AN INTERACTIVE COMPUTER FORECASTING MODEL TO DETERMINE
THE EFFECTS OF POL (U) NAVAL POSTGRADUATE SCHOOL
MONTEREY CA P G VALKO DEC 86
UNCLASSIFIED F/G55/9 NL
AN INTERACTIVE COMPUTER FORECASTING MODEL TO DETERMINE THE EFFECTS OF POLICY CHANGES ON THE VALUATION OF THE MILITARY RETIREMENT SYSTEM

by

Peter G. Valko

December 1986

Thesis Advisor K. J. Euske

Approved for public release; distribution is unlimited.
In the past thirty years, as military retirement costs have climbed from 1% of the defense budget to their current 8% level, the military retirement system (and, in particular, the non-disability retirement component) has come under increasing criticism and scrutiny by the Congress, the public, and the news media. Recommendations from previous studies of the military retirement system have proposed various modifications to the system to alleviate alleged inequities and inefficiencies, and to reduce costs. A BASIC-language computer model (ENTRYAGE) was developed in 1983 as part of a thesis to perform a sensitivity analysis on entry-age normal retirement cost methods to evaluate some of these recommendations. At the request of the Office of the Assistant Secretary of Defense, an effort was initiated to revise the program to produce results that replicate those of the Military
Retirement System Projection and Actuarial Valuation Program (GORGO) developed by the DoD Actuary. This study has determined that the level of sophistication of the GORGO program far exceeds that of the ENTRYAGE model, and the major re-programming effort required was beyond the scope of this study. However, the ENTRYAGE model was not user-friendly, required single-line data input, and would "crash" when the operator made an erroneous data entry. Therefore, the ENTRYAGE model was extensively revised to incorporate menus, prevent program crashes, present results in page format, and, in general, make it more user-friendly as an analytical tool.
An Interactive Computer Forecasting Model
to Determine the Effects of Policy Changes on
the Valuation of the Military Retirement System

by

Peter G. Valko
Lieutenant Commander, United States Navy
B.S., Aero-Space Institute, 1971

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1986

Author: Peter G. Valko

Approved by: K. J. Euske, Thesis Advisor
B. A. Frew, Second Reader
W. R. Greer, Jr., Chairman,
Department of Administrative Science

Kneale T. Marshall
Dean of Information and Policy Sciences
ABSTRACT

In the past thirty years, as military retirement costs have climbed from 1% of the defense budget to their current 8% level, the military retirement system (and, in particular, the non-disability retirement component) has come under increasing criticism and scrutiny by the Congress, the public, and the news media. Recommendations from previous studies of the military retirement system have proposed various modifications to the system to alleviate alleged inequities and inefficiencies, and to reduce costs. A BASIC-language computer model (ENTRYAGE) was developed in 1983 as part of a thesis to perform a sensitivity analysis on entry-age normal retirement cost methods to evaluate some of these recommendations. At the request of the Office of the Assistant Secretary of Defense, an effort was initiated to revise the program to produce results that replicate those of the Military Retirement System Projection and Actuarial Valuation Program (GORGO) developed by the DoD Actuary. This study has determined that the level of sophistication of the GORGO program far exceeds that of the ENTRYAGE model, and the major re-programming effort required was beyond the scope of this study. However, the ENTRYAGE model was not user-friendly, required single-line data input, and would "crash" when the operator made an erroneous data entry. Therefore, the ENTRYAGE model was extensively revised to incorporate menus, prevent program crashes, present results in page format, and, in general, make it more user-friendly as an analytical tool.
# TABLE OF CONTENTS

## I. BACKGROUND .......................................................... 9

- **A. INTRODUCTION .................................................. 9**
- **B. LEGISLATIVE HISTORY OF THE MILITARY RETIREMENT SYSTEM ............................. 11**
- **C. REVIEW OF MILITARY RETIREMENT SYSTEM STUDIES ........................................ 18**
  1. Hook Commission (1948) ........................................... 18
  2. Senate Subcommittee Hearings (1958) .................................. 18
  3. Gorman Committee Randall Panel (1962) .................................. 19
  4. First QRMC (1967) .................................................. 19
  5. Interagency Committee (1971) ...................................... 20
  6. DoD Retirement Study Group (1972) .................................. 20
  7. Third QRMC (1975-1976) ............................................ 21
- **D. SUMMARY .......................................................... 24**

## II. AN ECONOMIC COMPARISON AND EVALUATION .......................... 25

- **A. INTRODUCTION .................................................. 25**
B. DESCRIPTION OF THE CURRENT RETIREMENT SYSTEM ................................................ 25
C. MILITARY RETIREMENT COSTS VS. GNP AND FEDERAL OUTLAYS ............................. 28
D. REASONS FOR INCREASES IN MILITARY RETIREMENT COSTS .............................. 29
E. SUMMARY .................................................. 34

III. MILRET COMPUTER PROGRAM .......................................................... 35
A. BACKGROUND .................................................. 35
B. REVISIONS .................................................. 36
C. INSTRUCTIONS .................................................. 37

APPENDIX A: MILRET COMPUTER PROGRAM (VERSION 2.0) ....................... 38

APPENDIX B: MILRET COMPUTER PRINTOUTS ............................................ 63

APPENDIX C: FORMULAS IN THE ORIGINAL ENTRYAGE COMPUTER PROGRAM .......... 72

APPENDIX D: VARIABLES IN THE ORIGINAL ENTRYAGE COMPUTER PROGRAM (LISTED IN ORDER OF APPEARANCE) ................................................. 76

APPENDIX E: VARIABLES IN THE ORIGINAL ENTRYAGE COMPUTER PROGRAM (LISTED IN ALPHABETICAL ORDER) .............................................. 95

APPENDIX F: ORIGINAL ENTRYAGE COMPUTER PROGRAM .......................... 114

LIST OF REFERENCES .......................................................... 127

BIBLIOGRAPHY .......................................................... 129

INITIAL DISTRIBUTION LIST .......................................................... 130
LIST OF TABLES

I. SUMMARY OF MILITARY RETIREMENT LEGISLATION ........ 15
II. COMPONENTS OF THE MILITARY RETIREMENT SYSTEM ...................................................... 27
III. 30 YEARS OF GNP AND FEDERAL OUTLAYS .................. 30
LIST OF FIGURES

2.1 GNP and Federal Outlays ......................................... 31
2.2 Federal Outlays .................................................... 32
2.3 Defense Spending .................................................... 33
I. BACKGROUND

"The (non-disability retirement) plan proposed is basically a penalty provision for early, voluntary retirement."
William Francis, Asst. SECDEF (MP,R), 1958

"The non-disability retirement system is inefficient, inequitable, and costly."
The Interagency Committee, 1971

"Military retirement...is a key issue that has to be faced. The stakes are high; the financial consequences are potentially greater than those involved in the major debates over force levels and weapon systems."
Martin Binkin, The Military Pay Muddle, 1975

"The military retirement system is wasteful in dollars and human resources."
The President's Commission on Military Compensation, 1978

"There probably is no other retirement system which is as liberal and costly as the U.S. Military Retirement System."
Grace Commission, 1984

"...(the military retirement system)...is a scandal; it's an outrage."
David Stockman, Budget Director, OMB, 1985

A. INTRODUCTION

As the above comments indicate, the military retirement system has had its share of critics over the years. Most of the criticisms leveled at the military retirement system stem from a few basic arguments: (1) non-disability retirement allows military personnel to retire at too early of an age; (2) retirement benefits (annuities) are too liberal; (3) lack of vesting until 20 years of service makes superiors reluctant to involuntary separate marginal or poor performers who are close to retirement; and, by far, the strongest criticism, (4) the military retirement system just costs too much.
The present military retirement system allows a service member to receive a non-disability retirement after 20 years of active duty service with a retirement annuity of 50% of the service member's final basic pay (or the average of the highest three years for those joining the Service after September 8, 1980). This annuity increases with additional active duty service so that a retiree with 30 years or more of service will receive 75% of basic pay. Provisions are also made for disability and reserve retirement, as well as an optional survivor benefit plan.

The costs of this retirement system have become a major issue. In the ten years from 1973 to 1983, the number of retirees paid by the Department of Defense (DoD) increased 43% from 935,272 to 1,333,360 individuals. However, for this same period of time, DoD expenditures for the military retirement system grew 263% from $4.4 billion to $15.9 billion. Looking back over the last thirty years from 1953, costs have increased almost 4,400% from $356 million while the number of military personnel receiving retired pay has increased only about 800% from 155,892. Retirement costs, then, have grown at approximately 5 to 6 times faster than the retirement rolls. Military retirement costs currently account for approximately 8% of the defense budget.

As the costs have increased, the military retirement system (specifically, the non-disability retirement portion which accounts for over eighty percent of the cost) has come under closer and closer Congressional, public, and media scrutiny. To reduce costs, proposals have been made, inter alia, to lower annuities, extend the minimum length of service required for retirement, and delay the commencement of retired pay until 55, 60, or 62 years of age. The question arises, however, if the proposed modifications to the military retirement system will produce the desired results. Will costs, in fact, be reduced? What effect will reducing non-disability retirement benefits
have on new accessions and retention, on recruiting and training costs? To what extent is the retirement system used as a force management tool?

This thesis attempts to deal with these issues. In order to provide an understanding of how the current retirement system came to be established, this first chapter contains a review of the legislation that has affected military retirement. Additionally, the recommendations of previous commissions, review panels, and study groups that have dealt with military retirement issues are briefly examined. Subsequent chapters deal more extensively with the provisions of the current retirement system and the costs of its component parts. Finally, a computer model used to project future retirement costs is presented and discussed.

B. LEGISLATIVE HISTORY OF THE MILITARY RETIREMENT SYSTEM

The beginnings of the military retirement system in the United States date back some three hundred and fifty years. In 1636, the Pilgrims at Plymouth Rock provided that any soldier becoming disabled would be maintained by the colony for the rest of his life [Ref. 1: p. VII-1].

The first national pension law was enacted in 1776 and provided half pay for life (or, for the duration of the disability) for disabled soldiers. Immediately after the Revolutionary War and again in 1790, legislation was passed making provisions for disabled military personnel: officers could receive up to one-half of their pay, while enlisted personnel could receive up to $5 a month for life. Benefits were increased for disabled Revolutionary War veterans in 1818 and again in 1832. [Ref. 1: p. VII-1]

In 1855, legislation was passed which permitted the Secretary of the Navy to determine the fitness of officers and allowed the removal of those officers judged incapable. Those determined to be incapable were removed from active duty with either leave-of-absence pay (approximately 75% of sea-duty pay) or furlough pay (50%...
of leave-of-absence pay). Though the main purpose of this legislation was to remove old and physically unfit Naval officers from active duty, the law could also be used to separate officers for non-disability reasons. [Refs. 1,2: p. VII-1, p. 145]

The first major non-disability legislation was enacted in 1861 at the beginning of the Civil War. This act provided for the voluntary retirement (at the discretion of the President) of regular officers of all branches of the military service after 40 years of active duty. The purpose of this legislation was to allow older officers, unfit for duty in the Civil War, to retire. Later legislation in 1861 and 1862 authorized involuntary retirement, i.e., an officer could be forced to retire upon reaching a certain age or years-in-service point. However, nothing in the legislation compelled authorities to take such actions. [Refs. 1,2: p. VII-2, p. 145]

After the Civil War, while reducing military forces to a peacetime level, Congress passed legislation in 1870 which established two lasting precedents for the military retirement system: (1) Army and Marine Corps officers were permitted to voluntary retire after 30 years of service (YOS) (upon approval of the President), and (2) retirement pay was set at 75% of the officer's final pay. (Though the 75% pay provision applied to Army and Marine Corps officers only, subsequent legislation in 1873 included Naval officers). Enlisted personnel were covered by legislation that was enacted in 1885, 1899, and 1907. The benefits that were provided closely followed those for officers, i.e., voluntary retirement after 30 years of service and 75% of final pay. Legislation in 1908 authorized the voluntary retirement of Navy officers after 30 years of service. [Refs. 1,2: p. VII-2, p. 146]

In 1916, legislation was again passed that had long-lasting effects on the military retirement system. Due to promotion stagnation in the officer ranks of the Navy as a result of World War I, selection boards were established for promotion to Commander.
Captain, and Rear Admiral on the basis of age-in-grade. Lieutenant commanders, commanders, and captains who reached age 45, 50, and 56, respectively, without being selected for promotion, became ineligible for further consideration and had to be retired. An officer so retired was entitled to retired pay of \(2.5\%\) of basic pay for each year of service, up to a maximum of \(75\%\) of pay. Thus, the "up-or-out" officer selection process was established. Also included in this legislation was the creation of the Fleet Naval Reserve for Navy and Marine Corps enlisted personnel. The purpose of this was to create a pool of experienced personnel who could be recalled to active duty in an emergency. Though "transferring" to the Fleet Reserve was technically different than "retiring", it basically allowed enlisted personnel to leave the Navy and Marine Corps with as little as 16 years of service (later raised to 20 YOS in 1925) and "retire" with "retainer" pay. [Refs. 1, 2: p. VII-3, pp. 147 & 150]

After World War I, the Navy was again having officer stagnation promotion problems. As a result, legislation was passed which: (1) replaced the age-in-grade program with one based on service-in-grade for grades Commander through Captain, with break points of 21, 28, and 35 years, respectively (passed in 1926); (2) extended the selection boards for promotion to Lieutenant and Lieutenant Commander (passed in 1934); and (3) provided for voluntary retirement of Naval officers after 20 years of commissioned service, at the discretion of the President (passed in 1938). [Refs. 1, 2: p. VII-4, p. 148]

Legislation passed after World War II brought standardization to the military retirement provisions of the various branches of the Service. In 1945, voluntary retirement after 20 years of service was authorized for Army enlisted personnel. In 1946, legislation was enacted which permitted Navy and Marine Corps officers to
voluntarily retire after 20 years of active service\(^1\) (including at least 10 years of commissioned service). Finally, Army and Air Force officers were authorized voluntary retirement after 20 years of active service (including 10 years of commissioned service) in 1948. Also during this period, the "up-or-out" officer selection promotion process was standardized (1947). [Refs. 1,2: p. VII-6, pp. 148-150]

During the 1950's through 1970's, the military retirement system remained relatively unchanged. Provisions for a specific retirement system for warrant officers were passed in 1954. Legislation was passed in 1958, 1963, 1975, and 1976 that made changes in the method of recomputing retirement pay for cost-of-living adjustments.

The early 1980's followed the trend of the last thirty years. Legislation enacted in 1980, 1981, 1982, and 1983 all dealt with adjustments to retirement pay: retired pay was to be adjusted only once a year and tied to Civil Service increases (passed in 1980); final basic pay was replaced by "retainer" pay (which was the average of the last 3 years of basic pay) as the basis for retirement annuities (passed in 1980); an annual adjustment based on the percentage increase in the Consumer Price Index (CPI) was established (passed in 1981); a three-year "ceiling" was placed on CPI adjustments for fiscal years 1983-1985\(^2\) (passed in 1982); and the "one-year look-back" save pay feature\(^3\) was repealed (passed in 1983). Table I provides a summary of the legislation that has been discussed. [Refs. 1,2: pp. VII-7 & VII-8, p. 149]

\(^1\) The legislation passed in 1938 allowed Naval officers to retire after 20 years of commissioned service, while the legislation passed in 1946 allowed Navy and Marine Corps officers to retire with 20 years of total active service, only 10 years of which were required to be commissioned service.

\(^2\) CPIs of 3.3, 3.6, and 3.3 percent, were set for FY83-FY85, respectively.

