AD-A166 495 COST-BENEFIT ANALYSIS OF PUBLISHING DLAM 41402 ON MICROFICHE(U) DEFENSE LOGISTICS AGENCY ALEXANDRIA VA OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE 1/1

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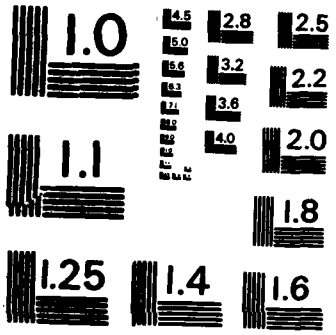

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Cost-Benefit Analysis of Publishing DLAM 4140.2 On Microfiche

October 1985

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FOREWORD

This cost-benefit analysis was conducted to determine the cost effectiveness of a suggestion submitted to the Defense Logistics Agency (DLA) on the subject of converting DLAM 4140.2, Supply Operations Manual, from paper to microfiche and distributing it thereafter in microfiche form. A questionnaire was sent out to the actual users of the manual to aid in the evaluation of the suggestion. Three alternatives of status quo and microfiche combinations for meeting the requirements of the suggestion were identified and treated in this analysis. Extensive effort was made to obtain cost estimates reflecting current costs. Present value analysis was used to evaluate the comparative cost of investment alternatives. The summary analysis shows that conversion to microfiche from magnetic tape is the least costly alternative. However, since the Distributed Minicomputer System (DMINS) project currently underway is expected to provide direct access to most major publications, the conversion of DLAM 4140.2 to microfiche as an interim process is not recommended.

ROGER G. ROY
Assistant Director
Policy and Plans

RE: Distribution Statement
Approved for Public Release. Distribution Unlimited.
Per Ms. Cleo Ridgeway, Defense Logistics Agency/LO

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I. Introduction.

A. Background: Two formal suggestions with the same objective were submitted via the Defense Logistics Agency (DLA) Suggestion Program from two DLA employees at separate Primary Level Field Activities (PLFAs) within a period of one year. The subject of both suggestions was the conversion of the Supply Manual DLAM 4240.2 from paper to microfiche, and distributing it thereafter in microfiche form. The first suggestion was disapproved in November 1983. However, as a result of a similar second suggestion received several months later, the first case was reopened. The Directorate of Supply Operations (DLA-O) submitted the suggestion to the Operations Research and Economic Analysis Office (DLA-LO) and requested that a cost-benefit study be conducted to support a decision on appropriate action.

DLAM 4240.2 is published in 3 volumes:

Volume I - Policy Manual

Volume II - Supply Operations and Procedures

Volume III - MOWASP Manual

A complete set of DLAM 4140.2 can easily fill a large bookcase. It occupies approximately 19 3-inch ring binders. It is used throughout DLA PLFAs to provide guidance to agency personnel in accomplishing day to day functions. The voluminous storage in administrative work spaces required for multiple copies of the manual suggests that a conversion to microfiche, or loading the manual into an on-line system, could be beneficial. The workload of personnel who post the quarterly changes to the manual may also be reduced by such conversion.

B. Objective: The study has two objectives:

1. Provide a cost-benefit analysis of converting DLAM 4140.2 to a microfiche publication and distributing it in that form.

2. Provide a basis for making the decision on whether or not to convert the manual from paper publication.

II. Methodology.

A. General Approach: The approach to this study began with a review of the current procedures used in managing the publication, its distribution, and issuance of changes.

To aid in the evaluation of the suggestion, we prepared a questionnaire and distributed it to various users of the manual. The survey responses were accumulated, tallied, and analyzed along with cost data for conversion.

Cost data consisting of distribution, storage, labor, and equipment costs were identified for those alternatives of status quo and microfiche combinations that could provide the best feasible solutions to the suggestion. The estimated life cycle costs for the alternatives were collected and organized into one-time and recurring costs. A present value analysis, following the basic guidelines of DLAM 7041.1, Economic Analysis, was performed to determine the least costly alternative.

B. Questionnaire Formulation and Distribution: The questionnaire was designed to obtain as much objective information as possible without excessively burdening the respondents. Three separate questionnaires were developed, one for each using activity's Publications Support Officer, one for the Administrative Assistant in the offices using the manual, and one for the actual Users and Maintainers of the manual. Appendix A contains the questionnaire package sent out.

