COMPTROLLER GENERAL OF THE UNITED STATES
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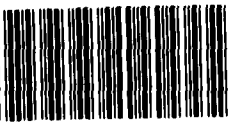

The Honorable Jamie Whitten
Chairman, Committee on Appropriations
House of Representatives HSE00300

Dear Mr. Chairman:

Subject: Review of Selected Computer System Procurements (FGMSD-80-34)

By letter of October 5, 1978, your Committee asked us to study how conversion costs affect the procurement of new computer systems. Of particular concern was whether including conversion costs in computer procurements would result in selecting the system that would cost the Government the least over the life of the system; that is, not only the lowest hardware procurement cost, but also conversion, operation, installation, training, and other costs.

Conversion costs can be a significant factor in computer replacement procurements. By staying within the incumbent vendor's product line, or acquiring compatible computer equipment, an agency can avoid many of these costs. Conversion costs may run into millions of dollars when noncompatible equipment is acquired.

In making our study, we reviewed six computer procurements in which a different make of computer was acquired. Our primary objectives were to ascertain whether conversion costs were considered when selecting the successful offerors and whether the selected proposal cost the least over the life of the system. The procurements we studied are shown in the table below.

Agency	Manufacturer of Existing equipment	Manufacturer of Replacement equipment
Energy	Control Data Corp.	Univac
Environmental Protection Agency (EPA)	IBM	Univac
Navy	RCA, IBM	Univac
Agriculture (USDA) 2 cases	IBM, Burroughs IBM	Honeywell Honeywell
Veterans Administration (VA)	IBM	Honeywell

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Conversion costs considered in the six competitive procurements varied significantly from case to case, and each installation we visited had underestimated the cost and time it would take to convert its application software to the replacement computer system. The table below shows the conversion factors that were considered.

Conversion Cost Factors Included in Bid Proposal Evaluation

Factor	Energy	EPA	Navy	USDA (note a)	VA
Site modification installation (note b)	yes	yes	yes	yes	yes
Software conversion	yes (note c)	yes (note c)	no	yes (notes b and c)	no
Dual equipment operations	no	yes (note c)	no	no	no
Training:					
Tuition	yes	yes	yes	yes	yes
Salary and other	no	no	no	no	no

a/The cost factors for both Agriculture procurements were identical.
b/Not all costs were considered.
c/Costs were underestimated.

We increased the costs used in selecting the winning vendor by including conversion costs we believe should have been considered and adjusting for significant underestimates. We found that:

--In two cases the procurement decision would have been different, and the incumbent vendor would have been selected.

--In one case the same nonincumbent vendor would have been selected because he offered a lower price despite inclusion of conversion costs in the selection of the lowest cost alternative.

--In three cases the same nonincumbent vendor would have been selected because the incumbent vendor either declined to submit a proposal, was no longer manufacturing computer equipment, or was disqualified from the competition.

Details of these differences are not shown because a vendor's proprietary rights in the data prevent us from disclosing the amounts of unsuccessful proposals. It is not apparent to us, however, that including conversion costs would have ruled out competitive procurements.

Enclosure I summarizes which elements of conversion costs were considered in evaluating the proposals. The table also shows the best available information on what costs will actually be incurred in these categories.

Currently, no official written procurement policy or regulation deals adequately with the treatment of conversion costs in evaluating vendor proposals during the computer system acquisition process. Federal Property Management Regulation 101-35.2 (formerly Federal Management Circular 74-5) establishes policies for the management, acquisition, and utilization of ADP equipment and recognizes conversion as a cost factor, but in our view, provides only general guidance which is both unclear and subject to misinterpretation.

In July 1979, GSA developed a draft guideline for its internal use on how to handle agency procurement requests which involve augmenting or replacing an agency's installed ADP equipment. According to the guideline, most conversion costs should be included when evaluating vendor proposals to determine the lowest overall cost. The guideline also promotes the use of good programming practices, such as using standard programming languages to minimize potential conversion problems. In January 1980, GSA incorporated this guidance into draft revisions of Federal Property Management Regulations and Federal Procurement Regulations but has yet to issue it. (The part of GSA's draft regulation covering treatment of conversion costs is contained in encl. II.)

Because the draft revisions to these regulations are so recent, we will not offer an overall opinion on them here. However, they do adopt a life cycle cost approach which we consider appropriate, and the treatment to be accorded conversion costs is sound. The definition and computation of life cycle costs becomes an integral part of such procurement decisions and we are not reporting here on the adequacy of existing guidance for determining such costs. We plan to further consider such guidance in a future report.

