shutdown^b	Termination^c	Total
General Dynamics					
F33657-89-C-0082	1990	\$0.107	\$0	\$4.000	\$4.107
	1991	0.064	6.000	12.000	18.064
F33657-91-C-0032	1992	0.416	0	0	0.416
F33657-88-C-0103	1992 ^d	0	15.000	5.000	20.000
	1993 ^d	0	0	4.000	4.000
McDonnell Douglas					
F33657-87-C-0128	1992 ^d	0	2.058	1.331	3.389
	1993 ^d	0	0	1.680	1.680
^e	^e	0	5.000	0	5.000
Total		\$0.587	\$28.058	\$28.011	\$56.656

^aNegotiated price for administrative costs associated with the fiscal year 1987 and 1988 contract terminations.

^bOur estimate of costs associated with the shutdown of the production program, including undepreciated capital equipment, unexpired leases, and other costs.

^cOur estimate of costs associated with termination of specific contracts, including settlement expenses, disposition of work-in-process, and other costs.

^dThese were the fiscal year 1992 and 1993 long-lead efforts that were terminated.

^eThis amount has been budgeted as a contingency fund for potential claims.

Of the \$56.7 million in potential liability, only the \$587,000 in administrative restructure costs reflects a definitized cost. The values for the fiscal year 1990 and 1991 production efforts reflected a not-to-exceed clause incorporated within the contract during restructuring. The values for the fiscal year 1992 and 1993 efforts were based either on estimates provided by contractor or Defense Contract Management Command officials or on our review of the contractors' termination proposals. Similarly, the \$5 million reflected the amount budgeted by the program office as a contingency or reserve fund against any potential claims that may be filed by McDonnell Douglas. As such, all costs other than the administrative restructure costs are subject to adjustment.

The potential shutdown and termination costs do not include the value of nonusable residual material. In the broadest sense, the value of this material could be considered another cost of terminating the production efforts. As the fiscal year 1992 and 1993 terminations are settled, some of

the costs currently categorized as subcontractor material and associated costs will be more appropriately considered to be termination expenses.

The DOD Inspector General reported that the Air Force might have to assume up to \$49 million in contractor liabilities, or the contractor's share of the projected cost overruns on the fiscal year 1987 and 1988 efforts. Air Force analyses indicate that the Air Force paid no more for the 250 missiles under the restructured contracts than it would have had the fiscal year 1987 and 1988 efforts been completed under the original contracts. According to the Air Force, the anticipated liability did not occur. However, the Air Force did incur an additional cost of approximately \$587,000 for administrative restructure expenses. While not a penalty, these costs would not have been incurred if the contracts had not been terminated and the efforts moved to a new contract.

Program Funding

Of the \$4.8 billion provided to the ACM program between fiscal years 1982 and 1993, about \$2.5 billion was obligated on six production contracts. Although the Air Force made numerous accounting changes affecting the funding of the production contracts during and subsequent to restructuring, we found no instances in which funds obligated on the original fiscal year 1990, 1991, or 1992 efforts were applied directly to cover overruns on the fiscal year 1987 or 1988 efforts.

In mid-1992, the Air Force made a special request for an additional \$127.1 million in fiscal year 1993 funds to complete missile production and close out the ACM program. While Congress appropriated the requested amount, as of November 1993, nearly half of these funds were held as management reserve, withheld by DOD, or reprogrammed.

Previous Funding and Future Requirements

After various reprogrammings and other adjustments, about \$4.8 billion was provided for the ACM program between fiscal years 1982 and 1993. This amount includes \$2.9 billion for missile procurement, \$1.6 billion for research and development, and \$0.3 billion for aircraft modification and military construction.

On the basis of congressional actions taken on the fiscal year 1994 budget, program officials estimate that about \$55 million will be needed between fiscal years 1994 and 1996. The majority of the funds are required to complete development of an Air Force depot repair capability and fund other weapon system and program management support activities.