A mailing list for the survey was developed using records obtained from DLA Headquarters Publications Distribution Branch. Those organizations currently receiving the most copies of the quarterly changes to the manual received a questionnaire packet. A breakdown of manual copies distributed by volume and part is provided in Table 1.

Table 1

Distribution Summary

Item	Date of Last Complete Revision	No. of pages	No. of Distributed copies
VOL I	April 65	716	573
VOL II			
part 1	June 82	1215	552
part 2	June 82	2176	467
part 3	June 82	5567	799
VOL III	March 84	5077	485

C. Alternatives: Three feasible alternatives were examined:

1. Alternative 1 - STATUS QUO - Distribution of changes to the manual in paper form as currently done.

2. Alternative 2 - MICROFICHE FROM PAPER - Development of a camera-ready master of the entire document in paper form, conversion to microfiche master, the replication and distribution of microfiche copies of the document.

3. Alternative 3 - MICROFICHE FROM TAPE - Downloading the revised document master including file controls to magnetic tape, conversion to microfiche master, the replication and distribution of microfiche copies of the document.

D. General Assumptions and Factors: The following general assumptions and factors were made qualifying the validity of data that was available:

1. All alternatives require DSAC to continue maintaining an on-line document.

2. Printing cost estimates obtained from DLA-XPP were based on the estimated costs of changes issued in FY 85.

3. Those costs inherent and equal in all 3 alternatives were not included.

4. DSAC estimates of labor required to convert/reformat/edit were used in alternatives 2 and 3.

5. The amount of office space used up by bookcases holding the document was considered equal to the space required by the number of microfiche reader stations required.

6. All personnel cost estimates are based on representative grades at step 4 for each specialty and include leave adjustment of 18 percent and fringe benefits of 36.2 percent.

7. The discount rate in evaluating DLA investment is 10 percent.

8. All cost estimates used are in FY 85 constant dollars.

E. Cost Data Collection: Sources of applicable costs data were difficult to identify. Personnel costs were represented by costs for the average labor class. Standard GSA stock prices for the additional equipment required (microfiche readers and reader/printers) were obtained from the manufacturer. DLA Publications (DLA-XP) provided cost estimates for printing and distribution and also the costs associated with producing microfiche via either alternative 2 or alternative 3 method. Static costs data collected are summarized in Table 2.

Table 2

Summary of Static Cost Data

GSA price of Microfiche Reader	$ 240
GSA price of Microfiche Reader/Printer	1,412
10 Boxes of paper to print the manual	390
Continuous duty printer	8,000

III. Analysis and Findings of Questionnaire.

Responses from both using activities' administrative assistants and actual users and maintainers of the manual were overwhelmingly negative toward the idea of converting the manual to microfiche. A brief summary of the responses is shown in Table 3 below.

Table 3

Questionnaire Response Summary

	Admin Assistant	User/Maintainer
IN FAVOR	0%	11%
OPPOSED	82%	74%
UNDECIDED	18%	15%

Publications Support Officers reported no significant change in their workload or procedures for distribution if the manual was to be converted.

There were three main reasons indicated against converting to microfiche. They are:

1. Referring to microfiche would be more difficult and would take more time per referral.

2. Referring to the manual generally required the simultaneous examination of more than one section because of the manual's structure, a task not possible in microfiche.

3. The manual is policy-oriented and requires lengthy reading which, if on microfiche, would be hard on the eyes and would tie up the readers.

The responses also showed that more frequently and extensively any particular respondent used the manual, the more negative were his/her responses toward conversion. Those rarely using it provided mostly neutral/positive responses.

Tabulating the specific responses to the questions on additional equipment revealed that their intent was not clearly understood by all the respondents. Nevertheless, a rough estimate of the requirements is provided below:

85 additional microfiche readers

65 additional reader/printers

These requirements are tabulated by respondent in Appendix B.

IV. Analysis and Findings of Alternatives.

Appendix C presents tables summarizing the costs used in comparing all three alternatives based upon net present value methods. Table 4 below summarizes the results.

Table 4

Cost and Present Value Summary

Alt.	Title	One-Time Costs	Annual Recurring Costs	10 Year Present Value
1	Status Quo	$ 0	$60,520	$390,180
2	Microfiche from Paper	130,610	27,860	304,240
3	Microfiche from Tape	119,250	19,090	236,820

The 10-year present value of alternative 3 is $153,360 less than the status quo of alternative 1. Exercising alternative 3 the minimum payback would be 3.5 years. This information is presented in Figures 1 and 2.