\(^3\) The save pay feature allowed a service member to "look back" one preceding basic pay scale to compute retired pay, increased by any retired pay adjustments that occurred in the interim. This method was advantageous when the rate of retired pay adjustments exceeded increases to basic pay.
### TABLE I

**SUMMARY OF MILITARY RETIREMENT LEGISLATION**

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1855</td>
<td>Authorized involuntary removal of Navy officers from active list for disability and other reasons.</td>
</tr>
<tr>
<td>1861</td>
<td>Authorized voluntary retirement of officers of all Services after 40 years of service, at the discretion of the President.</td>
</tr>
<tr>
<td>1861</td>
<td>Permitted involuntary retirement of Navy officers after 45 years of service or at age 62.</td>
</tr>
<tr>
<td>1862</td>
<td>Permitted involuntary retirement of Army and Marine Corps officers after 45 years or at age 62.</td>
</tr>
<tr>
<td>1870</td>
<td>Authorized voluntary retirement of Army and Marine Corps officers after 30 years of service, at the discretion of the President. Retirement pay for Army and Marine Corps officers was set at 75% of final pay and at 50% for Navy officers.</td>
</tr>
<tr>
<td>1878</td>
<td>Raised the Navy officer retirement rate to 75% of sea duty pay.</td>
</tr>
<tr>
<td>1882</td>
<td>Made retirement mandatory at age 64 for officers of all Services. Also gave officers a nondiscretionary right to voluntary retirement after 40 years of service. (Earlier law had authorized voluntary retirement, but had given the President the power to grant or deny such a retirement.)</td>
</tr>
<tr>
<td>1885</td>
<td>Authorized voluntary retirement of Army and Marine Corps enlisted personnel after 30 years of service. Retired pay was set at 75% of a member's pay, plus an allowance in lieu of quarters, fuel, and light.</td>
</tr>
<tr>
<td>1899</td>
<td>Authorized voluntary retirement of Navy enlisted personnel after 30 years of service. Established the &quot;promotion flow&quot; retirement program for Navy officers.</td>
</tr>
<tr>
<td>1907</td>
<td>Consolidated the 30-year voluntary retirement authority for the enlisted personnel of all branches of the Services into one status.</td>
</tr>
<tr>
<td>1908</td>
<td>Authorized voluntary retirement of Navy officers after 30 years of service.</td>
</tr>
<tr>
<td>1916</td>
<td>Created Fleet Reserve. Authorized voluntary transfer of Navy and Marine Corps enlisted personnel to Fleet Reserve after 16 years of active service.</td>
</tr>
<tr>
<td>1916</td>
<td>Established &quot;up-or-out&quot; promotion system based on age-in-grade and integrated involuntary retirement system. First to use &quot;standard&quot; retired pay formula of 2.5% times years-of-service, up to maximum of 75%.</td>
</tr>
<tr>
<td>1920</td>
<td>Provided for classification of Army officers and authorized involuntary retirement of those designated &quot;Class B&quot; (i.e., inefficient performance).</td>
</tr>
<tr>
<td>DATE</td>
<td>ACTION</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>1922</td>
<td>Authorized involuntary retirement of Army officers chosen for elimination from active list by board officers.</td>
</tr>
<tr>
<td>1925</td>
<td>Raised minimum length-of-service required by Navy and Marine Corps enlisted personnel for eligibility for transfer to Fleet Reserve from 16 to 20 years.</td>
</tr>
<tr>
<td>1926</td>
<td>Changed integrated Navy officer promotion/involuntary retirement system from age-in-grade to service-in-grade program.</td>
</tr>
<tr>
<td>1934</td>
<td>Made Marine Corps officers subject to Navy rather than Army retirement laws. Brought them under Navy’s promotion/involuntary retirement system. Extended the Navy’s officer selection program to promotion to O-4 and O-5.</td>
</tr>
<tr>
<td>1935</td>
<td>Authorized voluntary retirement of Army officers after 15 years of active service.</td>
</tr>
<tr>
<td>1938</td>
<td>Revised the Navy’s officer selection and retirement processes. 0-4’s to 0-6’s who had twice failed of selection for promotion were involuntarily retired after 26, 28, and 30 years of service, respectively. Also authorized the voluntary retirement of Navy officers after 20 years of commissioned service, at the discretion of the President.</td>
</tr>
<tr>
<td>1945</td>
<td>Authorized voluntary retirement of Army enlisted personnel after 20 years of active service.</td>
</tr>
<tr>
<td>1946</td>
<td>Authorized voluntary retirement of Navy and Marine Corps officers after 20 years of active service, including 10 years of commissioned service. Lowered mandatory retirement age from 64 to 62 for such officers. Temporarily authorized their involuntary retirement if chosen for elimination from active list by board of officers.</td>
</tr>
<tr>
<td>1947</td>
<td>Created Department of Air Force. Made Army retirement laws applicable to Air Force personnel.</td>
</tr>
<tr>
<td>1947</td>
<td>Established integrated promotion/involuntary retirement system for officers of all Services.</td>
</tr>
<tr>
<td>1948</td>
<td>Established retirement system for career personnel of Reserve and National Guard. Authorized voluntary retirement of Air Force and Army officers after 20 years of active service, including 10 years of commissioned service. Repealed 15-year voluntary retirement authority enacted in 1935.</td>
</tr>
<tr>
<td>1954</td>
<td>Established specific retirement system for warrant officers of services.</td>
</tr>
<tr>
<td>DATE</td>
<td>ACTION</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>1958</td>
<td>Suspended &quot;recomputation&quot; method that primarily had been used to make post-retirement adjustments to retired pay since origin of Service retirement system.</td>
</tr>
<tr>
<td>1975</td>
<td>Provided that the monthly retired/retainer pay of those who became entitled to that pay on or after 1 Jan 1971 may not be less than it would have been had the member become entitled to such pay of an earlier date in that member's career (Tower Amendment).</td>
</tr>
<tr>
<td>1976</td>
<td>Eliminated the one percent add-on and established a semi-annual adjustment mechanism effective March 1st and Sept. 1st of each year. Percentage adjustment determined on CPI percentage increase from June to December and December to June, respectively (Chiles Amendment).</td>
</tr>
<tr>
<td>1980</td>
<td>Deleted the semi-annual mechanism and directed that retired pay be adjusted at the same time and by the same percentage as Civil Service pensions, contingent on annual mechanism being established for retired Civil Service.</td>
</tr>
<tr>
<td>1980</td>
<td>Replaced use of terminal basic pay with monthly retired or retainer pay base (average of highest three of basic pay) for determining retired or retainer pay entitlements.</td>
</tr>
<tr>
<td>1981</td>
<td>Established an annual adjustment mechanism for retired Civil Service employees and activated a similar feature for retired military service members, effective on March 1st of each year, as determined by the percentage increase in CPI from December to December of each year.</td>
</tr>
<tr>
<td>1982</td>
<td>Placed a three-year limitation on CPI adjustments during FY83 to FY85, and slipped the effective date one month during each year (April, May, June), respectively. Members age 62 or older, or disabled, receive full CPI percentage adjustments. Members under age 62 receive one-half &quot;assumed CPI&quot; (3.3, 3.6, 3.3 for FY83, FY84, FY85, respectively), plus the actual CPI percentage increase.</td>
</tr>
<tr>
<td>1983</td>
<td>Repealed the &quot;one-year look-back&quot; save pay feature for the calculation of initial amounts of retired/retainer pay, but (1) created a 3-year extension for those eligible to retire on 24 Sept. 1983 to use the &quot;look back&quot; feature, and (2) ensured that retired/retainer pay may not be less that what it would have been during the 3-year period for members eligible to retire on 24 Sept. 1983. Provided that gross retired/retainer pay be rounded to the next lower dollar amount. Provided that years-of-service creditation for calculation purposes be based on 1/12 of a year for each full month served. This terminated the six-month rounding rule for computing retired/retainer pay.</td>
</tr>
</tbody>
</table>
C. REVIEW OF MILITARY RETIREMENT SYSTEM STUDIES

1. Hook Commission (1948)

The Hook Commission (Advisory Commission on Service Pay) in 1948 was the first major study of the entire military compensation system conducted after World War II. The Commission's recommendations provided the basis for the Career Compensation Act of 1949. This legislation enacted provisions which set the framework for the current system of basic compensation, and Special and Incentive pays. In regards to military retirement, the Commission recommended: (1) that the system should be non-contributory; (2) voluntary retirement with 20 years of service at age 60 (for officers; for enlisted personnel this would drop down to age 50) or at any age with 30 years of service; (3) that there was no need to accumulate a fund; (4) that mandatory retirement for officers be no lower than age 60; (5) that severance pay be paid to those who are involuntary separated; and (6) retirement pay be 2.5% of basic pay multiplied by the years of service, not to exceed 75%. [Ref. 3]

2. Senate Subcommittee Hearings (1958)

Though not the results of a formal study, recommendations to change the military retirement system only for senior officers were presented by the Assistant Secretary of Defense (Manpower, Personnel, and Reserves), William Francis, to the 1958 Senate Subcommittee Hearings on military pay matters. Mr. Francis presented a plan whereby the normal retirement points for senior officers would be established as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-6 through O-10</td>
<td>30</td>
</tr>
<tr>
<td>O-5</td>
<td>26</td>
</tr>
<tr>
<td>O-4 and below</td>
<td>20</td>
</tr>
</tbody>
</table>
This plan was proposed in response to the exodus of young colonels in the Air Force with 20 years of service. [Ref. 4]

3. Gorman Committee Randall Panel (1962)

The Gorman Committee was a comprehensive study of the Service compensation system. No final report was ever issued; however, its findings were reviewed and (for the most part) approved by the Randall Panel. This led to the second largest Service pay raise in modern times (the largest was in fiscal year 1982). A major recommendation of this study that was enacted into law was to base adjustments to Service retired pay on the CPI rather than on changes in basic pay of active duty personnel. [Ref. 1: p.VII-16]

4. First QRMC (1967)

Title 37, U.S. Code, Section 1008b, required the President to initiate a quadrennial review of military compensation, and to submit a comprehensive report to Congress. The First Quadrennial Review of Military Compensation (First QRMC) was convened in December 1966, with the report published in November 1967. The major recommendations of this First QRMC were: (1) a career force member should be fully paid in taxable cash, i.e., a "military salary," with deductions for taxes and any subsistence housing furnished; (2) a career service member would contribute 0.5% of his salary to a retirement account and have a vested equity in this contribution; (3) adoption of a two-step annuity plan where the retiree begins drawing Step-1 pay percentages (24% at 20 years of service to 66% at 40 years of service) immediately upon leaving the Service, and graduating to Step-2 pay percentages (33% at 20 years

---

4 There have been five quadrennial reviews conducted to date. Three of the reviews, the First Third Fifth, dealt with military retirement and are discussed in this thesis. The remaining two, the Second Fourth, did not address military retirement and are, therefore, not included.
of service to 75% at 40 years of service) at age 55 to age 60, depending upon length of service at retirement; (4) integration with Social Security, with military retirement annuities to be offset by 50% of social security benefits; and (5) military retirement annuities to continue to be protected by CPI adjustments. [Ref. 5: pp. S12-S20, xvi-xviii, 3-1 to 5-5]

5. *Interagency Committee (1971)*

The Interagency Committee (IAC) on Uniformed Services Retirement and Survivor Benefits (1971) proposed extensive reform of the non-disability retirement system. The Committee's recommendations were intended to decrease costs, improve the efficiency and effectiveness of the system as a management tool, and to reduce some of the system's inequities. The major recommendations included: (1) a reduced annuity for retiring earlier than age 60 with 20-24 years of service, or at age 55 with 30 or more years of service; (2) a three-step annuity plan of 2.5% for 1-24 years of service, 3% for 25-30 years of service, and 2% for 31-35 years of service; (3) vesting at 10 years of service; and (4) a lump sum severance pay for involuntary separation after 5 years of service. [Ref. 1: p. VII-16]

6. *DoD Retirement Study Group (1972)*

The DoD Retirement Study Group (1972) was formed to review the recommendations of the Interagency Committee (IAC). The results of this study group took the form of the proposed Retirement Modernization Act (RMA), legislation that was never passed. The RMA proposed a two-step annuity plan (2.5% for 1-24 years, 3% for 25-30 years) which would be reduced by 15 percentage points for retirement with less than 30 years of service. The reduction would be lifted when the retiree reached the point where he would have had 30 years of service. The proposed Act also provided vesting at 10 years of service and severance pay after 5 years of service. [Ref. 1: p. VII-16]

The Third Quadrennial Review of Military Compensation (Third QRMC) took a comprehensive look at the entire military compensation system. Though ten volumes were published in 1976 that contained research and background papers, no final report was ever issued. The recommendations of the Third QRMC included: (1) comparability with Civil Service should be the standard for establishing pay; (2) the military pay and allowances system should be modernized; and (3) the previously discussed Retirement Modernization Act should replace the present retirement system. [Ref. 2: p. VII-17]


The Defense Manpower Commission (DMC) was created by Congress to study a large number of defense manpower issues, only one of which was military compensation. Its report published in 1976 recommended a conversion to a salary system (versus one of base pay, allowances, and incentives) and a revised retirement plan. The proposed retirement plan would allow a service member to "earn" retirement points for each year of service: 1 point for each year in a non-combat job, 1.5 points for each year in a combat job. A service member could retire between 20 and 30 years of service when 30 points were accumulated, and receive an annuity of $2.67 per retirement point multiplied by the highest three years of basic pay. (Example: 22 years non-combat service equals 22 points and 4 years of combat service equals 8 points. $22 + 8 = 30$ points. $30 \times 2.67\% = 80\%$.) This meant that for service members with no combat time, a full 30 years of service must be served. [Ref. 1: p. VII-16]

9. President’s Commission on Military Compensation (1977-1979)

In 1977, President Carter established his President's Commission on Military Compensation (also referred to as the Zwick Commission), and tasked them with
reviewing "at least the analyses, findings, and recommendations related to military compensation which have been completed by the Quadrennial Reviews of Military Compensation, the Comptroller General, the Interagency Committee," and others. The Commission was tasked with making recommendations on a wide-range of military compensation issues. Inter alia, the Commission was to identify the purposes of the military retirement system, determine if the present system was effective, and to recommend appropriate changes. The Commission recommended a retirement system that provided retired annuities with as few as 10 years of service. However, the annuities could not be collected until age 55 for 30 or more years of service, age 60 for 20-29 years of service, or age 62 for 10-19 years of service. A change from a level multiplier to a three-step multiplier was also recommended: 2.00% for 1-5 years of service, 2.25% for 6-10 years of service, and 2.75% for 11-35 years of service. Other recommendations included a "high-three average" instead of final basic pay to compute the retirement annuity; reduction in military retirement pay when social security benefits commenced; adjustment of annuities through the use of a CPI change; and the establishment of a deferred compensation trust fund for each member after 5 years of service. [Ref. 6: pp. 62-70] DoD modified the Commission's retirement proposal and submitted it to Congress in 1979 as the Uniformed Services Retirement Act (USRBA). No action, however, was taken by Congress. [Ref. 1: p. VII-17]


The President's Private Sector Survey on Cost Control (PPSS), more widely known as the Grace Commission, was formed to identify and suggest remedies for waste and abuse in the Federal government. The military retirement system was identified as an area in which cost savings could be realized. The proposed changes to the military retirement system called for: (1) no voluntary retirement before age 55; (2)
age 62 to be the earliest retirement age to receive unreduced retirement benefits; (3) reduced pension benefits between age 55 and age 62; (4) a change in the earnings base from high-3 to high-5 average; (5) a reduction in the annuity multiplier to 1.3% of Basic Military Compensation (BMC) per year of service (BMC is the sum of basic pay, basic allowance for quarters, basic allowance for subsistence, and the tax advantage gained by receiving tax-free allowances); (6) vesting after 10 years of service; (7) a decrease in COLA increases; and (8) the integration of the military retirement system with Social Security. [Ref. 7] Though mention was made that the military retirement system is used as a personnel management tool, the PPSS believed it to be of little value. It appears from the nature of the proposed recommendations that they were selected solely on the basis of cost reduction, and, in fact, did not consider manpower force requirements of the military services. [Ref. 1: p. VII-17]


Finally, in the fall of 1982, the Fifth Quadrennial Review of Military Compensation (Fifth QRMC) was organized to assess the extent to which the existing military retirement and special incentive pay systems contribute to our national defense. Contrasted to the Grace Commission's strictly "cost-reduction" view of the military retirement system, the Fifth QRMC evaluated the military retirement system from the perspective of how it supported and complemented the manpower force management requirements of the military Services. The findings, recommendations, and supporting documentation of the retirement system portion of the study were published in five volumes in early 1984. In order to strengthen the military retirement system, the Fifth QRMC recommended that consideration be given to modifying the system with one of four alternatives that recommended combinations of reduced multipliers and COLAs for early (less than 30 years) retirement. The Review further
recommended that the system should be "grandfathered," remain non-contributory, not be explicitly integrated with social security (i.e., no offset), and that vesting should remain at 20 years of service. [Ref. 1: pp. 1-35 & 1-36]

D. SUMMARY

The reviews of the legislative history and various studies of the military retirement system establish that the system is not solely an old-age pension system. Rather, it is an integral part of total military compensation which has been, and should continue to be, used as a force management tool. As the Fifth QRMC stated, any modification to the retirement system should "be proposed in a legislative form that recognizes the absolute requirement for an integrated proposal, and that subsequent fragmenting of the modification could negate the resultant force structure and thus cause the modification to fail its intended purpose" [Ref. 1: p. 1-35]. Any modifications to the retirement system must consider this tie-in between the retirement system and force management, and potential spill over effects. Dollars that are saved by reducing benefits to retirees could be needed to pay for increased recruiting, training, and retention costs.
II. AN ECONOMIC COMPARISON AND EVALUATION

A. INTRODUCTION

As mentioned above, military retirement costs for fiscal year 1983 amounted to $15.9 billion and accounted for approximately 8% of all defense spending. The costs of this retirement system are projected by the DoD Office of the Actuary to reach over $45 billion in fiscal year 2000 [Ref. 8; p. 21]. In this chapter the component parts of the current military retirement system are described, and the costs of providing these benefits are examined. Military retirement outlays are compared to the Gross National Product (GNP) and other portions of the Federal budget. The results of analyses performed during the Fifth Quadrennial Review on Military Compensation are presented.