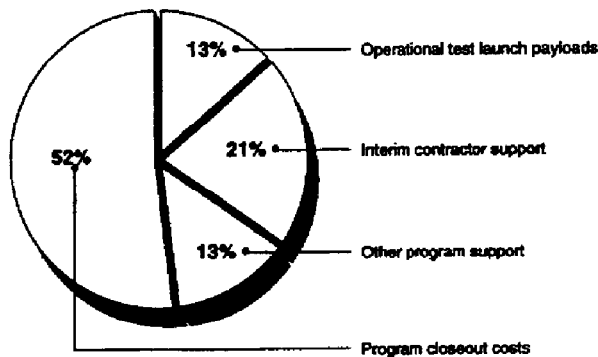
Fiscal Year 1993 Funding Uses

After the President's decision to terminate ACM production, the amended budget request for fiscal year 1993 included no procurement funds for the ACM program. In mid-1992, the Air Force subsequently made a special request to the congressional defense committees for \$127.1 million in procurement funds to complete the ACM program, pay termination costs, and deliver 450 operational missiles to the using command. Although Congress authorized and appropriated these funds, the Air Force overestimated its funding requirements. Consequently, as of November 1993, approximately \$63 million of the funds appropriated in fiscal year 1993 were held as management reserve at the program office, withheld by DOD as being unneeded, or reprogrammed, as shown in figure II.1.

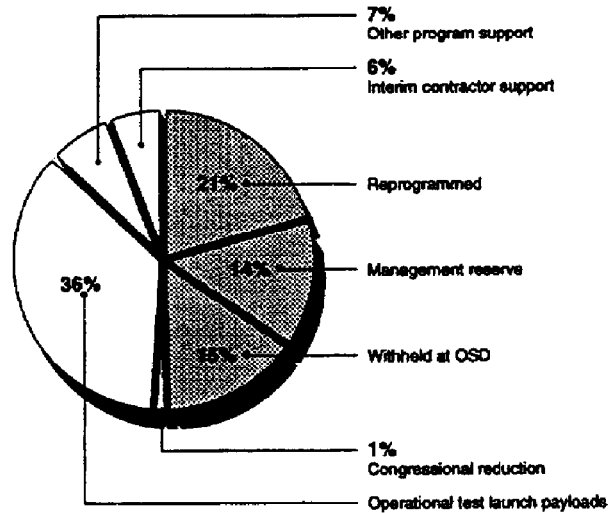
Appendix II
Program Funding

Figure II.1: Changes to Planned Usage of Fiscal Year 1993 Funds

Uses as Requested Mid-1992



Projected Uses as of November 1993*



Excess funds

*The Air Force has proposed using excess funds not already reprogrammed for operations and maintenance activities in fiscal year 1994.

Missile Production
Contracts Funding

The Air Force had obligated about \$2.5 billion on the six missile production contracts awarded to General Dynamics and McDonnell Douglas, or about 52 percent of program funding through fiscal year 1993. These contracts are nearing completion and close-out efforts are underway.

Table II.1 shows that about \$2.2 billion—or 90 percent—of the funds obligated on the missile production contracts have been expended. The funds that have not yet been obligated will be used for such purposes as award fees, undefinitized contract actions, and other activities.

Appendix II
Program Funding

Table II.1: Status of Contract Funding
as of October 30, 1993

Dollars in Million				
Contractor	Missile production (fiscal year)	Obligated	Expended	Unobligated ^a
General Dynamics				
F33657-85-C-0008	1985 1986	\$ 640.2	\$ 618.4	\$ 4.9
F33657-88-C-0103	1987 1988 1992 ^b 1993 ^b	922.2	860.9	9.3
F33657-89-C-0082	1990 1991	346.7	239.6	5.0
F33657-91-C-0032	1992	57.7	49.5	10.0
McDonnell Douglas				
F33657-87-C-0128	Qualification ^c 1992 ^b 1993 ^b	133.9	45.5 ^d	0.2
F33657-89-C-0083	1990 1991	396.1	422.7 ^d	9.7
Total		\$2,496.8	\$2,236.6	\$39.1

^aRepresents additional funds planned for such efforts as award fees, undefinitized contract actions, contingent liabilities, and other activities.