V. Conclusions.

The cost analysis of sections III and IV shows alternative 3 to be the least expensive method of publishing DLAM 4140.2 in the long run. Implementation of this conversion to microfiche would involve an up front investment that would be recovered in 3.5 years.

The Distributed Minicomputer System (DMINS) project is currently underway with the goal of providing on-line availability of major DLA manuals with remote terminal access. A DMINS contract was awarded 31 July 85, with the first system expected to be installed at DSAC in late 1985. Current projections of having at least one minicomputer system operational at each DLA activity by mid 1987 are considered highly optimistic. The objectives of DMINS are similar but more extensive than what might be achieved by converting DLAM 4140.2, or any other major DLA manual to microfiche. In our view, a conversion to microfiche should now be considered an interim process on the way to the eventuality of having most major publications in on-line storage. The DMINS implementation schedule should, therefore, be considered in any required payback period of an interim conversion to microfiche.

Figure 1

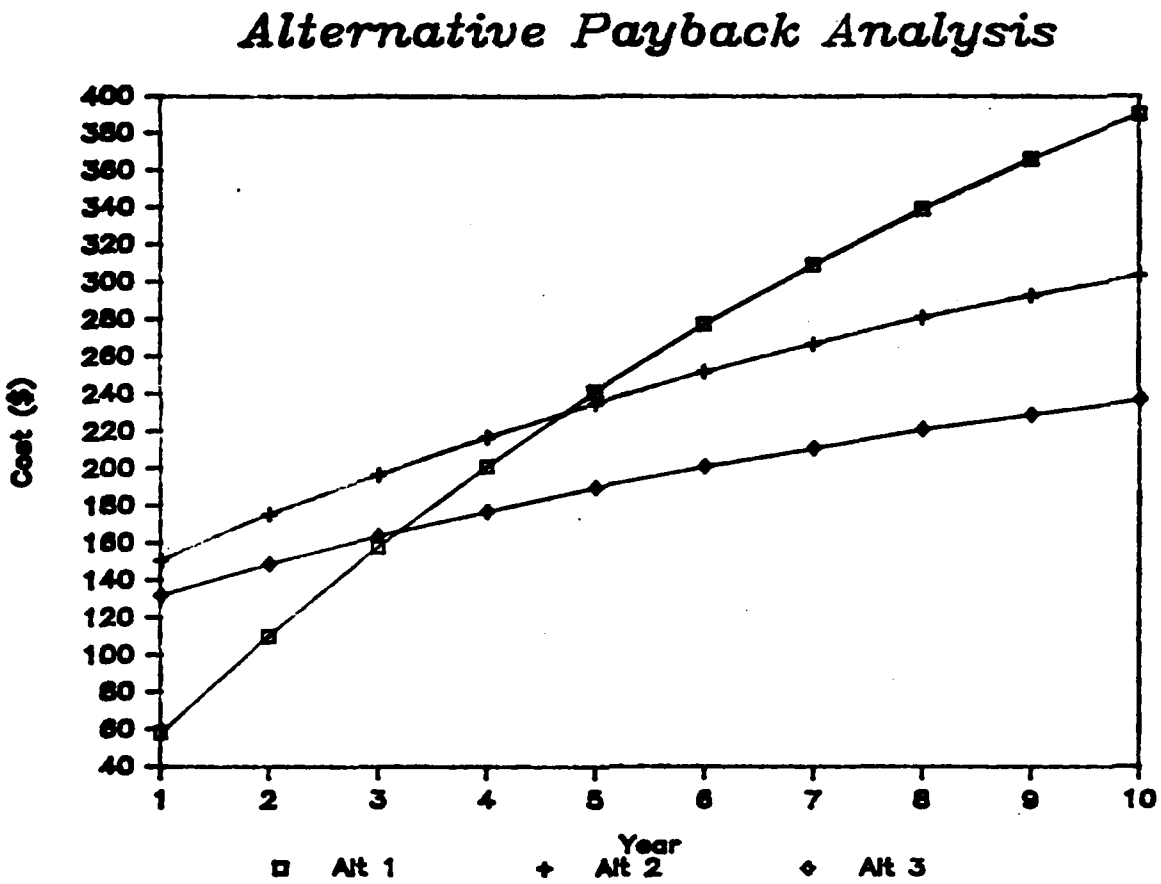
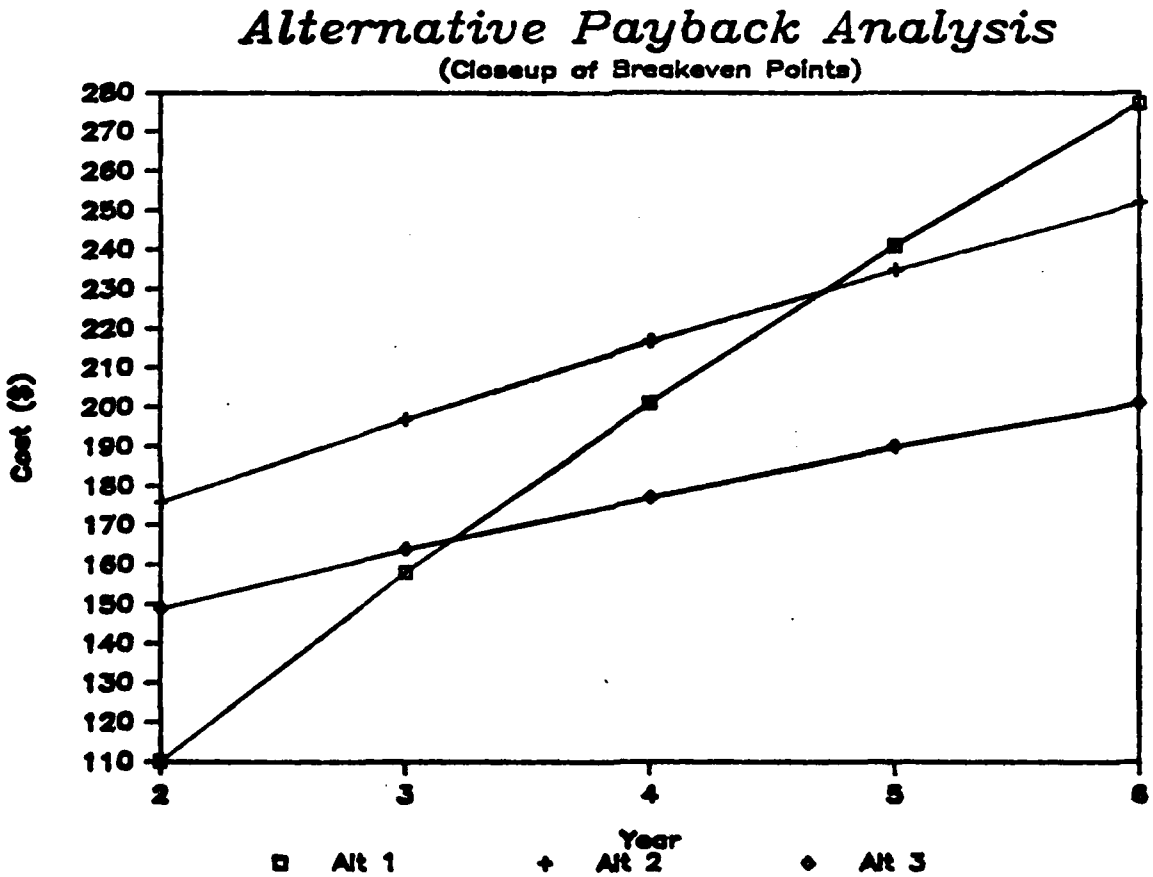