The revisions not only spell out what costs should be considered--basically the software conversion, site modification, dual equipment, operations, and training costs mentioned earlier--but they specifically prohibit consideration of costs that are a normal operating function. In its evaluation of proposals, an agency cannot consider costs to

--convert existing software and data bases which are to be redesigned,

--purge duplicate or obsolete software and data bases,

--develop documentation for existing application software, and

--improve management and operating procedures.

This prohibition precludes agencies from "loading up" estimated conversion costs so that the incumbent is favored to the detriment of competition. We believe this is an appropriate restriction.

We fully endorse the principle of competition. However, the purpose of competition is not to insure that all vendors face exactly the same odds in competing for Government contracts. Rather, the purpose is to insure that the Government obtains its minimum requirements at the lowest cost. As shown by our review of the six cases, consideration of conversion costs does not necessarily preclude effective competition. Because of this, we believe that the provisions concerning the treatment of conversion costs contained in GSA's draft regulation should be issued, and that the principle of the lowest overall cost--price and other factors considered--should be the basis for selecting the winning vendor.

As we see it, there are two other major problems in considering conversion:

--Estimating costs with reasonable accuracy.

--Managing the conversion process.

GSA has announced the establishment of the Federal Conversion Support Center and among its objectives will be to develop techniques to better estimate conversion costs. Managing the conversion process is difficult because (1) most data processing professionals are not accustomed to conversion work, (2) it is viewed essentially as a nonproductive task, and (3) the process involves a large number of interrelated tasks.

Federal agency management can take a number of actions now to ease conversion when it does occur. Among the more important of these actions are:

--Advance planning, including setting up a mechanism for project management and control.

--Developing, adopting, and enforcing standard documentation and programming techniques.

--Identifying application programs that have had a history of problems and may be candidates for redesign rather than conversion.

--Setting up and maintaining comprehensive source program and test data libraries.

--Developing and maintaining an accurate inventory which describes the characteristics of existing application software.

--Informing the staffs and management of the ADP and user organizations of the potential benefits of the new computer system, to minimize resistance to change.

By taking these actions and recognizing that conversion is a management concern, an agency can minimize future conversion problems. The agency will also be able to determine the complexity of the conversion and provide a basis for estimating conversion costs. We have prepared a provisional checklist to help manage software conversion projects. The checklist was developed as a supplement to our report "Millions In Savings Possible In Converting Programs From One Computer To Another" (FGMSD-77-34, Sept. 15, 1977) and is available upon request.

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The question of whether conversion costs should be considered, and if so, which costs and to what extent, is central to the issue of evaluating alternatives in acquiring computer systems. A primary concern has been whether considering conversion costs would preclude effective competition. In our view, the Government should obtain its minimum requirements at the lowest possible cost, and our review has shown that considering conversion costs will not necessarily eliminate competition and in fact, may result in a lower total cost.

We are preparing a more detailed version of this report for later issuance including distribution to agencies that can take action on our findings. As requested, we did not obtain comments on our report from the responsible agencies.

We will be in touch with your office regarding distribution of this report.

Sincerely yours,

Comptroller General
of the United States

Conversion Costs Considered In Selected Procurements

As Compared with Actual Amounts To Be Expended (note a)

Conversion cost element	Dept. of Energy	EPA	Navy (note b)	Dept. of Agriculture (Kansas City)	Dept. of Agriculture (New Orleans)	Veterans Administration
Site modification/ installation						
Considered	$ 651,000	$ 5,800	$ 46,099	$ 10,591	$ 11,640	$ 1,806,592
Actual/estimated	$ 672,590	$ 490,261	$ 1,474,956	$ 45,791	$ 222,466	$ 3,783,963
Application software						
Considered	366,424	446,177	none	582,000	731,000	none
Actual/estimated	3,412,300	1,529,647	9,810,581	3,408,753	1,364,031	4,582,243
Dual equipment operations						
Considered	none	130,083	none	none	none	none
Actual/estimated	3,655,390	605,978	3,576,132	3,054,976	5,167,332	3,892,997
Training						
Considered	(c)	(c)	(c)	494,429	328,750	407,776
Actual/estimated	151,535	234,890	972,296	1,833,155	700,236	1,512,806
Total						
Considered	$1,017,424	$ 582,060	$ 46,099	$1,087,020	$1,071,390	$ 2,214,368
Actual/estimated	$7,891,815	$2,860,776	$15,833,965	$8,342,675	$7,454,065	$13,772,009

a/In cases where the conversion was not complete at the time of our review, the amount shown reflects the best estimate to complete the conversion.

b/The conversion costs shown include only three of the Navy's six computer centers being converted plus the cost to convert and implement Navy-standard application software at all six centers. The Navy could have avoided substantial conversion costs at only one of its centers.

c/Training tuition costs were considered; however, the winning vendor did not charge separately for training.