B. DESCRIPTION OF THE CURRENT RETIREMENT SYSTEM

The current military retirement system is comprised of four distinct, but inter-related components:

- A non-disability system for service personnel (either Regular or Reservists) who may retire from active duty after at least 20 years of service (no age limitations).
- A non-disability system for drill reservists who have completed at least 20 years of creditable service for retirement purposes. These personnel may retire at age 60.
- A disability system for service members either temporarily or permanently disabled.
- A Survivor Benefit Program (SBP).

After 20 years of active duty, a service member is eligible for immediate non-disability retirement annuities. The service member's retirement pay is equal to years-of-service (YOS) times a multiplier (2.5%) times final basic pay. (For those...
entering the Services after September 8, 1980, the pay base used is high-3 average instead of final basic pay.) A maximum of 75% of base pay may be received. Cost-of-living adjustments to retired pay are based upon the Consumer Price Index (CPI). [Refs. 1,8: pp. VI-1 to VI-3, pp. 1 & 2]

Non-disability reserve retirement provisions closely follow those of non-disability active duty retirement. Two distinct differences are involved, however:

- Years of equivalent service are earned by receiving creditable days ("points") for active duty, full-time Reserve service during annual training, drill periods, and membership in a Reserve component.

- Though a service member may retire from the Reserves any time after 20 creditable years are earned, retirement pay does not begin until age 60 [Refs. 1,8: VI-7 & VI-8, p. 3].

Disability retirement is provided to service members unable to perform their duties. Disability retirement qualification and amount of pay are determined by length of service, disability percentage (from a Veterans Administration rating system), cause of the disability, and service member's basic pay. The disabled service member receives retired pay based upon the most advantageous level of benefit. [Refs. 1,8: pp. VI-8 & VI-9, pp. 2 & 3]

The Survivor Benefit Program (SBP) is an optional program that provides income to surviving families of service members who die in retirement or on active duty after reaching eligibility. Service members elect a percentage of their gross retired pay to be provided to their survivors, and give up a portion of their retirement annuity in return. This is the only portion of the military retirement system where service members explicitly share the costs of the system with the government. [Ref. 8: pp. 3 & 4]

Table III presents the number of retired personnel and retirement costs broken down by component parts for fiscal years 1979 to 1983. Each component as a percentage of total retirement and SBP costs has remained relatively constant during
TABLE II

COMPONENTS OF THE MILITARY RETIREMENT SYSTEM

(Dollar amounts in billions of $)

<table>
<thead>
<tr>
<th></th>
<th>FY79</th>
<th>FY80</th>
<th>FY81</th>
<th>FY82</th>
<th>FY83</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-disability retirees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>974.6</td>
<td>1,000.6</td>
<td>1,019.9</td>
<td>1,038.0</td>
<td>1,052.1</td>
</tr>
<tr>
<td>Retirement pay</td>
<td>$8.41</td>
<td>$9.77</td>
<td>$11.24</td>
<td>$12.23</td>
<td>$13.04</td>
</tr>
<tr>
<td>(81.8%)</td>
<td>(82.0%)</td>
<td>(81.9%)</td>
<td>(81.9%)</td>
<td>(81.9%)</td>
<td></td>
</tr>
<tr>
<td><strong>Drill reservists</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>101.5</td>
<td>112.7</td>
<td>123.2</td>
<td>133.3</td>
<td>141.2</td>
</tr>
<tr>
<td>Retirement pay</td>
<td>$.58</td>
<td>$.69</td>
<td>$.85</td>
<td>$.96</td>
<td>$1.06</td>
</tr>
<tr>
<td>(5.6%)</td>
<td>(5.8%)</td>
<td>(6.2%)</td>
<td>(6.4%)</td>
<td>(6.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Disability retirees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>152.3</td>
<td>151.1</td>
<td>145.7</td>
<td>142.1</td>
<td>140.0</td>
</tr>
<tr>
<td>Retirement pay</td>
<td>$1.09</td>
<td>$1.20</td>
<td>$1.30</td>
<td>$1.36</td>
<td>$1.38</td>
</tr>
<tr>
<td>(10.4%)</td>
<td>(10.1%)</td>
<td>(9.5%)</td>
<td>(9.1%)</td>
<td>(8.6%)</td>
<td></td>
</tr>
<tr>
<td><strong>Surviving families</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>57.8</td>
<td>65.6</td>
<td>74.1</td>
<td>77.3</td>
<td>85.5</td>
</tr>
<tr>
<td>SBP payments</td>
<td>$.20</td>
<td>$.26</td>
<td>$.33</td>
<td>$.39</td>
<td>$.45</td>
</tr>
<tr>
<td>(1.9%)</td>
<td>(2.2%)</td>
<td>(2.4%)</td>
<td>(2.6%)</td>
<td>(2.8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,286.3</td>
<td>1,330.1</td>
<td>1,363.1</td>
<td>1,390.8</td>
<td>1,418.9</td>
</tr>
<tr>
<td>Number</td>
<td>1,286.3</td>
<td>1,330.1</td>
<td>1,363.1</td>
<td>1,390.8</td>
<td>1,418.9</td>
</tr>
<tr>
<td>Expenditures</td>
<td>$10.28</td>
<td>$11.92</td>
<td>$13.72</td>
<td>$14.92</td>
<td>$15.93</td>
</tr>
</tbody>
</table>

(Data was obtained from the DoD Statistical Reports on the Military Retirement System, FY1979 to FY1983.)

these years: active duty non-disability retired pay, 82%; drill reservists non-disability retired pay, 6-7%; disability retired pay, 9-11%; and SBP, 2-3%. (As a percentage of total costs, there are slight increases for drill reservists non-disability and SBP, and a
Slight decrease for disability retirees.) Since the active duty non-disability retirement portion accounts for the majority of the cost of the system, it logically follows that if modifications are to be made to the retirement system in an effort to reduce costs, then this portion of it would undoubtedly produce the greatest cost savings. [Refs. 9,10,11,12,13: p. 13,p. 13,p. 13,p. 16,p. 16]

Prior to fiscal year 1985, the military retirement system was an unfunded or "pay-as-you-go" system. This funding method charges future generations of tax payers for services rendered by the military service to the current generation of tax payers. However, the DoD FY84 Authorization Act (Public Law 98-94) requires the military retirement system to be valued using accrual accounting and funded using an aggregate entry-age normal method. Under accrual accounting, future retirement and survivor benefits that are earned by current service members are accounted for and charged to the current budget. The aggregate entry-age normal method sets aside a uniform or level percentage of basic pay to provide the funds for the retirement annuities. Only each year's normal cost (plus, minus any actuarial gains or losses) will be funded by DoD. The U.S. Treasury will assume responsibility to make payments on the unfunded liability. Accrual accounting and aggregate entry-age funding should provide three improvements over the pay-as-you-go system: (1) the current year's total cost of the present military force is more accurately presented; (2) a more accurate assessment of how changes to the force structure effect future retirement costs; and (3) less emphasis on immediate retirement benefit cuts that offer only short-term savings. [Ref. 1: p. 1-8]

C. MILITARY RETIREMENT COSTS VS. GNP AND FEDERAL OUTLAYS

Taken by themselves, military retirement costs certainly do appear to be excessive: a 400% increase in the last thirty years with a fiscal year 1983 cash cost of $15.9 billion. But, how do these figures compare to other costs?
Table IV presents GNP, federal budget, defense spending, and military personnel costs for the last thirty years. Though retirement costs have steadily increased since 1954, GNP and the federal expenditures have also been rising steadily. (See Figures 2.1 - 2.3.) [Refs. 9,14,15: pp. 10 & 11]

Examining the increases in GNP and the federal outlays over the last thirty years, we find that the percentage increase in military retirements costs has, in fact, far outdistanced the others. Retirement costs have climbed 4000% since 1954. During this same period, GNP, the federal budget, defense spending, and military personnel costs have increased 875%, 1023%, 422%, and 315%, respectively.

Looking at the relationship between retirement costs, defense spending, and total federal outlays a little closer, we find that in the same period that military retirement costs have increased from 1% to 8% of the defense budget, defense spending has decreased as a percentage of the federal budget from 57% down to 26%. As a percentage of the federal budget, military retirement costs have increased roughly three and a half times from .6% to 2.0%. These increases in military retirement costs would seem to make a strong argument in favor of modifying the retirement system in order to reduce costs.

D. REASONS FOR INCREASES IN MILITARY RETIREMENT COSTS

This section briefly describes the results of analyses conducted during the Fifth Quadrennial Review on Military Compensation. Using non-disability retirement data from fiscal years 1955 to 1982, four factors were investigated to determine their influence on the increases in retirement costs. These four factors were: (1) retired population growth, (2) CPI inflation, (3) basic pay (which is used to determine retirement pay) increases in excess of inflation, and (4) retired pay adjustments (COLA). [Ref. 16: p. F-1]
### TABLE III

30 YEARS OF GNP AND FEDERAL OUTLAYS

(Billions of $)

<table>
<thead>
<tr>
<th>FY YEAR</th>
<th>GNP (Billion $)</th>
<th>FEDERAL BUDGET</th>
<th>DEFENSE</th>
<th>% OF FED. BUD.</th>
<th>MILPERS DEF.</th>
<th>% OF MILPERS DEF.</th>
<th>RETIRED DEF.</th>
<th>% OF RETIRED DEF. BUD.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>3500.0</td>
<td>795.97</td>
<td>210.48</td>
<td>26.4</td>
<td>45.52</td>
<td>21.6</td>
<td>15.93</td>
<td>7.6</td>
</tr>
<tr>
<td>1982</td>
<td>3200.0</td>
<td>728.38</td>
<td>187.42</td>
<td>25.7</td>
<td>42.34</td>
<td>22.6</td>
<td>14.94</td>
<td>8.0</td>
</tr>
<tr>
<td>1981</td>
<td>2937.7</td>
<td>657.20</td>
<td>159.77</td>
<td>24.3</td>
<td>36.41</td>
<td>22.8</td>
<td>13.72</td>
<td>8.6</td>
</tr>
<tr>
<td>1980</td>
<td>2635.1</td>
<td>576.68</td>
<td>155.86</td>
<td>23.6</td>
<td>30.84</td>
<td>22.7</td>
<td>11.92</td>
<td>8.8</td>
</tr>
<tr>
<td>1979</td>
<td>2417.8</td>
<td>491.00</td>
<td>117.70</td>
<td>24.0</td>
<td>28.40</td>
<td>24.1</td>
<td>10.28</td>
<td>8.7</td>
</tr>
<tr>
<td>1978</td>
<td>2165.9</td>
<td>448.37</td>
<td>105.20</td>
<td>23.5</td>
<td>27.10</td>
<td>25.8</td>
<td>9.17</td>
<td>8.7</td>
</tr>
<tr>
<td>1977</td>
<td>1918.3</td>
<td>400.51</td>
<td>97.50</td>
<td>24.3</td>
<td>25.70</td>
<td>26.4</td>
<td>8.22</td>
<td>8.6</td>
</tr>
<tr>
<td>1976</td>
<td>1718.0</td>
<td>364.47</td>
<td>89.40</td>
<td>24.5</td>
<td>25.10</td>
<td>28.1</td>
<td>7.30</td>
<td>8.2</td>
</tr>
<tr>
<td>1975</td>
<td>1549.2</td>
<td>324.26</td>
<td>85.60</td>
<td>26.4</td>
<td>25.00</td>
<td>29.2</td>
<td>6.24</td>
<td>7.3</td>
</tr>
<tr>
<td>1974</td>
<td>1434.2</td>
<td>276.91</td>
<td>77.80</td>
<td>28.1</td>
<td>23.70</td>
<td>30.5</td>
<td>5.14</td>
<td>6.6</td>
</tr>
<tr>
<td>1973</td>
<td>1326.4</td>
<td>265.65</td>
<td>74.50</td>
<td>30.3</td>
<td>23.20</td>
<td>31.1</td>
<td>4.39</td>
<td>5.9</td>
</tr>
<tr>
<td>1972</td>
<td>1185.9</td>
<td>230.68</td>
<td>76.60</td>
<td>33.2</td>
<td>23.00</td>
<td>30.0</td>
<td>3.89</td>
<td>5.1</td>
</tr>
<tr>
<td>1971</td>
<td>1077.6</td>
<td>210.17</td>
<td>75.80</td>
<td>36.1</td>
<td>22.60</td>
<td>29.8</td>
<td>3.39</td>
<td>4.5</td>
</tr>
<tr>
<td>1970</td>
<td>992.7</td>
<td>195.65</td>
<td>78.60</td>
<td>40.2</td>
<td>23.00</td>
<td>29.3</td>
<td>2.85</td>
<td>3.6</td>
</tr>
<tr>
<td>1969</td>
<td>944.0</td>
<td>183.65</td>
<td>79.40</td>
<td>43.2</td>
<td>21.40</td>
<td>27.0</td>
<td>2.64</td>
<td>3.1</td>
</tr>
<tr>
<td>1968</td>
<td>873.4</td>
<td>178.13</td>
<td>78.80</td>
<td>44.2</td>
<td>21.95</td>
<td>27.9</td>
<td>2.09</td>
<td>2.7</td>
</tr>
<tr>
<td>1967</td>
<td>799.6</td>
<td>157.61</td>
<td>68.20</td>
<td>43.3</td>
<td>19.79</td>
<td>29.0</td>
<td>1.83</td>
<td>2.7</td>
</tr>
<tr>
<td>1966</td>
<td>756.0</td>
<td>134.65</td>
<td>54.90</td>
<td>40.8</td>
<td>16.75</td>
<td>30.5</td>
<td>1.59</td>
<td>2.9</td>
</tr>
<tr>
<td>1965</td>
<td>691.1</td>
<td>118.43</td>
<td>47.50</td>
<td>40.1</td>
<td>14.80</td>
<td>31.2</td>
<td>1.39</td>
<td>2.9</td>
</tr>
<tr>
<td>1964</td>
<td>637.7</td>
<td>118.58</td>
<td>51.50</td>
<td>43.4</td>
<td>14.20</td>
<td>25.9</td>
<td>1.01</td>
<td>2.0</td>
</tr>
<tr>
<td>1963</td>
<td>596.7</td>
<td>111.31</td>
<td>50.10</td>
<td>45.0</td>
<td>13.00</td>
<td>27.6</td>
<td>1.21</td>
<td>2.3</td>
</tr>
<tr>
<td>1962</td>
<td>565.0</td>
<td>106.81</td>
<td>49.00</td>
<td>45.9</td>
<td>13.00</td>
<td>26.5</td>
<td>0.90</td>
<td>1.8</td>
</tr>
<tr>
<td>1961</td>
<td>524.6</td>
<td>97.80</td>
<td>46.60</td>
<td>47.6</td>
<td>12.10</td>
<td>26.0</td>
<td>0.79</td>
<td>1.7</td>
</tr>
<tr>
<td>1960</td>
<td>506.5</td>
<td>92.22</td>
<td>45.20</td>
<td>49.0</td>
<td>11.70</td>
<td>25.9</td>
<td>0.69</td>
<td>1.5</td>
</tr>
<tr>
<td>1959</td>
<td>487.9</td>
<td>92.10</td>
<td>45.50</td>
<td>50.5</td>
<td>11.80</td>
<td>25.4</td>
<td>0.63</td>
<td>1.4</td>
</tr>
<tr>
<td>1958</td>
<td>449.7</td>
<td>82.58</td>
<td>44.20</td>
<td>53.5</td>
<td>11.60</td>
<td>26.2</td>
<td>0.56</td>
<td>1.3</td>
</tr>
<tr>
<td>1957</td>
<td>444.0</td>
<td>76.74</td>
<td>43.60</td>
<td>56.6</td>
<td>11.40</td>
<td>26.3</td>
<td>0.51</td>
<td>1.2</td>
</tr>
<tr>
<td>1956</td>
<td>421.7</td>
<td>70.46</td>
<td>40.10</td>
<td>56.9</td>
<td>11.60</td>
<td>28.9</td>
<td>0.48</td>
<td>1.2</td>
</tr>
<tr>
<td>1955</td>
<td>400.0</td>
<td>68.31</td>
<td>40.63</td>
<td>59.3</td>
<td>10.64</td>
<td>28.2</td>
<td>0.42</td>
<td>1.0</td>
</tr>
<tr>
<td>1954</td>
<td>366.8</td>
<td>70.89</td>
<td>40.34</td>
<td>56.9</td>
<td>10.96</td>
<td>27.2</td>
<td>0.39</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(Data was obtained from the FY1983 Valuation of the Military Retirement System, and the 1983 and 1967 Economic Reports of the President.)