Figure 2



VI. Recommendation. It is recommended at this time that DLAM 4140.2 not be converted to microfiche pending a determination of the capability and timeliness of the proposed DLA Minicomputer System (DMINS) to provide direct access to the publication.

Appendix A

Questionnaire Package

INFORMATION SHEET

Suggestions have been received at DLA HQ concerning the possible benefits to be gained by publishing DLAM 4140.2 on microfiche instead of paper. Obvious savings would be achieved in storage space reductions and the elimination of man-hours spent entering quarterly changes. The changes would be incorporated into complete microfiche copies distributed as often as required to maintain currency. There may also be drawbacks to the proposal, however, such as difficulty in use, availability of microfiche readers and printers, and individual productivity.

DLA-LO is performing a cost/benefit analysis of converting DLAM 4140.2 to microfiche to aid DLA-O in the evaluation of the formal suggestions submitted, and in any subsequent actions on the proposal. A questionnaire package is being sent to all activities that use one or more volumes of DLAM 4140.2. Data generated from replies will be compiled and used in the analysis.

There are three separate questionnaire response forms - one for each of the following:

1) The using activity's Publications Support Officer (PSO)

2) The administrative assistant in the using directorates

3) User/Maintainers of DLAM 4140.2

Whichever response form you personally fill out, please be as clear and thorough as possible. If you feel that you have any information that would aid the analysis, please feel free to add comment sheets - or call DLA-LO.
Any questions concerning the questionnaire may be directed to Mr. Lou Zamarra in DLA-LO (autovon 284-6183, comm. (202) 274-6183).

Encl (1)

RESPONSE SHEET - USING DIRECTORATE ADMINISTRATIVE ASSISTANT

DIRECTORATE _____ VOLUMES OF DLAM 4140.2 USED _____

How many copies of the manual do you have in your directorate? _____

Is this enough? _____ If no, how many more would you like? _____

What is the average time spent entering a change into 1 copy of the manual? _____ minutes

How many 3" ring binders does each copy occupy? _____

Does storage of the manual near to its users present any significant problems?

_____

_____

A microfiche version of the manual would probably be distributed in its entirety each quarter with all changes included. If the manual was distributed in microfiche form, how many of the following would you need:

copies of the microfiche -- _____

additional microfiche readers -- _____

microfiche reader/printers -- _____

Would the savings in quarterly workload and storage space be an acceptable offset to any inconveniences or procedural changes required in the offices using the manual in microfiche form?

_____

_____

_____

Do you have local supplements to the manual that are kept in the same binders? _____ If yes, would there be any problems consolidating the supplements into a single binder, with the basic manual on microfiche?

_____

_____

Please attach additional sheets for comments if desired. Thank you.

Encl (2)

RESPONSE SHEET - PUBLICATIONS SUPPORT OFFICER

OFFICE SYMBOL _____

How many copies of changes to each part of DLAM 4140.2 do you receive?

Volume I ____	Volume III Part 1 ____	Volume III Part 5 ____
Volume II Part 1 ____	Volume III Part 2 ____	Volume III Part 6 ____
Volume II Part 2 ____	Volume III Part 3 ____	Volume III Part 7 ____
Volume II Part 3 ____	Volume III Part 4 ____	Volume III Part 8 ____

Do all of the copies get distributed? ____ If not, what percent are not, ____, and what happens to those retained? _____

_____

_____

How do you physically distribute the changes? _____

_____

_____

Would your overall workload increase or decrease if the changes came in on microfiche? YES / NO. If yes, estimate the man-hour reduction or increase: ____ man-hour quarterly, increase / decrease (circle one)

Please list the directorates that you routed the questionnaire to:

_____ _____

_____ _____

Comments: _____

_____

Please attach additional sheets for comments if desired. Thank you.

RESPONSE SHEET - USER / MAINTAINER

OFFICE SYMBOL _____ VOLUME OF DLAM 4140.2 USED _____

How often do you refer to the manual per week? _____ times

How many minutes does each referral take? _____ minutes

When you use the manual, what percent of the time do you refer to more than one section at a time? _____ percent

How far from your desk do you have to go to the closest copy of the manual you can use? _____ feet

How many people use the same copy of the manual as you? _____ people

How long does it take you to enter a quarterly change? _____ minutes

Do you make photocopies of individual pages of frequently used sections for your personal use? always / sometimes / never

If DLAM 4140.2 were to be published on microfiche .....

Would refering to it be more / less difficult?

Would refering to it be more / less time? (circle responses)

Would you need to make photocopies of individual pages for use at your desk? always / sometimes / never

Please list advantages: _____

_____

_____

Disadvantages: _____

_____

_____

Would the time savings from eliminating quarterly changes and storage space savings offset any possible inconveniences to you as a user?

_____

_____

Please attach additional sheets for comments if desired. Thank you.

Appendix B

Summary of Questionnaire Responses

TABLE B-1

SUMMARY OF QUESTIONNAIRE RESPONSES
FROM ADMINISTRATIVE ASSISTANT QUESTIONNAIRES

Respondent	Copies of Manual in Directorate	Copies of Microfiche Required	Reader Requirements	Reader/printer Requirements
A	2	2	0	0
B	1	2	1	1
C	3	2	1	1
D	152	35	25	10
E	1	1	0	0
F	1	1	0	1
G	3	2	1	1
H	1	1	0	1
I	1	1	0	0
J	2	3	2	1
K	20	15	9	6
L	2	2	1	1
M	4	3	1	2
N	20	15	9	6
O	15	12	4	8
P	2	2	0	1
Q	31	25	15	10
R	40	30	15	15
S	2	2	0	0
T	1	1	1	0
	304	157	85	65