ENCLOSURE I

ENCLOSURE II

GENERAL SERVICES ADMINISTRATION

DRAFT REGULATION ON THE TREATMENT OF

CONVERSION COSTS IN THE EVALUATION

OF VENDOR PROPOSALS

"*** 1-4.1109-12 Evaluation of conversion costs.
(a) Conversion costs which can be stated in dollars for software, including data base management systems and data base conversion, system test, parallel operations and other expenses directly related to the conversion from installed ADPE 1/ and software to augmentation or replacement ADPE and software shall be included in the evaluation for determining the lowest overall cost, price and other factors considered. The following are examples of other factors that should be considered:

(1) Economic benefits clearly attributable to increased agency productivity.

(2) Direct savings that would accrue to the Government from the release of rented ADPE, discontinuance of commercial ADP services, or reduction in telecommunications costs.

(3) Indirect savings derived from reductions in other than ADPE or ADP service costs such as space and/or non-ADP personnel support expenses.

(4) Benefits from being able to implement new applications which otherwise would have to be deferred, either indefinitely or to a significantly distant point-in-time.

(5) Economic advantages resulting from providing the capability to accommodate projected increases in workload without contracting for further augmentation or replacement of the ADPE or acquisition of commercial ADP services.

(6) Potential savings due to the availability of software already developed and available from the Federal inventory or commercial market place which could be used to meet additional agency requirements.

(7) Proven reliability of the equipment and operating system software in similar operating environments.

(8) The continued availability of operating system software support and maintenance services beyond the initial

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1/automatic data processing equipment

system/item life that would enhance the probability of reutilization of the ADPE within the Government.

(9) The potential for supporting other agencies through the ADP sharing program.

(b) The statement of requirements for an augmentation or replacement acquisition that is limited to ADPE or software compatible with the installed system shall be:

(i) Supported by a conversion cost study, and

(ii) Justified on the basis of either (A) agency mission essential data processing requirements, or (B) economy and efficiency. ***"

*** 1-4.1109-14 Determination of Conversion Costs

(a) Costs directly related to the conversion from the installed ADPE, software, data bases, and telecommunications software to the replacement system and project management costs shall include but are not limited to:

(1) Conversion of the following software by reprogramming, recoding, or translation:

(i) Existing software written in Federal Standard or other ANSI 1/ Standard higher level language; and

(ii) Application software written in assembly or other nonstandard languages that will continue to meet essential agency mission needs without redesign, provided that continued use of the nonstandard software can be justified on the basis of economy and efficiency; and

(iii) Mission essential application software to be developed for operational use before the augmentation or replacement ADPE and operating system software is installed provided the software is written in Federal Standard or other ANSI Standard languages;

(2) Conversion of data bases, data base design changes, and data base management systems to the extent necessary to permit the continued use of existing application software.

1/American National Standards Institute

(3) Firmware required solely to permit the continued use of application software;

(4) Site preparation and modifications to installed environmental controls;

(5) Parallel system operation to support mission essential data processing requirements, including off-site data processing support,

(6) Travel and training expenses, including pay and fringe benefits of Government employees during attendance at formal classroom training courses; and

(7) General expenses directly related to the conversion effort, e.g., conversion planning, preparation, and management and supplies and any additional general purpose software required to support the conversion.

(b) Changes in agency data processing requirements, operating system software and equipment technology limit the useful and economic life of application software. Normally, the life expectancy of application software is about five to ten years before redesign and reprogramming is necessary. The costs of technology updating which are deferred must eventually be reckoned with, regardless of whether application software is converted from one ADP system architecture to another. The costs incurred for the redesign of application software in technology updating are not bona fide conversion costs and they shall not be evaluated for the purpose of determining the lowest total overall cost offer/bid. These technology updating costs include:

(1) The conversion of existing software and data bases which are to be redesigned.

(2) Purging duplicate or obsolete software and data bases;

(3) Development of documentation for existing application software; and

(4) Improvements in management and operating procedures.

(c) Standard cost factors, such as those contained in the OMB Cost Comparison Handbook (Supplement No. 1 to OMB Circular A-76) shall be used to the maximum practicable extent in preparing conversion cost studies and estimates. These cost factors may be supplemented by industry standards or agency developed cost factors, as necessary. ***"