The analyses determined military basic pay increased by a factor of 4.8, while CPI inflation had increased by a factor of 3.6. These two factors were calculated to have accounted for approximately 76% of the increase in military retirement costs.)

30
Figure 2.2  Federal Outlays.
DEFENSE SPENDING

LEGEND
DEFENSE SPENDING
MILPERS COSTS
RETIREMENT COSTS

Figure 2.3 Defense Spending.
(21% - wage growth, 55% - CPI inflation). The other two factors, increases in the retired population and COLA adjustments to retired pay, were responsible for 19% and 5%, respectively, of the remaining 24% increase in costs. [Refs. 1,16: p. VIII-7, pp. F-1 to F-11]

It was also determined that changes in officer enlisted mix, changes in grade rank years-of-service (YOS) at retirement, mortality improvements, and the establishment of paygrades E8 E9 were not major factors for the increases in retirement costs. [Refs. 1,16: p. VIII-7, p. F-9]

E. SUMMARY

Whether considered alone or whether they are compared to other federal outlays, the costs of the military retirement system have grown tremendously. In the last thirty years alone, as a percentage of total federal expenditures, retirement costs have increased over three-fold. There is no doubt that these costs will continue to grow and become an even greater percentage of the federal and defense budgets. As the major portion of military retirement costs, non-disability retirement provisions appear to be the likely candidates for cost-saving measures.


III. MILRET COMPUTER PROGRAM

A. BACKGROUND

The MILRET computer program is a major revision of the ENTRYAGE computer Model that was developed in 1983 at the Naval Postgraduate School as part of a thesis. The ENTRYAGE model is an 750-line Waterloo BASIC language program that was used to perform a sensitivity analysis on both individual and aggregate entry-age normal retirement cost methods under differing economic, managerial, and legal assumptions. However, only active duty non-disability retirement costs were included in the program. [Ref. 17]

At the request of the Office of the Assistant Secretary of Defense (Manpower, Logistics, and Reserve Affairs), an effort was initiated to revise the ENTRYAGE program to produce results comparable to those of the Military Retirement System Projection and Actuarial Valuation Program (GORGO) developed by the DoD Actuary. This 3000-line FORTRAN language program has the capability to make dynamic, transitional, and steady-state projections. GORGO is an extremely detailed program that encompasses all aspects of the military retirement system: non-disability, disability, active and reserve, officers and enlisted personnel, and SBP population and cost. Input for this program is provided by another DoD Actuary program, the Annualized Cost of Leaving (ACOL) model. [Refs. 1,8: pp. IX-24 & IX-25.pp. 9 & 10]

The revisions to the original ENTRYAGE model were to include: (1) reserve, disability, and SBP provisions in the algorithms; (2) make the program more "user-friendly" and interactive; (3) produce "cleaner" output; and (4) have the capability to access external data bases. Consideration was also to be given to recode the
ENTRYAGE program to either Pascal or Interactive Financial Planning System (IFPS).

As work progressed, it became obvious that the GORGO program was of a much higher level of sophistication than the ENTRYAGE computer model. In fact, for the Fifth Quadrennial Review of Military Compensation, two additional computer programs were written to provide data inputs to GORGO. In all, five separate computer programs were utilized to analyze military retirement costs and the impact of various alternatives. The experience, talent, and time required to develop the ENTRYAGE model into something comparable to GORGO were beyond the scope of the author.

B. REVISIONS

The changes made to the ENTRYAGE model have been extensive. The ENTRYAGE model has been almost completely rewritten and the new program has, therefore, been renamed as the MILRET (Military Retirement) program. Major revisions to the original ENTRYAGE model include:

* Internal documentation of the program.

* Development of "call-able" procedures and functions (features of Waterloo BASIC) to replace approximately 75 "GOTO" and "GOSUB" statements.

* Extensive use of menus to provide a more user-friendly environment

The revisions to the ENTRYAGE model have resulted in over 1300 lines of code for the MILRET program. Since Waterloo BASIC includes functions and procedures, the decision was made to remain with that language. No algorithms were developed for reserve, disability, or SBP provisions, nor was the capability to access external data bases included.
C. INSTRUCTIONS

Use of the MILRET is relatively simple and straightforward. To enter the Waterloo BASIC environment on the IBM System 3033, the following steps are required:

1. "WBASIC" < ENTER >
2. "OLD MILRET < ENTER >
3. "RUN" < ENTER >

Do not include the quotation marks, only what is contained between them. After a few moments while the program is loading, a message will appear with the MILREP name. Shortly thereafter, a Main Menu is presented from which to choose the following:

1. Program Description
2. Enter Change Data and Actuarial Assumptions
3. Individual Entry-Age Method
4. Aggregate Entry-Age Method
5. Expanded Multi-Year Individual Cost Method
6. Exit Program

It is recommended for the first time user to start with the program description, followed by a review of the data and actuarial assumptions contained in the program. Appendix C contains listings of the various menus that are displayed and some sample inputs.
APPENDIX A

MILRET COMPUTER PROGRAM (VERSION 2.0)

00010!***************************************************************
00020! MILRET Pension Cost Program
00030! This is a three part interactive program that calculates
00040! non-disability military retirement costs. The three parts of
00050! the program are (1) individual entry-age cost method calcula-
00060! tion, (2) aggregate entry-age cost method, and (3) a multi-
00070! year expanded individual cost method. Program data has been
00080! derived from Department of Defense sources, and considers
00090! 1983 to be the current year.
00100!***************************************************************
00110
00120!***************************************************************
00130! OPTION Statements
00140! system of certain global information to be used to the control
00150! the execution of the program;
00160! prompt: A '?' is displayed on the terminal when data is input
00170! base 1: Establishes 'l' as the lower extent of all matrices
00180! lprec: Numbers have 16 digits of precision (long precision).
00190!***************************************************************
00200! option prompt, base 1, lprec
00210
00220
00230!***************************************************************
00240! RESTORE Statement
00250! Restores the data-list conceptual pointer to the first item
00260! in the first data statement of the program.
00270!***************************************************************
00280
00290
00300!***************************************************************
00310! Actuarial and economic assumptions
00320!***************************************************************
00330! current_year = 1983  % annuity_multiplier = .025
00340! cola = .95  % max_percent_of_pay = .75
00350! salary_scale_incr = .055  % off_retire_prob = .40
00360! annual_disc_rate = .06  % enl_retire_prob = .12
00370
00380!***************************************************************
00390! The opening credit is first displayed, followed by the
00400! program's main menu. The operator's selection is checked to
00410! determine if the operator desires to terminate the program.
00420! If the program continues on, the appropriate procedure is
00430! called. Finally, if an invalid selection number has been
00440! entered, an error message is printed and the main menu is
00450! re-displayed to the operator.
00460!***************************************************************

38
**PAGE 2**

00470 call dimension_matrices
00480 call read_in_data
00490 00500 call milret_program_opening_credit
00510 main_menu_selection$='0'
00520 while (main_menu_selection$>'6')
00530 call display_main_menu
00540 on ioerr ignore
00550 input main_menu_selection$
00560 if main_menu_selection$='6'
00570 call exit_program_message
00580 else main_menu_selection$='1'
00590 call program_description
00600 else main_menu_selection$='2'
00610 call enter_data
00620 else main_menu_selection$='3'
00630 call individual_entry_age_normal
00640 else main_menu_selection$='4'
00650 call aggregate_entry_age_normal
00660 else main_menu_selection$='5'
00670 call expanded_multi_year_individual_normal
00680 else
00690 call main_menu_error_message
00700 endif
00710 endloop
00720
00730 PROCEDURE milret_program_opening_credit
00740# PROCEDURE milret_program_opening_credit
00750 PROCEDURE milret_program_opening_credit
00760 proc milret_program_opening_credit
00770 print chr$(12)
00780 print chr$(12)
00790 print chr$(12)
00800 print
00810 print tab(14); "MILRET PROGRAM (Version 2.0, 1985)"
00820 print
00830 print tab(14); 'Developed at Naval Postgraduate School, Monterey, CA"
00840 print
00850 print tab(14); ' (Please wait - program is loading.)"
00860 for i = 1 to 30000
00870 next i
00880 endproc
00890 endproc
00900# ENTRYAGE_PROGRAM_OPENING_CREDIT
00910# ENTRYAGE_PROGRAM_OPENING_CREDIT
00920# ENTRYAGE_PROGRAM_OPENING_CREDIT
00930 PROCEDURE dimension_matrices
00940 PROCEDURE dimension_matrices
00950 PROCEDURE dimension_matrices
00960 proc dimension_matrices
00970 proc dimension_matrices
00980 proc dimension_matrices
00990 current_year_basepay(26,6)
01000 prior_year_basepay(26,6)
01010 nml_nondis_retd_mortality(31)
01020 off_nondis_retd_mortality(31)
01030 avg_age_indiv_retired_grade(26)
01040 avg_age_indiv_retired_grade(26)
01050 target_retired_grade_prob(26)
01060 enlisted_accession(32)
01070 officer_accession(32)
01080 endproc
01090 endproc
01100 endproc

**PAGE 3**
PROCEDURE read_in_data

The various data matrices are read from the program into internal storage for use in the calculations.

proc readindata
read mat current_year_basepay
read mat prior_year_basepay
read mat enl_nondis_retired_mortality
read mat off_nondis_retired_mortality
read mat avg_loss_for_retired_grade
read mat avg_age_for_retired_grade
read mat target_retired_grade_prob
read mat enlisted_accession
endproc

1983 pay data

There is a value in this matrix (and the one below) for each of the 26 paygrades (e1-e9, w1-w4, o1, o1e, o2, o2e, o3, o3e, and o4-o10) in 2-year increments from 20 years to 30+ years of military service.

20 yrs. 22 yrs. 24 yrs. 26 yrs. 28 yrs. 30+ yrs.
573.6, 573.6, 573.6, 573.6, 573.6, 573.6
642.9, 642.9, 642.9, 642.9, 642.9, 642.9
762.3, 762.3, 762.3, 762.3, 762.3, 762.3
888.6, 888.6, 888.6, 888.6, 888.6, 888.6
1102.8, 1102.8, 1102.8, 1102.8, 1102.8, 1102.8
1299.3, 1299.3, 1299.3, 1299.3, 1299.3, 1299.3
1483.5, 1483.1, 1583.1, 1779.9, 1779.9, 1779.9
1917.9, 2019.0, 2019.0, 2215.2, 2215.2, 2215.2
1660.8, 1660.8, 1660.8, 1660.8, 1660.8, 1660.8
1789.8, 1862.4, 1862.4, 1862.4, 1862.4, 1862.4
1994.1, 2066.4, 2066.4, 2139.3, 2139.3, 2139.3
2267.7, 2243.6, 2243.6, 2526.0, 2526.0, 2526.0
1362.4, 1382.4, 1382.4, 1382.4, 1382.4, 1382.4
1716.6, 1716.6, 1716.6, 1716.6, 1716.6, 1716.6
1752.6, 1752.6, 1752.6, 1752.6, 1752.6, 1752.6
2029.2, 2029.2, 2029.2, 2029.2, 2029.2, 2029.2
2361.9, 2361.9, 2361.9, 2361.9, 2361.9, 2361.9
2397.3, 2397.3, 2397.3, 2397.3, 2397.3, 2397.3
2731.2, 2731.2, 2731.2, 2731.2, 2731.2, 2731.2
3155.7, 3266.1, 3266.1, 3266.1, 3266.1, 3266.1
3488.4, 3690.9, 3690.9, 4002.9, 4002.9, 4002.9
4555.8, 4555.8, 4555.8, 4555.8, 4555.8, 4555.8
4791.6, 4791.6, 4791.6, 4791.6, 4791.6, 4791.6
4791.6, 4791.6, 4791.6, 4791.6, 4791.6, 4791.6
1984 pay data

20 yrs. 22 yrs. 24 yrs. 26 yrs. 28 yrs. 30 yrs.
551.4, 551.4, 551.4, 551.4, 551.4, 551.4
551.4, 551.4, 551.4, 551.4, 551.4, 551.4
551.4, 551.4, 551.4, 551.4, 551.4, 551.4
551.4, 551.4, 551.4, 551.4, 551.4, 551.4
551.4, 551.4, 551.4, 551.4, 551.4, 551.4
551.4, 551.4, 551.4, 551.4, 551.4, 551.4
### Enlisted Non-Disability Retired Life Expectations

Thirty-one life expectancies for ages 35 to 65 years old.

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Life Expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>37.47</td>
</tr>
<tr>
<td>36</td>
<td>36.57</td>
</tr>
<tr>
<td>37</td>
<td>35.67</td>
</tr>
<tr>
<td>38</td>
<td>34.77</td>
</tr>
<tr>
<td>39</td>
<td>33.86</td>
</tr>
<tr>
<td>40</td>
<td>32.95</td>
</tr>
<tr>
<td>41</td>
<td>32.04</td>
</tr>
<tr>
<td>42</td>
<td>31.14</td>
</tr>
<tr>
<td>43</td>
<td>30.24</td>
</tr>
<tr>
<td>44</td>
<td>29.34</td>
</tr>
<tr>
<td>45</td>
<td>28.46</td>
</tr>
<tr>
<td>46</td>
<td>27.59</td>
</tr>
<tr>
<td>47</td>
<td>26.73</td>
</tr>
<tr>
<td>48</td>
<td>25.88</td>
</tr>
<tr>
<td>49</td>
<td>25.04</td>
</tr>
<tr>
<td>50</td>
<td>24.22</td>
</tr>
<tr>
<td>51</td>
<td>23.41</td>
</tr>
<tr>
<td>52</td>
<td>22.62</td>
</tr>
<tr>
<td>53</td>
<td>21.87</td>
</tr>
<tr>
<td>54</td>
<td>21.12</td>
</tr>
<tr>
<td>55</td>
<td>20.38</td>
</tr>
<tr>
<td>56</td>
<td>19.63</td>
</tr>
<tr>
<td>57</td>
<td>18.88</td>
</tr>
<tr>
<td>58</td>
<td>18.14</td>
</tr>
<tr>
<td>59</td>
<td>17.40</td>
</tr>
<tr>
<td>60</td>
<td>16.66</td>
</tr>
<tr>
<td>61</td>
<td>15.92</td>
</tr>
<tr>
<td>62</td>
<td>15.18</td>
</tr>
<tr>
<td>63</td>
<td>14.44</td>
</tr>
<tr>
<td>64</td>
<td>13.70</td>
</tr>
<tr>
<td>65</td>
<td>12.96</td>
</tr>
</tbody>
</table>

### Officer Non-Disability Retired Life Expectations

Thirty-one life expectancies for ages 35 to 65 years old.