^bThese were the fiscal year 1992 and 1993 long-lead efforts that were terminated.

^cReflects efforts to qualify McDonnell Douglas as a second production source.

^dDiscrepancies in these amounts are being reconciled by the Defense Finance and Accounting Service.

As indicated in table II.1, some discrepancies exist between the program office's records and the official records maintained by the Defense Finance and Accounting Service on funds expended on the McDonnell Douglas contracts. Program officials explained that until September 1990 the program office was responsible for providing progress payments to McDonnell Douglas. After that point, responsibility for certain payments was transferred to the Defense Finance and Accounting Service. According to program officials, a lack of proper planning and poor communication at the time of transfer resulted in confusion concerning each organization's responsibilities. Consequently, numerous accounting errors occurred. Efforts to resolve these errors are still underway.

In addition to these difficulties, program officials acknowledged that their financial records were in disarray before restructuring. For example, program office and General Dynamics records disagreed by about \$40 million on the amount expended on the various production efforts. Program officials attributed this condition to several factors, including the quantity of contract modifications, the transfer of efforts between contracts, inaccurate recording of financial information, and the absence of an integrated contractual and financial management information system. We estimate 32 of the 101 modifications to the fiscal year 1987 and 1988 contracts in 1992 were issued primarily to correct fund citations, obligation amounts, and other financial information. According to program officials, they largely completed efforts to resolve these discrepancies prior to restructuring.

Although the Air Force made numerous accounting changes affecting the funding of the production contracts during and subsequent to restructuring, our evaluation did not reveal any instances where funds applied against the fiscal year 1990 to 1993 production efforts were deobligated and reapplied directly against the fiscal year 1987 or 1988 efforts. Our review indicated that the primary fiscal year 1987 and 1988 efforts, which we defined as those efforts established at the time of contract award, were funded using fiscal year 1986, 1987, or 1988 funds.¹ Rather, the Air Force funded the cost overruns by moving, in effect, the uncompleted work on the terminated fiscal year 1987 and 1988 efforts forward to the fiscal year 1990, 1991, and 1992 efforts. The Air Force then paid for this work using available funding.

¹The remaining fiscal year 1987 and 1988 efforts are comprised primarily of contract modifications that incorporated various design changes.

Missile Performance

The ACM program encountered significant technical, manufacturing, and quality problems for most of its history. DOD and Air Force officials noted that ACM suffered from the program's high degree of concurrency, manufacturing and quality control problems at General Dynamics, and a lack of thorough ground testing at the beginning of the program. Consequently, the flight test program and feedback from the operating bases revealed many design and manufacturing deficiencies after a significant number of missiles were already in production. For example, problems with fuel leaks and water intrusion were disclosed during inspections of missiles at K.I. Sawyer Air Force Base, Michigan. These design and quality problems led the Air Force and the contractor to suspend missile deliveries.

Factory and field performance data since 1991 show a continuing improvement in manufacturing efficiency and missile quality, while operational testing showed that the missile generally meets or exceeds Air Force requirements.

Location and Status of Missiles as of November 1993

The Air Force eventually acquired 461 missiles from General Dynamics and McDonnell Douglas. As shown in table III.1, 353 of these missiles were considered fully mission capable as of November 1993. The majority of the remaining missiles were undergoing some type of maintenance or were awaiting retrofitting to the current configuration.

Six missiles acquired in fiscal year 1985, however, are considered by contractor officials to be operationally unsuitable. These officials told us that the missiles had been used extensively, as directed by the Air Force, as part of the efforts to identify design and manufacturing deficiencies; therefore, upgrading them to operational status is not cost-effective. In addition, 23 missiles have been used in flight testing.