Appendix C

Present Value Tables

TABLE C-1

PROJECT COST SUMMARY

ALTERNATIVE 1 - STATUS QUO

ECONOMIC LIFE = 10 YEARS

Project Year(s)	Cost Element	Amount ($) One-Time	Amount ($) Recurring
1-10	Update document		435
1-10	Publication of changes		42,619
1-10	Posting changes		17,468
	TOTAL	- - -	60,522

TABLE C-2

PRESENT VALUE COSTS

ALTERNATIVE 1 - STATUS QUO

PROJECT YEAR(S)	ONE-TIME COSTS($)	NET RECURRING COSTS($)	TOTAL COSTS ($)	DISCOUNT FACTOR	DISCOUNTED COSTS($)	CUMULATIVE DISCOUNTED COSTS($)
1		60,522	60,522	0.954	57,738	57,738
2		"	"	0.867	52,473	110,211
3		"	"	0.788	47,691	157,902
4		"	"	0.717	43,394	201,296
5		"	"	0.652	39,460	240,756
6		"	"	0.592	35,829	276,585
7		"	"	0.538	32,561	309,146
8		"	"	0.489	29,595	338,741
9		"	"	0.445	26,932	365,673
10		"	"	0.405	24,511	390,184

TABLE C-3

PROJECT COST SUMMARY

ALTERNATIVE 2 - MICROFICHE FROM PAPER MASTER

ECONOMIC LIFE = 10 YEARS

Project Year(s)	Cost Element	Amount ($) One-Time	Recurring
1	Equipment (microfiche readers/ printers)	112,000	
1	DSAC additional printer	8,000	
1	Edit camera copy	10,609	
1-10	Operation reformatting		5,897
1-10	Publication of document		8,614
1-10	Paper supplies		1,560
1-10	Monitor printing		11,793
	TOTAL	130,609	27,864

TABLE C-4

PRESENT VALUE COSTS

ALTERNATIVE 2 - MICROFICHE FROM PAPER MASTER

PROJECT YEAR(S)	ONE-TIME COSTS(S)	NET RECURRING COSTS(S)	TOTAL COSTS ($)	DISCOUNT FACTOR	DISCOUNTED COSTS($)	CUMULATIVE DISCOUNTED COSTS($)
1	130,609	27,864	158,473	0.954	151,183	151,183
2		27,864	27,864	0.867	24,158	175,341
3		27,864	27,864	0.788	21,957	197,298
4		27,864	27,864	0.717	19,978	217,276
5		27,864	27,864	0.652	18,167	235,443
6		27,864	27,864	0.592	16,495	251,938
7		27,864	27,864	0.538	14,991	266,929
8		27,864	27,864	0.489	13,625	280,554
9		27,864	27,864	0.445	12,399	292,953
10		27,864	27,864	0.405	11,285	304,238

TABLE C-5

PROJECT COST SUMMARY

ALTERNATIVE 3 - MICROFICHE FROM MAGNETIC TAPE

ECONOMIC LIFE = 10 YEARS

Project Year(s)	Cost Element	Amount ($) One-Time	Amount ($) Recurring
1	Equipment (microfiche readers/ printers)	112,000	
1	Set up document controls	7,254	
1-10	File maintenance		10,920
1-10	Publication of document		8,166
	TOTAL	119,254	19,086

TABLE C-6

PRESENT VALUE COSTS

ALTERNATIVE 3 - MICROFICHE FROM MAGNETIC TAPE

PROJECT YEAR(S)	ONE-TIME COSTS($)	NET RECURRING COSTS($)	TOTAL COSTS ($)	DISCOUNT FACTOR	DISCOUNTED COSTS($)	CUMULATIVE DISCOUNTED COSTS($)
1	119,254	19,086	138,340	0.954	131,976	131,976
2		19,086	19,086	0.867	16,548	148,524
3		19,086	19,086	0.788	15,040	163,564
4		19,086	19,086	0.717	13,685	177,249
5		19,086	19,086	0.652	12,444	189,693
6		19,086	19,086	0.592	11,299	200,992
7		19,086	19,086	0.538	10,268	211,260
8		19,086	19,086	0.489	9,333	220,593
9		19,086	19,086	0.445	8,493	229,086
10		19,086	19,086	0.405	7,730	236,816

END