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Life Expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>40.90</td>
</tr>
<tr>
<td>36</td>
<td>39.97</td>
</tr>
<tr>
<td>37</td>
<td>39.04</td>
</tr>
<tr>
<td>38</td>
<td>38.13</td>
</tr>
<tr>
<td>39</td>
<td>37.20</td>
</tr>
<tr>
<td>40</td>
<td>36.28</td>
</tr>
<tr>
<td>41</td>
<td>35.37</td>
</tr>
<tr>
<td>42</td>
<td>34.45</td>
</tr>
<tr>
<td>43</td>
<td>33.54</td>
</tr>
<tr>
<td>44</td>
<td>32.63</td>
</tr>
<tr>
<td>45</td>
<td>31.73</td>
</tr>
<tr>
<td>46</td>
<td>30.85</td>
</tr>
<tr>
<td>47</td>
<td>30.00</td>
</tr>
<tr>
<td>48</td>
<td>29.14</td>
</tr>
<tr>
<td>49</td>
<td>28.27</td>
</tr>
<tr>
<td>50</td>
<td>27.40</td>
</tr>
<tr>
<td>51</td>
<td>26.52</td>
</tr>
<tr>
<td>52</td>
<td>25.65</td>
</tr>
<tr>
<td>53</td>
<td>24.78</td>
</tr>
<tr>
<td>54</td>
<td>23.91</td>
</tr>
<tr>
<td>55</td>
<td>23.04</td>
</tr>
<tr>
<td>56</td>
<td>22.16</td>
</tr>
<tr>
<td>57</td>
<td>21.30</td>
</tr>
<tr>
<td>58</td>
<td>20.43</td>
</tr>
<tr>
<td>59</td>
<td>19.56</td>
</tr>
<tr>
<td>60</td>
<td>18.70</td>
</tr>
<tr>
<td>61</td>
<td>17.83</td>
</tr>
<tr>
<td>62</td>
<td>16.97</td>
</tr>
<tr>
<td>63</td>
<td>16.11</td>
</tr>
<tr>
<td>64</td>
<td>15.25</td>
</tr>
<tr>
<td>65</td>
<td>14.39</td>
</tr>
</tbody>
</table>

### Average LOS Data

There is an entry in this matrix (and the two below) for e1-e9, w1-w4, o1, o2, o4, o5, o3, o2, and o4-o10. Therefore, there are twenty-six data entries.
02510! Average age at retirement data
02520! 26 average retirement ages for each of the 26 paygrades.
02530! Average age at retirement data
02540! 26 average retirement ages for each of the 26 paygrades.
02560! 26 average retirement ages for each of the 26 paygrades.

02570! Target retirement grade probability data
02610! 26 probabilities of retiring in a particular paygrade.
02630! 26 probabilities of retiring in a particular paygrade.

02690! Enlisted accession data
02710! Contains 32 enlisted accession rates for the years 1951-1982.
02720! Contains 32 enlisted accession rates for the years 1951-1982.
02730! Contains 32 enlisted accession rates for the years 1951-1982.

02790! Officer accession data
02810! Contains 32 officer accession rates for the years 1951-1982.
02820! Contains 32 officer accession rates for the years 1951-1982.

PROCEDURE display_main_menu
02910! Displays a main menu from which to make a program selection.
02920! Displays a main menu from which to make a program selection.
02930! Displays a main menu from which to make a program selection.

02990! This is a three-part interactive program that
02990! Calculates individual, aggregate, and multi-year
02990! Retirement costs. Choose a selection from the
03000! Following list of options:
03010! '1. Program description'
03020! '2. Enter/change data and actuarial assumptions'
03030! '3. Individual entry-age cost method'
03040! '4. Aggregate entry-age cost method'
03100 print tab(12);'5. Expanded multi-year individual cost method'  
03110 print  
03120 print tab(12);'6. Exit program'  
03130 print  
03140 print ' Type in your selection number and press the <enter> key.'  
03150 endproc  
03160!**************************************************************************  
03170  
03210!**************************************************************************  
03220!* PROCEDURE exit_program_message  
03230!* Prints a message upon exiting the entry-age program.  
03240!***************************************************************************  
03250 proc exit_program_message  
03260 print chr$(12)  
03270 print  
03280 print 'Program has been exited. Type in "bye" and press the <enter> key to return to the'  
03290 print 'CM5 environment.'  
03300 print  
03310 print 'CMS environment.'  
03320 print  
03330 print % print % print % print % print % print % stop  
03340!**************************************************************************  
03350  
03390!**************************************************************************  
03400!* PROCEDURE main_menu_error_message  
03410!* This procedure prints an error message when called.  
03420!***************************************************************************  
03430 proc main_menu_error_message  
03440 print chr$(12)  
03450 print  
03460 print % print % print  
03470 print % print % print  
03480 print  
03490 print tab(16); 'You have made an incorrect selection. A number'  
03500 print tab(16); 'from 1 to 6 must be entered in order to proceed.'  
03510 print tab(16); 'Please input an appropriate number when the main'  
03520 print tab(16); 'menu returns to the screen.'  
03530 print % print % print  
03540 print tab(16); 'Please press <enter> to return to main menu.'  
03550 input nothing$  
03560 endproc  
03570!**************************************************************************  
03580  
03660 proc program_description  
03670 print chr$(12)  
03680 print  
03690 print tab(27); 'Welcome to the MILRET program. This program was developed'  
03700 print tab(10); &  
03710 & 'at the Naval Postgraduate School in 1983 and revised in 1985.'  
03720 print tab(10); &  
03730 & 'The program utilizes three variations of the entry-age normal'  
03740 print tab(10); &  
03750 & 'method of determining retirement costs.'  
03760 print
1. Individual entry age normal
2. Aggregate entry age normal
3. Multi-year expanded individual

Retirement costs are computed from user-supplied information.

The individual subprogram produces detailed information at the individual paygrade and year of service entry level.

Retirement costs are computed from user-supplied information and internally stored data. Some of the actuarial and economic assumptions may be changed by the operator.

Please press <enter> to continue.

The aggregate subprogram requires the operator to input all of the data. The information stored within the program is not available to this subprogram. There are no "hardwired" probability assumptions.

The multi-year expanded individual subprogram computes both normal costs and total retirement costs for years 1983 through 1982. This subprogram utilizes user-provided data and stored information. The operator may select from a "summary" or a "detail" presentation of the retirement cost calculations.

When you are returned to the main menu, please select from the options listed. If this is your first time with this program, you may want to review the assumptions first.

Please press <enter> to return to main menu.

The individual subprogram produces detailed information at the individual paygrade and year of service entry level.

Some of the actuarial and economic assumptions may be changed by the operator.

The aggregate subprogram requires the operator to input all of the data. The information stored within the program is not available to this subprogram. There are no "hardwired" probability assumptions.

The multi-year expanded individual subprogram computes both normal costs and total retirement costs for years 1983 through 1982. This subprogram utilizes user-provided data and stored information. The operator may select from a "summary" or a "detail" presentation of the retirement cost calculations.

When you are returned to the main menu, please select from the options listed. If this is your first time with this program, you may want to review the assumptions first.

Please press <enter> to return to main menu.
04410 max_pbp = 0.80 %  min_pbp = 0.25
04420 max_por = 1.00 %  min_por = 0.01
04430 max_per = 1.00 %  min_per = 0.01
04440 data_sel$='0'.
04450 on error ignore % on conv ignore
04460 while (data_sel$<>'8')
04470 call print_data_menu
04480 input data_sel$
04490 if data_sel$='1' then
04500 print tab(05); Enter the new value for cola (e.g., .052).
04510 input new_c % flagio_status
04520 call numeric_value_check(new_c,max_cola,min_cola)
04530 if ((new_c=max_cola) and (new_c=min_cola)) and (flag<>8)
04540 cola = new_c
04550 endif
04560 elseif data_sel$='2'
04570 print tab(05); Enter the new salary increase (e.g., .045).
04580 input new_ssi % flagio_status
04590 call numeric_value_check(new_ssi,max_ssi,min_ssi)
04600 if ((new_ssi=max_ssi) and (new_ssi=min_ssi)) and (flag<>8)
04610 salary_scale_incr = new_ssi
04620 endif
04630 elseif data_sel$='3'
04640 print tab(05); & Enter the new annual discount rate (e.g., .075).'
04650 input new adr % flagio_status
04660 call numeric_value_check(new adr,max adr,min adr)
04670 if ((new adr=max adr) and (new adr=min adr)) and (flag<>8)
04680 annual_disc_rate = new adr
04690 endif
04700 elseif data_sel$='4'
04710 print tab(05); & Enter the new multiplier (e.g., .015).'
04720 input new_am % flagio_status
04730 call numeric_value_check(new am,max am,min am)
04740 if ((new am=max am) and (new am=min am)) and (flag<>8)
04750 annuity_multiplier = new am
04760 endif
04770 elseif data_sel$='5'
04780 print tab(05); & Enter the new maximum % of basic pay (e.g., .60).'
04790 input new pbp % flagio_status
04800 call numeric_value_check(new pbp,max pbp,min pbp)
04810 if ((new pbp=max pbp) and (new pbp=min pbp)) and (flag<>8)
04820 max_percent_of_pay = new pbp
04830 endif
04840 elseif data_sel$='6'
04850 print 'Enter probability of new officer entrant retiring.'
04860 input new por % flagio_status
04870 call numeric_value_check(new por,max por,min por)
04880 if ((new por=max por) and (new por=min por)) and (flag<>8)
04890 off_reitre_prob = new por
04900 endif
04910 elseif data_sel$='7'
04920 print 'Enter probability of new enlisted entrant retiring.'
04930 input new_per % flagio_status
04940 call numeric_value_check(new per,max per,min per)
04950 if ((new per=max per) and (new per=min per)) and (flag<>8)
04960 enl_reitre_prob = new per
04970 endif
This procedure checks that the value input is a valid numeric value. If not, an error message is displayed.

```plaintext
proc numeric_value_check(new_value,max_value,min_value)
   if #8
      print chr$(12) % print % print % print % print
      print tab(15) &
      & " You have entered an alpha-numeric vs. numeric value."
      print using " Only numeric values from $000" +
      & " to $999 may be entered." & min_value,max_value &
      print % print % print % print tab(15) &
      & " Please press <enter> to return to the Data Menu ==>
   input nothing$
   elseif (new_value < min_value) or (new_value > max_value)
      print tab(15) &
      & " The value you have entered is outside the range"
      print tab(15) &
      & " of allowable values. Please input a numeric value"
      print using " between $000 and $999 for your" &
      & " entry." & min_value,max_value &
      print % print % print % print tab(15) &
      & " Please press <enter> to return to the Data Menu ==>
   input nothing$
   endif
endproc
```

The following actuarial and economic values are currently stored within the MILRET program. To change a value, type ' in the selection number first (i.e., from 1 to 7) and press <enter>. When the prompt appears, type in the new value as a decimal (e.g., .065) and press <enter> again. Repeat this as necessary.
05610 print tab(10) &
05620 & 'often as necessary. Enter an "S" to return to the main menu.'
05630 print
05640 print using cola$,cola
05650 print using salary$,salary_scale_incr
05660 print using discount$,annual_disc_rate
05670 print using multiplier$,annuity_multiplier
05680 print using most$,max_percent_of_pay
05690 print using oprob$,off_retire_prob
05700 print using eprob$,eml_retire_prob
05710 print exit$
05720 print
05730 print tab(40)
'Please input a number and press <enter>.'
05740 endproc

ired

05780 PROCEDURE individual_entry_age_normal
05790 PROC individual_entry_age_normal
05800 call input_individual_data
05820 call individual_subprogram_c>redit
05830 call input_individual_data
05840 call determine_year_factor
05860 curr_pay_for_retired_grade = current_year_basepay(y,y)
05870 retirement_year = entry_year + los
05880 number_of_years_to_retirement = (retirement_year - current_year)
05890 sal_incr = salary_scale_incr
05900 curr_pay = curr_pay_for_retired_grade
05910 percentage_of_pay = los * annuity_multiplier
05930 projected_monthly_retirement_basepay = &
05940 & fn_future_value(currpay,number_of_years_to_retirement,sal_incr)
05960 if (percentage_of_pay > max_percent_of_pay)
05970 percentage_of_pay = max_percent_of_pay
05980 endif
06000 if (entry_year>1980)
06010 num_yrs_to_ret = number_of_years_to_retirement
06020 call high_3_pay_avg(num_yrs_to_ret,currpay,sal_incr)
06030 pay_basis_for_retirement = avg_pay
06040 else
06050 pay_basis_for_retirement = projected_monthly_retirement_basepay
06060 endif
06080 projected_annual_retirement_annuity = &
06100 & pay_basis_for_retirement * percentage_of_pay * 12 !months)
06110 para = projected_annual_retirement_annuity
06120 rle = remain_life_expect /adr = annual_disc_rate
06140 pv_ret_pay_at_retire = &
06150 & fn_pv_of_retirement_benefits_at_retirement(para,rle,adr)
06170 pvpars = pv_ret_pay_at_retire =
06180 noytr = number_of_years_to_retirement
06200 pv_ret_pay_incurr yr = &
06210 & fn_pv_of_retirement_benefits_in_current_year(pvpars,loytr,adr)
06230 curr yr norm_cost = &
06250 & fn_current_year_individual_normal_cost(pvpar,los,adr)
06260 cal prior year data
06280 if (prev yr_ind norm cost = 0.00) then call prior year normal cost
06570 curr yr gain or loss = curr yr norm cost - prev yr ind norm cost
06720 if (defer gain or loss > (-999999)) and &
06730 & (defer gain or loss < 999999)
06740 n = number_of_years_to_retirement + 1
06750 factor = 1/(1+annual_disc_rate)^n
apl_ddgain_or_loss = curr_yr_gain_or_loss + defer_gain_or_loss &
annual_disc_rate / (1-factor)
curr_yr_ind_ret_cost = curr_yr_norm_cost + applied_gain_or_loss
&
proportion_new_entrants * tgt_year_prob
curr_yrindret - costs = curr_yrnormcost + applddgainorloss

if target_population_retiring * number_of_new_entrants = &
curr_yr_ind_ret_cost
endif

!(* individual entry age normal *)

print tab(10); &
'You are now in the individual MILRET subprogram. Detailed' print tab(0); A
'information for an individual retirement pay grade and specific' print tab(10); &
'year of service entry date is produced.' print <enter> to continue 2:>
input nothing$
endproc

PROCEDURE input_individual_data

while (ind_data_sel$ <> '8')
call individual_data_display
input inddatasel$
if inddatasel$ = '1'
print tab(5); 'Enter paygrade at retirement.'
input grade$
if (g>=27) then goto 7270
los = avg_los_for_retired_grade(g)
age = avg_age_for_retired_grade(g)
tgt_grade_prob = target_retired_grade_prob(g)
if (g<:1) and (g<:19) then
prob_of_new_entrant_retiring = enl_retire_prob
elseif (g>20) and (g<:26)
prob_of_new_entrant_retiring = off_retire_prob
endif
elseif (g>=20) and (g<:26)
prob_of_new_entrant_retiring = enl_retire_prob
endif
elseif ind_data_sel$ = '2'
print tab(5); 'Enter year of service entry.'

PROCEDURE display_individual_data

PROCEDURE display_individual_retrement_cost_projections

PROCEDURE display_targetgroup_retrement_cost_projections

PROCEDURE individual_subprogram_credit

PROCEDURE individual_subprogram_credit

PROCEDURE input_individual_data

PROCEDURE input_individual_data

PROCEDURE input_individual_data

PROCEDURE input_individual_data

PROCEDURE input_individual_data

PROCEDURE input_individual_data

PROCEDURE input_individual_data
07490  input entry_year
07500  on conv ignore
07510  if (entry_year>=1951) and (entry_year<=1982)
07520    index = entry_year - 1950
07530  else if (g>=20) and (g<=26)
07540    number_of_new_entrants = 1000 * enlisted_accession(index)
07550  else if (g>=1) and (g<=19)
07560    number_of_new_entrants = 1000 * officer_accession(index)
07570  endif
07580  else
07590    loop
07600      print chr$(12) / print % print % print % print % print
07610      print tab(15); 'Enter new number of new entrants in initial year of service (e.g., 8500, 203000.)'
07620      input number_of_new_entrants
07630      num_new_ents = number_of_new_entrants
07640      until ((num_new_ents>0) and (num_new_ents<300000))
07650  endif
07660  elseif ind_data_sel$ = '3'
07670      print tab(5); 'Enter LOS for this paygrade'
07680      input los
07690  elseif ind_data_sel$ = '4'
07700      print tab(5); 'Enter age for this paygrade'
07710      input age
07720  elseif ind_data_sel$ = '5'
07730      print tab(5); 'Enter remaining life expectancy'
07740      input remain_life_expect
07750  elseif ind_data_sel$ = '6'
07760      print tab(5); 'Enter probability of new entrant retiring.'
07770      input prob_of_new_entrant_retiring
07780  elseif ind_data_sel$ = '7'
07790      print tab(5); 'Enter prob. of entrant retiring in tgt. grade'
07800      input tgt_grade_prob
07810  endif
07820 endloop
07830 endproc

07930 PROCEDURE individualdata_display
07940 proc individual_data_display
07950 paygrade$ = '1. Paygrade at retirement = $$$'
07960 entryyr$ = '2. Year of service entry = $$$'
07970 avglos$ = '3. Average LOS for this paygrade = $$.'
07980 avgage$ = '4. Average age for this paygrade = $$.'
07990 lifexp$ = '5. Remaining life expectancy = $$.'
08000 newprob$ = '6. Probability of new entrant retiring = $$'
08010 &
08020 retprob$ = '7. Probability of entrant retiring in ' &
08030 'tgt grade = $$'
08040 ind_exit$ = '8. Data entry complete'
08050 print chr$(12)
08060 print tab(25); 'Individual Subprogram Data'
08070 print tab(10); &
Start with item number 1 and enter the desired "Paygrade at retirement." Next enter the "Year of service entry." Data items '3 through 7 will be supplied by the program. If you desire to change them, type in the appropriate number and press <enter>.'