**Appendix III
Missile Performance**

**Table III.1: Missile Status as of
November 1993**

Status	Number of missiles
Fielded	
Fully mission capable	353
Undergoing maintenance/testing	36
Subtotal	389
At General Dynamics^a	
Under repair	6
Awaiting retrofit	28
Awaiting shipment or enroute to base	9
Operationally unsuitable	6
Subtotal	49
Expended in flight testing	23
Total	461

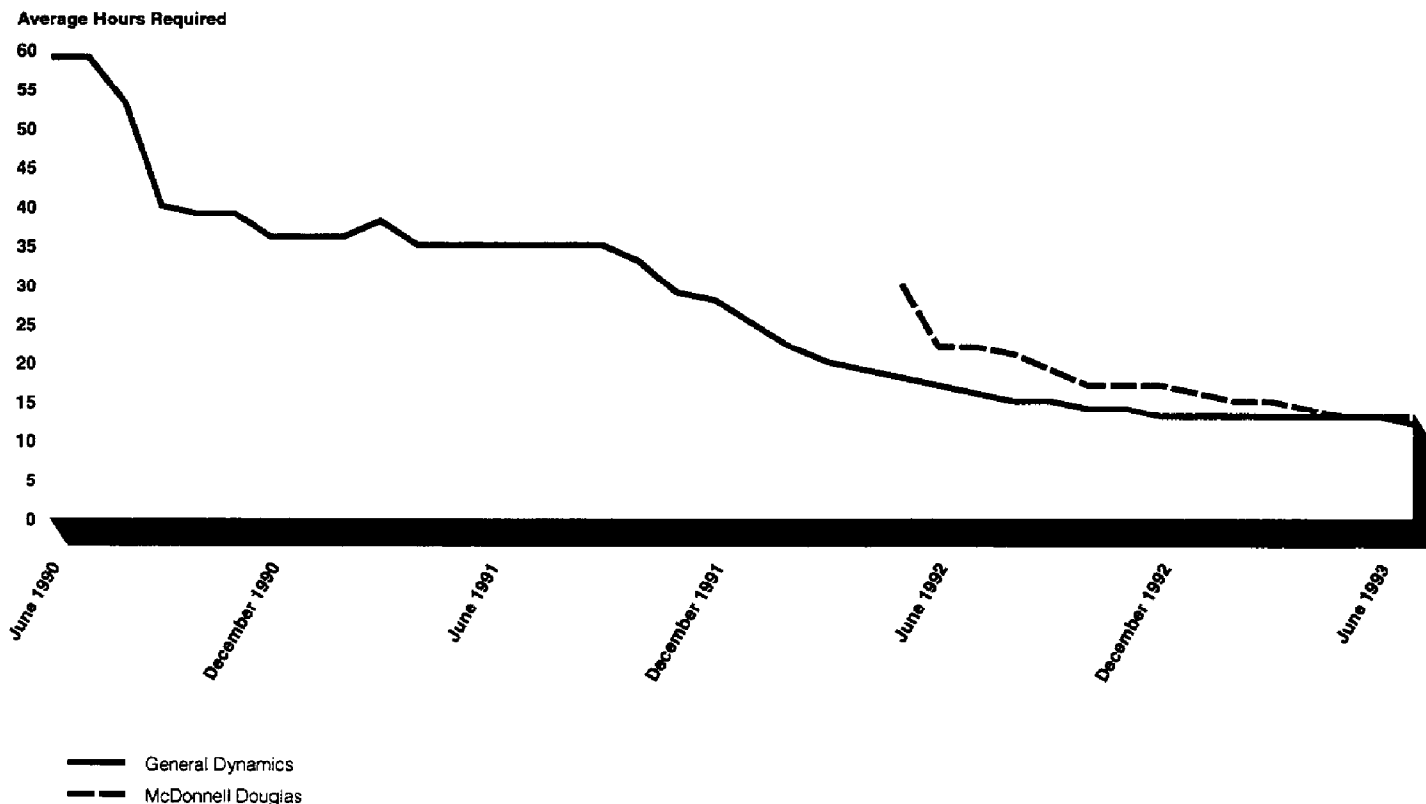
^aAs General Dynamics is the design agent for the ACM program, all missiles—including those built by McDonnell Douglas—that require maintenance at the contractor's facility are shipped back to General Dynamics.