PROCEDURE determine_grade_factor

PROCEDURE determine_life_expectancy_factor
08750 if (age<40.5) and (age>=39.5) then z=6
08760 if (age<41.5) and (age>=40.5) then z=7
08770 if (age<42.5) and (age>=41.5) then z=8
08780 if (age<43.5) and (age>=42.5) then z=9
08790 if (age<44.5) and (age>=43.5) then z=10
08800 if (age<45.5) and (age>=44.5) then z=11
08810 if (age<46.5) and (age>=45.5) then z=12
08820 if (age<47.5) and (age>=46.5) then z=13
08830 if (age<48.5) and (age>=47.5) then z=14
08840 if (age<49.5) and (age>=48.5) then z=15
08850 if (age<50.5) and (age>=49.5) then z=16
08860 if (age<51.5) and (age>=50.5) then z=17
08870 if (age<52.5) and (age>=51.5) then z=18
08880 if (age<53.5) and (age>=52.5) then z=19
08890 if (age<54.5) and (age>=53.5) then z=20
08900 if (age<55.5) and (age>=54.5) then z=21
08910 if (age<56.5) and (age>=55.5) then z=22
08920 if (age<57.5) and (age>=56.5) then z=23
08930 if (age<58.5) and (age>=57.5) then z=24
08940 if (age<59.5) and (age>=58.5) then z=25
08950 if (age<60.5) and (age>=59.5) then z=26
08960 if (age<61.5) and (age>=60.5) then z=27
08970 if (age<62.5) and (age>=61.5) then z=28
08980 if (age<63.5) and (age>=62.5) then z=29
08990 if (age<64.5) and (age>=63.5) then z=30
09000 if (age<65.5) and (age>=64.5) then z=31
09010 endproc !(* determine_life_expectancy_factor *)
09020 !********************************************************************
09030 !FUNCTION future_value *
09040 !********************************************************************
09050 !
09060 !FUNCTION future_value(pv,n,i) 
09070 !
09080 ! pv = current basepay at retirement paygrade 
09090 ! n = number of years to retirement 
09100 ! i = annual discount rate 
09110 !
09120 fn_future_value = pv*(1+i)^n 
09130 fnend
09140 fnend
09150 fnend
09160 fnend
09170 fnend

09180 !PROCEDURE high_3pay_avg *
09190 !This procedure computes the average of the last 3 years *
09200 !basepay for those personnel who entered the service *
09210 !after 1980. It assumes that the highest 3 pay years are the *
09220 !last 3 years of an individuals career. *
09230 !
09240 proc high_3pay_avg(num_yrs,pay,ssincr)
09250 yrs = (num_yrs - 2)
09260 two_yr_prev_pay = fn_future_value(pay,yrs,ssincr)

51
PAGE 15

09470 one_yr_prev_pay = two_yr_prev_pay*1 + ssincr)
09480 retirement_yr_pay = one_yr_prev_pay*1 + ssincr)
09490 sum_of_pay = two_yr_prev_pay + one_yr_prev_pay + retirement_yr_pay)
09500 avg_pay = sum_of_pay/3
09510 endproc (* high 3 year averaging *)
09520
09530
09540 !============================================================================================================
09550 !FUNCTION pv_of_retirement_benefits_at_retirement *)
09560 !============================================================================================================
09570 def fn_pv_of_retirement_benefits_at_retirement(pmt,n,i)
09580 ! pmt = projected annual retirement pay in retirement year
09590 ! n = remaining life expectancy in years
09600 ! i = annual discount rate
09610 ! pv = "present" value of benefits in retirement year
09620 denominator = ((1+i)^n)
09630 pv = pmt * (((1-i)/denominator))/i)
09640 fn_pv_of_retirement_benefits_at_retirement = pv
09650 fnend
09660 !============================================================================================================
09670
09680
09690
09700 !FUNCTION pv_of_retirement_benefits_in_current_year *)
09710 !============================================================================================================
09720 def fn_pv_of_retirement_benefits_in_current_year(fv,n,i)
09730 ! fv = "present" value of benefits in retirement year
09740 ! n = number of years to retirement
09750 ! pv = present value of benefits in current year
09760 pv = fv/((1+i)^n)
09770 fn_pv_of_retirement_benefits_in_current_year = pv
09780 fnend
09790 !============================================================================================================
09800
09810
09820 !FUNCTION fn_current_year_individual_normal_cost *)
09830 !============================================================================================================
09840 def fn_current_year_individual_normal_cost(pv,n,i)
09850 ! pv = present value of future retirement benefits
09860 ! i = annual discount rate
09870 ! n = number of periods (length of service)
09880 ! pmt = current year normal cost payment
09890 denominator = ((1+i)^n)-1)
09900 pv = pmt * (i/denominator)
09910 fn_current_year_individual_normal_cost = pmt
09920 fnend
09930 !============================================================================================================
09940
09950
09960 !FUNCTION fn_current_year_individual_normal_cost *)
09970 !============================================================================================================
09980 !FUNCTION fn_current_year_individual_normal_cost(pv,n,i)
09990 ! pv = present value of future retirement benefits
10000 ! i = annual discount rate
10010 ! n = number of periods (length of service)
10020 ! pmt = current year normal cost payment
10030 denominator = ((1+i)^n)-1)
10040 pv = pmt * (i/denominator)
10050 fn_current_year_individual_normal_cost = pmt
10060 fnend
10070 !============================================================================================================
10080
10090 !FUNCTION fn_current_year_individual_normal_cost *)
10100 !============================================================================================================
10110 !FUNCTION proc prior_year_normal_cost *)
10120 proc prior_year_normal_cost
10130 ! pr_pay = prior_year_basepay(g,y)
10140 ! pr_yrs = (number_of_years_to_retirement + 1)
10150 ! incr = prev_yr_salary_scale_incr
10160 ! prior_proj_pay = fn_future_value(pr_pay,pr_yrs,incr)
10170
10180 prior_yr = (current_year - 1)
if (prior_yr > 1980)
call high_3_pay_avg(pr yr,pr pay,incr)
prior_pay_basis = avg_pay
else
prior_pay_basis = prior_proj_pay
endif

pr_proj_ann_ret_pay = prior_pay_basis * percentage_of_pay = 12
pp = pr_proj_ann_ret_pay
le = prev_yr_remain_life_expect
dr = prev_yr_annual_disc_rate
prior_pv_at_ret = &
& fn_pv_of_retirement_benefits_at_retirement(pp,le,dr)
prior_yr_ind_norm_cost = &
& fn_current_year_individual_normal_cost(prior_pv_at_ret,los,dr)

endproc (!* prior_year_normal_cost *)

procedure display_individual_data
PROCEDURE display_individual_data
proc display_individual_data
print chr$(12)
print tab(35); 'Individual Data Summary'
print
print using paygrade$,grade$
print using entryyr$,entry_year
print using avglos$,los
print using avgage$,age
print using lifeexpect$,remain_life_expect
print newprob$,probofnewentrant_retiring
print retprob$,tgtgradeprob
print tab(14); 'Current year =';current_year
print tab(14); 'Cola =';cola
print tab(14); 'Salary scale increase =';salary_scale_incr
print tab(14); 'Annual discount rate =';annual_disc_rate
print tab(14); 'Annuity multiplier =';annuity_multiplier
print tab(14); 'Maximum % of basepay =';max_percent_of_pay
print % print
print % print
print tab(45); 'Press <enter> to continue ='
input nothing$
endproc (!* display_individual_data *)

procedure display_individual_retirement_cost_projections
PROCEDURE display_individual_retirement_cost_projections
proc display_individual_retirement_cost_projections
print chr$(12)
print tab(20); 'Individual Retirement Cost Projections'
print
as = ' 1. Current monthly basepay at retirement '
b$ = 'paygrade = $$$$.
print using as + b$; curr_pay_for_retired_grade
c$ = ' 2. Projected monthly basepay at retirement '
d$ = 'paygrade = $$$$.
print using c$ + d$; projected_monthly_retirement_basepay
3. Pay basis for retirement = 8888.88

4. Percentage multiplier = 8888.88

5. Projected yearly retirement annuity = 8888.88

6. "Present" value of retirement benefits in

7. Current present value of retirement

8. Current year individual normal cost = 8888.88

9. Current year individual retirement cost

10. Number of new entrants in entry year

11. Target population retiring

12. Current target group retirement cost
procedure prior_year_data
11510* PROCEDURE prior_year_data
11520* 
11530* 
11540* proc prior_year_data
11550* prevyr_ind_norm_cost = 0.00 % defer_gain_or_loss = 0.00
11560* prevyr_annual_disc_rate = annual_disc_rate
11570* prevyr_salary_scale_incr = salary_scale_incr
11580* prevyr_remain_life_expect = remain_life_expect
11590* on conv ignore
11600* data_sel$ = '0'
11610* while (data_sel$<>'6')
11620* call print_prior_menu
11630* input data_sel$
11640* if data_sel$='1'
11650* print tab(05); &
11660* '& Enter previous year individual normal cost (e.g., 5823.6).'
11670* input prevyr_ind_norm_cost
11680* elseif data_sel$='2'
11690* print tab(05); &
11700* '& Enter any deferred gains or losses (e.g., 127.24).'
11710* input defer_gain_or_loss
11720* elseif data_sel$='3'
11730* print tab(05); &
11740* '& Enter previous year salary scale increase (e.g., .045).'
11750* input prevyr_salary_scale_incr
11760* elseif data_sel$='4'
11770* print tab(05); &
11780* '& Enter previous year annual discount rate (e.g., .072).'
11790* input prevyr_annual_disc_rate
11800* elseif data_sel$='5'
11810* print tab(05); &
11820* '& Enter previous year life expectancy (e.g., 31.25).'
11830* input prevyr_remain_life_expect
11840* endif
11850* endloop
11860* endproc

12000 endproc (!# prior_year_stuff =)
12010 proc print_prior_menu
12020* 
12030* pyinc$ = '1. Previous year individual normal cost
12040* dgol$ = '2. Deferred gains or losses
12050* pyssi$ = '3. Previous year salary scale increase
12060* pyadr$ = '4. Previous year annual discount rate
12070* pylse$ = '5. Previous year life expectancy
12080* exit$ = '6. No changes or changes are complete
12090* 
12100 print chr$(12)
12110 print tab(25); 'Previous Year Normal Cost Data'
12120 print tab(05); &
12130 print tab(10); &
12140 & 'The previous year individual normal cost will be calculated'
12150 print tab(10); &
12160 & 'based on the current year actuarial assumptions and other data'
12170 print tab(10); &
12180 & 'displayed below. However, different values may be entered by'
12190 print tab(10); &
12200 & 'selecting the appropriate number, pressing <enter>, and then'
12210 print tab(10); &
12220 & 'entering your data. Enter any known deferred gains/losses.'
12230 print tab(10); &
12240 & 'If you enter a value for previous year, it will be used instead'
12250 print tab(10); &
12264 & 'of one being computed by the program.'
12270 print
12280 print using pyinc$, prev yr ind norm cost
12290 print using dgol$, defer gain or loss
12300 print using pyss$, prev yr salary scale incr
12310 print using pyadr$, prev yr annual disc rate
12320 print using pyl$, prev yr remain life expect
12330 print exit$
12340 print
12350 print title(40); 'Please input a number and press <enter>.
12360 print exit$
12370 print tab(40) 'Please input a number and press <enter>.
12380 print exit$
12390 print tab(40) 'Please input a number and press <enter>.
12400 print exit$
12410 print tab(40) 'Please input a number and press <enter>.
12420 print exit$
12430 print tab(40) 'Please input a number and press <enter>.
12440 print exit$
12450 print tab(40) 'Please input a number and press <enter>.
12460 print exit$
12470 print tab(40) 'Please input a number and press <enter>.
12480 print exit$
12490 print tab(40) 'Please input a number and press <enter>.
12500 print exit$
12510 print tab(40) 'Please input a number and press <enter>.
12520 print exit$
12530 print tab(40) 'Please input a number and press <enter>.
12540 print exit$
12550 print tab(40) 'Please input a number and press <enter>.
12560 print exit$
50500 pvofc$ = ' 2. Present value of future compensation ...
50510 &'...... $ZZZ,ZZZ,ZZZ,ZZZV.##'
50520 ncpf$ = ' 3. Normal cost percentage factor ...........
50530 &'...... $ZZZ,ZZZ,ZZZ,ZZZV.##'
50540 cfytp$ = ' 4. Current FY total base pay ..........
50550 &'...... $ZZZ,ZZZ,ZZZ,ZZZV.##'
50560 cfync$ = ' 5. Current FY active force normal cost ....'&
50570 &'...... $ZZZ,ZZZ,ZZZ,ZZZV.##'
50580 exit$ = ' 6. No changes or changes are complete'
50590 print chr$(12)
50600 print tab(25); 'Aggregate Current FY Data'
50610 print
50620 print tab(10); &
50630 & ' Enter the present value of future benefits, the present '
50640 print tab(10); &
50650 & ' value of future compensation, and the current FY total base'
50660 print tab(10); &
50670 & 'pay. The normal cost percentage factor and the current FY '
50680 print tab(10); &
50690 & 'active force normal cost will be computed. If you desire to '
50700 print tab(10); &
50710 & 'change the normal cost percentage factor, do so and a new '
50720 print tab(10); &
50730 & 'active force normal cost will be computed.'
50740 print
50750 print using pvofb$, pres_val_of_fut_ben
50760 print using pvofc$, pres_val_of_fut_comp
50770 print using ncpf$, norm_cost_per_fac
50780 print using cfytp$, cur_fy_tot_bp
50790 print using cfync$, cur_fy_norm_cost
50800 print exit$
50810 print
50820 print tab(40); 'Please input a number and press <enter>.
50830 endproc (! print_curr_agg_menu #)
50840*******************************************************
50850
50860*******************************************************
50870# процедур aggregate_prev_and_total_data_entry
50880*******************************************************
50890 proc aggregate_prev_and_total_data_entry
50900 on cony ignore % on ioeerr ignore
50910 on conv ignore % on ioeerr ignore
50920 data_sel$ = '0'
50930 while (data_sel$<>'8')
50940 call print_prev_and_total_agg_menu
50950 input data_sel$
50960 if data_sel$='1'
50970 print tab(05); 'Enter previous FY normal cost percentage.'
50980 input prev_fy_norm_cost_per
50990 prev_fy_norm_cost = prev_fy_norm_cost_per * prev_fy_tot_bp
51000 cur_fy_gain_loss = (cur_fy_norm_cost - prev_fy_norm_cost)
51010 elseif data_sel$='2'
51020 print tab(05); 'Enter previous FY total base pay.'
51030 input prev_fy_tot_bp
51040 prev_fy_tot_cost = prev_fy_norm_cost_per * prev_fy_tot_bp
51050 cur_fy_gain_loss = (cur_fy_norm_cost - prev_fy_norm_cost)
51060 elseif data_sel$='3'
51070 print tab(05); 'Enter previous FY active force normal cost.'
51080 input new_prev_fy_norm_cost
51090 prev_fy_norm_cost = new_prev_fy_norm_cost
51100 cur_fy_gain_loss = (cur_fy_norm_cost - prev_fy_norm_cost)
51110# print curr_agg_menu
51120 cur_fy_gain_loss = (cur_fy_norm_cost - prev_fy_norm_cost)
elseif data_sel$='4'
    print tab(05) 'Enter current FY actuarial gains/losses.'
    input new_cur_fy_gain_loss
    cur_fy_gain_loss = new_cur_fy_gain_loss

elseif data_sel$='5'
    print tab(05) 'Enter any deferred gains or losses.'
    input def_gain_loss

endif
endloop
endproc

PROCEDURE print_prev_and_total_agg_menu
proc print_prev_and_total_agg_menu
cur_fy_gain_loss = cur_fy_norm_cost - prov_fy_norm_cost
cur_fy_gain_loss_appld = cur_fy_gain_loss + def_gain_loss

cur_fy_tot_ret_cost = cur_fy_norm_cost * cur_fy_gain_loss_appld

pyncp$ = 1. Previous FY normal cost percentage ......."+$
pytbp$ = 2. Previous FY total base pay .............."+$
pyfnc$ = 3. Previous FY active force normal cost .."+$

cyagl$ = 4. Current FY actuarial gains/losses ......"+$

defgl$ = 5. Deferred gains or losses .................."+$
cygla$ = 6. Current FY gains/losses applied ........"+$
cytrc$ = 7. Current FY total retirement cost ......."+$

exit$ = 8. No changes or changes are complete'
exit$
print chr$(12)
print tab(16); 'Aggregate Previous FY and Current FY Total Data'
print using pyncp$,prev_fy_normcost_per
print using pytbp$,prevfy_totbp
print using pyfnc$,prevfynormcost
print using cyagl$,cur_fy_gain_loss
print using defgl$,def_gain_loss
print using cygla$,cur_fy_gainloss_appld
print using cytrc$,cur_fy_tot_ret_cost
print using exit$,exit
print
print tab(40) 'Please input a number and press <enter>.'
endproc (!= print_prev_and_total_agg_menu =)