**Factory and Field
Performance**

Our review of factory and field performance trends indicate continued improvement in manufacturing efficiency and in the quality of delivered missiles. For example, according to General Dynamics' figures, the number of hours required to assemble an ACM showed a 69-percent improvement from November 1991 to May 1993. Similar improvements are reflected in the decreases in the number of hours required by field personnel to make a delivered missile fully mission capable, as shown in figure III.1. When deliveries of missiles were suspended in April 1991, field personnel required an average of 35 hours to make the 47 missiles delivered between June 1990 and April 1991 fully mission capable. This excluded the time required to complete the initial inspection of the missile after receipt at the base. In July 1993, field personnel required an average of about 6 hours to make the 14 missiles delivered that month fully mission capable. Overall, the average number of hours had been reduced to about 12 hours.

Appendix III
Missile Performance

Figure III.1: Time Required to Make Delivered ACMs Fully Mission Capable Through July 1993



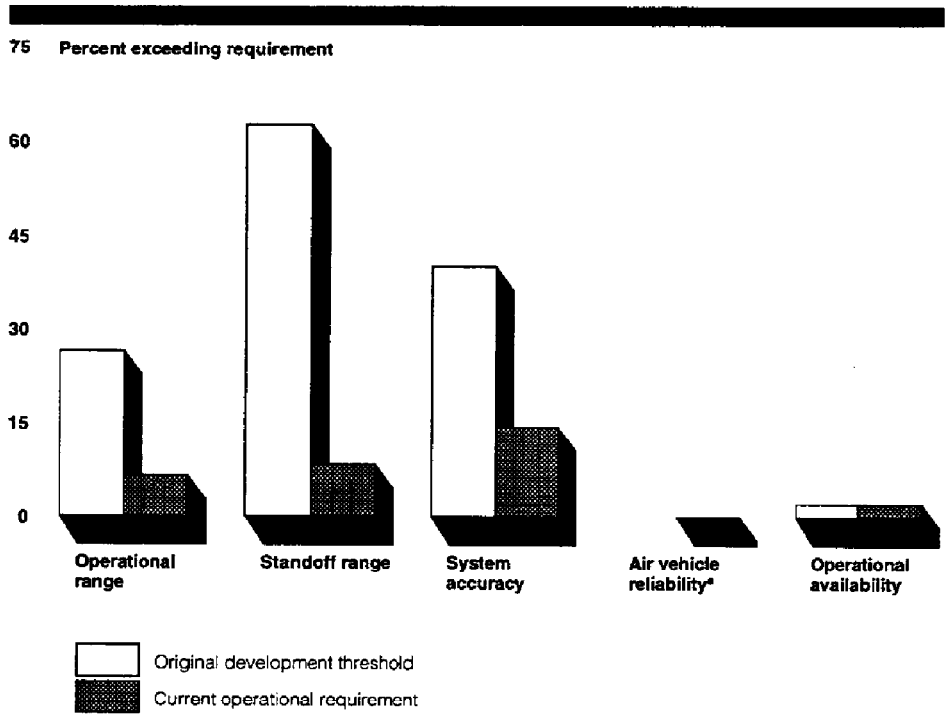
Note: Deliveries of General Dynamics missiles were halted between November 1989 to June 1990 and between April 1991 to October 1991 to resolve quality problems. McDonnell Douglas delivered its first missile in May 1992.

Operational Testing

Operational testing indicated that ACM generally meets or exceeds the criteria established under the original development threshold or the current operational requirement. Figure III.2 shows that the missile's operational and standoff range and overall system accuracy are significantly above the development threshold and exceeds current operational requirements.