PAGE 21
5140  elseif data_sel$='4'
5150    print tab(05) 'Enter current FY actuarial gains/losses.'
5160    input new_cur_fy_gain_loss
5170    cur_fy_gain_loss = new_cur_fy_gain_loss
5190  elseif data_sel$='5'
5200    print tab(05) 'Enter any deferred gains or losses.'
5210    input def_gain_loss
5220    endif
5230  endloop
5240  endproc
5250 Fermprint_prev_and_total_agg_menu
5300  cur_fy_gain_loss = cur_fy_norm_cost - prev_fy_norm_cost
5310  cur_fy_gain_loss_appld = (cur_fy_gain_loss + def_gain_loss) * &
5340  $(annual_disc_rate/1-1/((1+annual_disc_rate)**20)))
5350  cur_fy_tot_ret_cost = cur_fy_norm_cost * cur_fy_gain_loss_appld
5360  pyncp$ = 1. Previous FY normal cost percentage ......."+$
5370  pytbp$ = 2. Previous FY total base pay .............."+$
5390  pyfnc$ = 3. Previous FY active force normal cost .."+$
5410  cyagl$ = 4. Current FY actuarial gains/losses ......"+$
5430  defgl$ = 5. Deferred gains or losses .................."+$
5450  cygla$ = 6. Current FY gains/losses applied ........"+$
5470  cytrc$ = 7. Current FY total retirement cost ......."+$
5490  exit$ = 8. No changes or changes are complete'
5500  exit$
5510  print chr$(12)
5520  print tab(16); 'Aggregate Previous FY and Current FY Total Data'
5530  print
5540  print tab(10); &
5550  & 'Enter the previous FY normal cost percentage, the previous'
5560  print tab(10); &
5570  & 'FY active force normal cost, and any deferred gains or losses'
5580  print tab(10); &
5590  & 'to compute the previous FY active force normal cost, current'
5600  print tab(10); &
5610  & 'gains/losses applied, and the current FY total retirement cost.'
5620  print
5630  print using pyncp$,prev_fy_normcost_per
5640  print using pytbp$,prevfy_totbp
5650  print using pyfnc$,prevfynormcost
5660  print using cyagl$,cur_fy_gain_loss
5670  print using defgl$,def_gain_loss
5680  print using cygla$,cur_fy_gainloss_appld
5690  print using cytrc$,cur_fy_tot_ret_cost
5700  print exit$
5710  print
5720  print tab(40); 'Please input a number and press <enter>.'
5730  endproc (!= print_prev_and_total_agg_menu =)
5750  Fermprint_prev_and_total_agg_menu
5740
60000 !**********************************************************************************************************
60010 ! PROCEDURE expanded_multi_year_individual_normal
60020 !**********************************************************************************************************
60030 proc expanded_multi_year_individual_normal
60040 print chr$(IZ) Y print % print % print
60050 print tab(10); &
60060 & 'You are now in the multiyear expanded individual normal cost'
60070 print tab(10); &
60080 & 'portion of the program. Note that in this section an answer of'
60090 & '0 (zero) to an adjustment question means no change.'
60100 print tab(10); &
60110 & '% print
60120 print 'Input desired discount rate as decimal (e.g. .08).
60130 input dl
60140 print 'Input desired rate of salary increase as decimal (e.g. .055).
60150 input in
60160 print 'Input desired % rate of retired pay per year of duty (e.g. .02).
60170 input dl
60180 print 'Input desired maximum % of pay basis at retirement (e.g. .75).
60190 input dm
60200 print 'Input minimum los required to retire (e.g. 20).
60210 input mrt
60220 print 'Input adjustment to entrant retirement probability for officers:
60230 print 'e.g. -.02). The baseline value is 0.4.
60240 input proor
60250 print 'Input adjustment to entrant retirement probability for enlisted personnel:
60260 print 'e.g. -.02). The baseline value is 0.12.
60270 input proq
60280 print 'Input adjustment to LOS and age at retirement (e.g. -2).
60290 input adj
60300 print 'Input adjustment to life expectancy at retirement (e.g. +3).
60310 print 'Input adjustment to life expectancy at retirement (e.g. +3).
60320 print 'Input adjustment to life expectancy at retirement (e.g. +3).
60330 print 'Input adjustment to life expectancy at retirement (e.g. +3).
60340 print 'Input adjustment to life expectancy at retirement (e.g. +3).
60350 input cj$
60360 delt=1
60370 g=99
60380 ttrc=0
60390 ys=1953
60400 pg$='e1'
60410 print '***************************************************************************
60420 ttrc=0
60430 if (pg$='e1') then g=1
60440 if (pg$='e2') then g=2
60450 if (pg$='e3') then g=3
60460 if (pg$='e4') then g=4
60470 if (pg$='e5') then g=5
60480 if (pg$='e6') then g=6
60490 if (pg$='e7') then g=7
60500 if (pg$='e8') then g=8
60510 if (pg$='e9') then g=9
60520 if (pg$='w1') then g=10
60530 if (pg$='w2') then g=11
60540 if (pg$='w3') then g=12
60550 if (pg$='w4') then g=13
60560 if (pg$='o1') then g=16
60570 if (pg$='o2') then g=15
60580 if (pg$='o3') then g=16
60590 if (pg$='o4') then g=17

59
60600 if (pgs='o3') then g=18
60610 if (pgs='o5e') then g=19
60620 if (pgs='o4') then g=20
60630 if (pgs='o5') then g=21
60640 if (pgs='o6') then g=22
60650 if (pgs='o7') then g=23
60660 if (pgs='o8') then g=24
60670 if (pgs='o9') then g=25
60680 if (pgs='o10') then g=26
60690 if (pgs='o1') then goto 60370
60700 los=avg_los_for_retired_grade(g)+adj
60710 if (los <mrt) then los=mrt
60720 if (los<22) and (los>=20) then l=1
60730 if (los<24) and (los>=22) then l=2
60740 if (los<26) and (los>=24) then l=3
60750 if (los<28) and (los>=26) then l=4
60760 if (los<30) and (los>=28) then l=5
60770 if (los>=30) then l=6
60780 bp=current_year_basepay(g,1)
60790 cf=1983
60800 rf=los+cf
60810 n=rf-cf
60820 pp=bp
60830 for i=1 to n
60840 tp=pp*in
60850 pp=tp+pp
60860 next i
60870 fac =los * dl
60880 if (fac>dm) then fac=dm
60890 if (ya>1980) then goto 61650
60900 ann=fac*pp*12
60910 if (pgs='el') then goto 61500
60920 if (n<0) then goto 61820
60930 if (idx)+adj+mrt) and (mrt>20) then goto 61780
60940 ag=f(g)+adj
60950 if (lag<17+mrt) then ag=17+mrt
60960 if (lag<37) and (lag>36) then z=1
60970 if (lag<38) and (lag>37) then z=2
60980 if (lag<39) and (lag>38) then z=3
60990 if (lag<40) and (lag>39) then z=4
61000 if (lag<41) and (lag>40) then z=5
61010 if (lag<42) and (lag>41) then z=6
61020 if (lag<43) and (lag>42) then z=7
61030 if (lag<44) and (lag>43) then z=8
61040 if (lag<45) and (lag>44) then z=9
61050 if (lag<46) and (lag>45) then z=10
61060 if (lag<47) and (lag>46) then z=11
61070 if (lag<48) and (lag>47) then z=12
61080 if (lag<49) and (lag>48) then z=13
61090 if (lag<50) and (lag>49) then z=14
61100 if (lag<51) and (lag>50) then z=15
61110 if (lag<52) and (lag>51) then z=16
61120 if (lag<53) and (lag>52) then z=17
61130 if (lag<54) and (lag>53) then z=18
61140 if (lag<55) and (lag>54) then z=19
61150 if (lag<56) and (lag>55) then z=20
61160 if (lag<57) and (lag>56) then z=21
61170 if (lag<58) and (lag>57) then z=22
61180 if (lag<59) and (lag>58) then z=23
61190 if (lag<60) and (lag>59) then z=24
if (ag<61) and (ag>=60) then z=25
if (ag<62) and (ag>=61) then z=27
if (ag<63) and (ag>=62) then z=28
if (ag<64) and (ag>=63) then z=29
if (ag<65) and (ag>=64) then z=30
if (ag>=65) then z=31
if (g<20) then li=elz
if (g=20) then li=oz(z)
li=li+long
q=(1+dil* )*li
pre=ann*((1-(1/q))/di)
t=(:t+di)**losJ-l
nc=pre*(di/t )
rc=nc
if (g>201 then goto 61380
if (g<20) then pro=.12
if (g<203) then pro=proq
goto 61400
if (g>.20) then pro=.4
if (g>=Z)0 then pro=prou
pro=t pro+prop)
pe=pro*tgt~new
trczpec=rc
trcztrc=trc
ttgztargetretired
goto 61750
pec=pro*tgt~new
trczpec=rc
ttgztargetretired
goto 61750
for k=1 to a
sp=in*rp)+rp
pp=sp+rp+pp)/3
goto 60900
if (g>20) then new=1000#office_accession(ys-1950)
if (g<20) then new=1000#enlisted_accession(ys-1950)
goto 61440
average_losxavg_losforretiredjgrade(J
aq=avg_agetfor retired grad(g)
rctarget_rate_cost=total_cost
rem formual to adj attritio if avg los < nlos for retirement
61800 delt=1.00**(mrt-average_los-adj)
61810 goto 60950
61820 nc=0
61830 trc=0
61840 goto 61460
61850 IF (pg$='o10') THEN GOTO 62100
61860 IF (pg$='o9') THEN PG$='O10'
61870 IF (pg$='o8') THEN PG$='O9'
61880 IF (pg$='o7') THEN PG$='O8'
61890 IF (pg$='o6') THEN PG$='O7'
61900 IF (pg$='o5') THEN PG$='O6'
61910 IF (pg$='o4') THEN PG$='O5'
61920 IF (pg$='o3') THEN PG$='O4'
61930 IF (pg$='o2') THEN PG$='O3'
61940 IF (PG$='O1E') THEN PG$='O2E'
61950 IF (PG$='H4') THEN PG$='O1E'
61960 IF (PG$='H3') THEN PG$='H4'
61970 IF (PG$='H2') THEN PG$='H3'
61980 IF (PG$='H1') THEN PG$='H2'
62000 IF (PG$='E9') THEN PG$='H1'
62010 IF (PG$='E8') THEN PG$='E9'
62020 IF (PG$='E7') THEN PG$='E8'
62030 IF (PG$='E6') THEN PG$='E7'
62040 IF (PG$='E5') THEN PG$='E6'
62050 IF (PG$='E4') THEN PG$='E5'
62060 IF (PG$='E3') THEN PG$='E4'
62070 IF (PG$='E2') THEN PG$='E3'
62080 IF (PG$='E1') THEN PG$='E2'
62090 GOTO 60430
62100 PRINT USING 'TOTAL YEAR GROUP COST = ************',TTTRC
62110 TTTRC=TTTRC+TRC
62120 IF YS=1982 THEN GOTO 62150
62130 YS=YS+1
62140 goto 60400
62150 print'******************************************************************************'
62160 print 'Regular Navy Cost = ********************',tttrc
62170 print'******************************************************************************'
62190 endproc '(* expanded_multi_year_individual =)
This is a three-part interactive program that calculates individual, aggregate, and multi-year retirement costs. Choose a selection from the following list of options:

1. Program description
2. Enter/change data and actuarial assumptions
3. Individual entry-age cost method
4. Aggregate entry-age cost method
5. Expanded multi-year individual cost method
6. Exit program

Type in your selection number and press the <enter> key.

MILRET Description

Welcome to the MILRET program. This program was developed at the Naval Postgraduate School in 1983 and revised in 1985. The program utilizes three variations of the entry-age normal method of determining retirement costs:

1. Individual entry age normal
2. Aggregate entry age normal
3. Multi-year expanded individual

The individual subprogram produces detailed information at the individual paygrade and year of service entry level. Retirement costs are computed from user-supplied information and internally stored data. Some of the actuarial and economic assumptions may be changed by the operator.

Please press <enter> to continue >>
MILRET Description (cont.)

The aggregate subprogram requires the operator to input all of the data. The information stored within the program is not available to this subprogram. There are no "hardwired" probability assumptions.

The multi-year expanded individual subprogram computes both normal costs and total retirement costs for years 1953 through 1982. This subprogram utilizes user-provided data and stored information. The operator may select from a "summary" or a "detail" presentation of the retirement cost calculations.

When you are returned to the main menu, please select from the options listed. If this is your first time with this program, you may want to review the assumptions first.

Please press <enter> to return to main menu.

Military Pension Costs

This is a three-part interactive program that calculates individual, aggregate, and multi-year retirement costs. Choose a selection from the following list of options:

1. Program description
2. Enter/change data and actuarial assumptions
3. Individual entry-age cost method
4. Aggregate entry-age cost method
5. Expanded multi-year individual cost method
6. Exit program

Type in your selection number and press the <enter> key.

MILRET Data

The following actuarial and economic values are currently stored within the MILRET program. To change a value, type in the selection number first (i.e., from 1 to 7) and press <enter>. When the prompt appears, type in the new value as a decimal (e.g., .065) and press <enter> again. Repeat this as often as necessary. Enter an "8" to return to the main menu.

1. COLA = .050
2. Salary scale increase = .055
3. Annual discount rate = .060
4. Annuity multiplier = .025
5. Maximum percentage of base pay = .750
6. Officer retirement probability = .400
7. Enlisted retirement probability = .120
8. No changes or changes are complete

Please input a number and press <enter>,
Military Pension Costs

This is a three-part interactive program that calculates individual, aggregate, and multi-year retirement costs. Choose a selection from the following list of options:

1. Program description
2. Enter/change data and actuarial assumptions
3. Individual entry-age cost method
4. Aggregate entry-age cost method
5. Expanded multi-year individual cost method
6. Exit program

Type in your selection number and press the <enter> key.

You are now in the individual MILRET subprogram. Detailed information for an individual retirement pay grade and specific year of service entry date is produced.

Press <enter> to continue ==>

Individual Subprogram Data

Start with item number 1 and enter the desired "Paygrade at retirement." Next enter the "Year of service entry." Data items 3 through 7 will be supplied by the program. If you desire to change them, type in the appropriate number and press <enter>.

1. Paygrade at retirement =
2. Year of service entry = 0
3. Average LOS for this paygrade = 0.0
4. Average age for this paygrade = 0.0
5. Remaining life expectancy = 0.00
6. Probability of new entrant retiring = 0
7. Probability of entrant retiring in tgt grade = 0
8. Data entry complete

Please input a number and press <enter>.