Appendix III
Missile Performance

Figure III.2: Estimated Missile Performance for Selected Characteristics



*Air vehicle reliability requirement was not specified in development threshold.

Work Measurement Standards

Military Standard 1567A requires the application of a measurement standard to improve a contractor's productivity and efficiency. A key element of the standard is the requirement to develop type I standards, which are benchmarks to assess how efficiently a qualified worker is performing a specified task. The contractor is then to measure the worker's performance against these standards and identify areas in which improvements should be made.

The standard is applicable to new and follow-on contracts for full-scale development efforts that exceed \$100 million and for production efforts that exceed \$20 million annually or \$100 million cumulatively. If the standard is applied to prime contracts, then the standard must also be applied to subcontracts that exceed \$5 million annually or \$25 million cumulatively. Requests to waive or tailor standards may be submitted if implementing the standard is not cost-effective or is inappropriate for other reasons. Such requests must be supported with a cost-benefits analysis.

Air Force and contractor officials acknowledged that General Dynamics did not fully comply with the work measurement standard due to the program's numerous design and manufacturing problems. These problems precluded General Dynamics from developing and maintaining the required level of type I standards. Further, McDonnell Douglas was in the process of implementing the standard when in January 1992, the Program Executive Officer approved tailoring the standard for the fiscal year 1990 and 1991 production efforts with both General Dynamics and McDonnell Douglas. The tailored standard was incorporated into other production contracts as part of restructuring.

This tailored standard allowed the contractors to use their existing work measurement systems and eliminated the requirement to establish type I standards and conduct formal variance analysis and system audits. The program office estimates that by allowing the contractors to use their existing systems, the Air Force avoided incurring about \$1.4 million in costs that the contractors would have expended completing these tasks.

In August 1990, the Commander, Aeronautical Systems Command, approved waiving the standard for the ACM guidance set subcontractor, which, according to Air Force officials, refused to implement the standard. The Air Force and General Dynamics had not completed negotiations on the amount that General Dynamics would repay the Air Force before the fiscal year 1987 and 1988 efforts were terminated. Subsequently, as part of

Appendix IV
Work Measurement Standards

a restructuring package that resolved a number of outstanding issues, the Air Force estimated that it received about \$1 million in consideration for the waiver.

Progress Payments

Progress payments are a means by which the government provides financing to contractors as work progresses. In November 1985, Congress passed Public Law 99-145, which, in part, required the Secretary of Defense to ensure that payments for work-in-progress under defense contracts are commensurate with the work accomplished and that such work meets the standards of quality established under the contract.

The Defense Contract Management Command has cognizance for reviewing and approving progress payments for the ACM production contracts. The Command official responsible for approving such payments to General Dynamics told us that FAR provides specific criteria when it is appropriate to reduce or suspend progress payments. FAR criteria include unsatisfactory financial condition that places contract performance at risk, holding of excessive inventory, delinquent payments to subcontractors and vendors, and certain other conditions. According to FAR, non-compliance with material contract provisions are also grounds for withholding progress payments; however, if the contractor fails to comply with the contract without fault or negligence, progress payments are not to be reduced other than to correct overpayments. The official told us that General Dynamics was generally meeting contract specifications for quality and performance or was attempting to resolve areas of concern. Consequently, the Command official stated that even when missile deliveries were suspended between November 1989 to June 1990 and April to October 1991 due to design and quality problems, in his view, reductions in progress payments would not have been appropriate.

We noted in our review that FAR provides for two different types of progress payments: payments based on a percentage or stage of completion, which are confined to contracts for construction, shipbuilding, and ship conversion, alteration, or repair; and payments based on costs, which are the more common type of progress payments. Although FAR requires that progress payments based on a percentage or stage of completion be commensurate with work actually accomplished and meeting the contract's quality requirements, there is no comparably worded provision that governs progress payments based on costs. For construction contracts, a contracting officer is permitted to retain up to 10 percent of any progress payment if "satisfactory progress" is not being made.

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