Enter paygrade at retirement.
Individual Subprogram Data

Start with item number 1 and enter the desired "Paygrade at retirement." Next enter the "Year of service entry." Data items 3 through 7 will be supplied by the program. If you desire to change them, type in the appropriate number and press <enter>.

1. Paygrade at retirement = 05
2. Year of service entry = 0
3. Average LOS for this paygrade = 24.9
4. Average age for this paygrade = 46.3
5. Remaining life expectancy = 30.83
6. Probability of new entrant retiring = .4
7. Probability of entrant retiring in tgt grade = .3299
8. Data entry complete

Please input a number and press <enter>.

Enter year of service entry.

1973

Individual Subprogram Data

Start with item number 1 and enter the desired "Paygrade at retirement." Next enter the "Year of service entry." Data items 3 through 7 will be supplied by the program. If you desire to change them, type in the appropriate number and press <enter>.

1. Paygrade at retirement = 05
2. Year of service entry = 1973
3. Average LOS for this paygrade = 24.9
4. Average age for this paygrade = 46.3
5. Remaining life expectancy = 30.83
6. Probability of new entrant retiring = .4
7. Probability of entrant retiring in tgt grade = .3299
8. Data entry complete

Please input a number and press <enter>.

Previous Year Normal Cost Data

The previous year individual normal cost will be calculated based on the current year actuarial assumptions and other data displayed below. However, different values may be entered by selecting the appropriate number, pressing <enter>, and then entering your data. Enter any known deferred gains/losses. If you enter a value for previous year, it will be used instead of one being computed by the program.

1. Previous year individual normal cost = $ 0.00
2. Deferred gains or losses = $ 0.00
3. Previous year salary scale increase = .055
4. Previous year annual discount rate = .055
5. Previous year life expectancy = 30.83
6. No changes or changes are complete

Please input a number and press <enter>.

Enter previous year individual normal cost (e.g., 5823.6).

12345.66
Previous Year Normal Cost Data

The previous year individual normal cost will be calculated based on the current year actuarial assumptions and other data displayed below. However, different values may be entered by selecting the appropriate number, pressing <enter>, and then entering your data. Enter any known deferred gains/losses. If you enter a value for previous year, it will be used instead of one being computed by the program.

1. Previous year individual normal cost = $12345.66
2. Deferred gains or losses = $ 0.00
3. Previous year salary scale increase = .055
4. Previous year annual discount rate = .060
5. Previous year life expectancy = 30.83
6. No changes or changes are complete

Please input a number and press <enter>.

Enter any deferred gains or losses (e.g., 127.24).

327.58

Previous Year Normal Cost Data

The previous year individual normal cost will be calculated based on the current year actuarial assumptions and other data displayed below. However, different values may be entered by selecting the appropriate number, pressing <enter>, and then entering your data. Enter any known deferred gains/losses. If you enter a value for previous year, it will be used instead of one being computed by the program.

1. Previous year individual normal cost = $12345.66
2. Deferred gains or losses = $ 327.58
3. Previous year salary scale increase = .055
4. Previous year annual discount rate = .060
5. Previous year life expectancy = 30.83
6. No changes or changes are complete

Please input a number and press <enter>.

Individual Data Summary

1. Paygrade at retirement = .05
2. Year of service entry = 1973
3. Average LOS for this paygrade = 24.9
4. Average age for this paygrade = 46.3
5. Remaining life expectancy = 30.83
6. Probability of new entrant retiring = .4
7. Probability of entrant retiring in tgt grade = .3299
8. Current year = 1983
9. Cola = .05
10. Salary scale increase = .055
11. Annual discount rate = .06
12. Annuity multiplier = .025
13. Maximum % of basepay = .75

Press <enter> to continue =>>
Individual Retirement Cost Projections

1. Current monthly basepay at retirement paygrade = $3266.10
2. Projected monthly basepay at retirement paygrade = $7252.56
3. Pay basis for retirement = $7252.56
4. Percentage multiplier = .6225
5. Projected yearly retirement annuity = $54176.60
6. "Present" value of retirement benefits in retirement year = $753154.04
7. Current present value of retirement benefits = $316101.40
8. Current year individual normal cost = $13832.30

Press <enter> to continue =>

Target Group Retirement Cost Projections

1. Current year individual normal cost ............ $13,832.30
2. Previous year individual normal cost ............ $12,345.66
3. Current year gains or losses .................. $1,486.64
4. Deferred gains or losses ....................... $327.58
5. Applied gain or loss ........................... $180.21
6. Current year individual retirement cost ........ $14,012.51
7. Number of new entrants in entry year ........ 7,600
8. Target population retiring ..................... 1,003
9. Current target group retirement cost ........... $14,053,089.97

Press <enter> to continue =>

Military Pension Costs

This is a three-part interactive program that calculates individual, aggregate, and multi-year retirement costs. Choose a selection from the following list of options:

1. Program description
2. Enter/change data and actuarial assumptions
3. Individual entry-age cost method
4. Aggregate entry-age cost method
5. Expanded multi-year individual cost method
6. Exit program

Type in your selection number and press the <enter> key.
Aggregate Current FY Data

Enter the present value of future benefits, the present value of future compensation, and the current FY total base pay. The normal cost percentage factor and the current FY active force normal cost will be computed. If you desire to change the normal cost percentage factor, do so and a new active force normal cost will be computed.

1. Present value of future benefits $0.00
2. Present value of future compensation $0.00
3. Normal cost percentage factor 0.00
4. Current FY total base pay $0.00
5. Current FY active force normal cost $0.00
6. No changes or changes are complete

Please input a number and press <enter>.

1
Enter present value of future benefits.
2456784256.67
KO-17 Divide by zero

Aggregate Current FY Data

Enter the present value of future benefits, the present value of future compensation, and the current FY total base pay. The normal cost percentage factor and the current FY active force normal cost will be computed. If you desire to change the normal cost percentage factor, do so and a new active force normal cost will be computed.

1. Present value of future benefits $2,456,784,256.67
2. Present value of future compensation $0.00
3. Normal cost percentage factor 0.00
4. Current FY total base pay $0.00
5. Current FY active force normal cost $0.00
6. No changes or changes are complete

Please input a number and press <enter>.

2
Enter present value of future compensation.
3487458948.56

Aggregate Current FY Data

Enter the present value of future benefits, the present value of future compensation, and the current FY total base pay. The normal cost percentage factor and the current FY active force normal cost will be computed. If you desire to change the normal cost percentage factor, do so and a new active force normal cost will be computed.

1. Present value of future benefits $2,456,784,256.67
2. Present value of future compensation $3,487,458,948.56
3. Normal cost percentage factor 1.04
4. Current FY total base pay $30
5. Current FY active force normal cost $30
6. No changes or changes are complete

Please input a number and press <enter>.

4
Enter current FY total base pay
4467812456 99
## Aggregate Current FY Data

Enter the present value of future benefits, the present value of future compensation, and the current FY total base pay. The normal cost percentage factor and the current FY active force normal cost will be computed. If you desire to change the normal cost percentage factor, do so and a new active force normal cost will be computed.

1. Present value of future benefits: $2,456,784,256.67
2. Present value of future compensation: $3,487,458,998.56
3. Normal cost percentage factor: 70.45
5. Current FY active force normal cost: $3,147,420,642.45
6. No changes or changes are complete

Please input a number and press <enter>.

## Aggregate Previous FY and Current FY Total Data

Enter the previous FY normal cost percentage, the previous FY active force normal cost, and any deferred gains or losses to compute the previous FY active force normal cost, current gains/losses applied, and the current FY total retirement cost.

1. Previous FY normal cost percentage: 0.0000
2. Previous FY total base pay: $0.00
3. Previous FY active force normal cost: $0.00
4. Current FY actuarial gains/losses: $3,147,420,642.45
5. Deferred gains or losses: $0.00
7. Current FY total retirement cost: $3,421,827,116.78
8. No changes or changes are complete

Please input a number and press <enter>.

## Aggregate Previous FY and Current FY Total Data

Enter the previous FY normal cost percentage, the previous FY active force normal cost, and any deferred gains or losses to compute the previous FY active force normal cost, current gains/losses applied, and the current FY total retirement cost.

1. Previous FY normal cost percentage: 0.5700
2. Previous FY total base pay: $0.00
3. Previous FY active force normal cost: $0.00
4. Current FY actuarial gains/losses: $3,147,420,642.45
5. Deferred gains or losses: $0.00
7. Current FY total retirement cost: $3,421,827,116.78
8. No changes or changes are complete

Please input a number and press <enter>.
### Aggregate Previous FY and Current FY Total Data

Enter the previous FY normal cost percentage, the previous FY active force normal cost, and any deferred gains or losses to compute the previous FY active force normal cost, current gains/losses applied, and the current FY total retirement cost.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Previous FY normal cost percentage</td>
<td>57.00%</td>
</tr>
<tr>
<td>2</td>
<td>Previous FY total base pay</td>
<td>$3,784,592,054.57</td>
</tr>
<tr>
<td>3</td>
<td>Previous FY active force normal cost</td>
<td>$2,157,217,459.70</td>
</tr>
<tr>
<td>4</td>
<td>Current FY actuarial gains/losses</td>
<td>$990,203,182.75</td>
</tr>
<tr>
<td>5</td>
<td>Deferred gains or losses</td>
<td>$4,785,484.37</td>
</tr>
<tr>
<td>6</td>
<td>Current FY gains/losses applied</td>
<td>$86,747,646.14</td>
</tr>
<tr>
<td>7</td>
<td>Current FY total retirement cost</td>
<td>$3,234,168,288.59</td>
</tr>
<tr>
<td>8</td>
<td>No changes or changes are complete</td>
<td></td>
</tr>
</tbody>
</table>

Please input a number and press <enter>.

5

Enter any deferred gains or losses.

4785484.37

### Aggregate Previous FY and Current FY Total Data

Enter the previous FY normal cost percentage, the previous FY active force normal cost, and any deferred gains or losses to compute the previous FY active force normal cost, current gains/losses applied, and the current FY total retirement cost.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Previous FY normal cost percentage</td>
<td>57.00%</td>
</tr>
<tr>
<td>2</td>
<td>Previous FY total base pay</td>
<td>$3,784,592,054.57</td>
</tr>
<tr>
<td>3</td>
<td>Previous FY active force normal cost</td>
<td>$2,157,217,459.70</td>
</tr>
<tr>
<td>4</td>
<td>Current FY actuarial gains/losses</td>
<td>$990,203,182.75</td>
</tr>
<tr>
<td>5</td>
<td>Deferred gains or losses</td>
<td>$4,785,484.37</td>
</tr>
<tr>
<td>6</td>
<td>Current FY gains/losses applied</td>
<td>$86,747,646.14</td>
</tr>
<tr>
<td>7</td>
<td>Current FY total retirement cost</td>
<td>$3,234,168,288.59</td>
</tr>
<tr>
<td>8</td>
<td>No changes or changes are complete</td>
<td></td>
</tr>
</tbody>
</table>

Please input a number and press <enter>.

8

### Military Pension Costs

This is a three-part interactive program that calculates individual, aggregate, and multi-year retirement costs. Choose a selection from the following list of options:

1. Program description
2. Enter/change data and actuarial assumptions
3. Individual entry-age cost method
4. Aggregate entry-age cost method
5. Expanded multi-year individual cost method
6. Exit program

Type in your selection number and press the <enter> key.
### APPENDIX C

**FORMULAS IN THE ORIGINAL ENTRYAGE COMPUTER PROGRAM**

<table>
<thead>
<tr>
<th>Program Formula</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF=1983</td>
<td>Current Year = 1983</td>
</tr>
<tr>
<td>RF=LOS+YS</td>
<td>Retirement Year = Length of Service + Year of Service Entry</td>
</tr>
<tr>
<td>N=RF-CF</td>
<td>Number of Years to Retirement = Retirement Year - Current Year</td>
</tr>
<tr>
<td>IN=.055</td>
<td>Salary Scale Increase = .055</td>
</tr>
<tr>
<td>PP=BP</td>
<td>This is a rather long way of computing the projected base pay at retirement.</td>
</tr>
<tr>
<td>FOR I=1 TO N</td>
<td>A more acceptable computation is:</td>
</tr>
<tr>
<td>TP=PP*IN</td>
<td>$PP = BP \times (1 + IN)^N$</td>
</tr>
<tr>
<td>PP=TP+PP</td>
<td>where PP is projected basepay at retirement (or, future value); BP is current basepay (or, present value); IN is salary scale increase (or, interest per period); and N is the number of years to retirement (or, number of periods).</td>
</tr>
<tr>
<td>NEXT I</td>
<td>The percentage of basepay that a retiree is entitled to (FAC) is computed by multiplying his/her length of service (LOS) by a percent value (DL):</td>
</tr>
<tr>
<td>FAC=LOS+CL</td>
<td>$50% = (20 \text{ years}) \times (2.5% \text{ per year})$</td>
</tr>
</tbody>
</table>
### Program Formula

**ANN** = **FAC** * **PP** * 12

A retiree's annual annuity (ANN) is computed by multiplying his/her projected base pay (PP) by his percentage of basepay (FAC) by 12 months:

\[ \text{ANN} = \text{FAC} \times \text{PP} \times 12 \]

\[ \$18,000/\text{yr.} = 50\% \times \$3333/\text{mo.} \times 12 \text{ mo.} \]

**Q** = (1 + **DI**) **LI**

**PRE** = **ANN** * ((1 - (1/Q))/**DI**)

The present value of a retiree's future retirement benefits are calculated:

\[ Q = (1 + DI)^{LI} \]

\[ PRE = ANN \times \frac{1}{1 - \frac{1}{Q}} \times \frac{1}{DI} \]

where PRE is the present value of future retirement benefits, ANN is the yearly retirement annuity, DI is the annual discount rate, and LI is the life expectancy of the retiree at retirement.

A more traditional representation of the above is:

\[ 1 - \frac{1}{(1 + i)^N} \]

\[ PV = PYMT \times \frac{1}{1} \]

where PV is the present value, PYMT is the payment, i is the interest rate per period, and N is the number of periods.
<table>
<thead>
<tr>
<th>Program Formula</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ T = ((1+DI)^{**LOS}) - 1 ]</td>
<td>These two program statements calculate the current year's normal cost:</td>
</tr>
<tr>
<td>[ NC = PRE \times \frac{DI}{T} ]</td>
<td>where ( NC ) is the normal cost, ( PRE ) is the present value, ( DI ) is the discount rate, and ( LOS ) is the retiree's length of service.</td>
</tr>
<tr>
<td>[ V = N + 1 ]</td>
<td>The applied gain/loss is calculated as follows:</td>
</tr>
<tr>
<td>[ X = \frac{1}{((1+DI)^{**V})} ]</td>
<td>[ AP = \frac{DI}{(1-X)} ]</td>
</tr>
<tr>
<td>[ AP = (FC + GL) \times (DI/(1-X)) ]</td>
<td>where ( AP ) is the applied gain/loss, ( FC ) is the current year gain/loss, ( GL ) is the deferred gain/loss, ( DI ) is the annual discount rate, and ( N ) is the number of years to retirement.</td>
</tr>
<tr>
<td>[ RC = NC + AP ]</td>
<td>The current year individual retirement cost (RC) is calculated by adding the current year individual retirement cost (NC) and the applied gain or loss (AP).</td>
</tr>
<tr>
<td>[ PEC = PRO \times TGT \times NEW ]</td>
<td>The target population retiring (PEC) is computed by multiplying the probability of a new entrant retiring (PRO) by the probability of an entrant retiring at the target paygrade (TGT) and by the number of entrants in the initial year of service (NEW).</td>
</tr>
<tr>
<td>Program Formula</td>
<td>Explanation</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>TRC=PEC*RC</td>
<td>The current target group retirement cost (TRC) is calculated by multiplying the target population retiring (PEC) by the current year individual retirement cost (RC).</td>
</tr>
<tr>
<td>A=N-2</td>
<td>For individuals entering the services after September 1980, the pay basis for retirement is the average of the last 36 months of basepay versus ending basepay.</td>
</tr>
<tr>
<td>RP=BP</td>
<td>This program &quot;module&quot; finds the future value of basepay to the retirement year minus two, then computes the next year's basepay. Finally, the three basepays are averaged.</td>
</tr>
<tr>
<td>FOR K=1 TO A</td>
<td>FP=PBE/PCE The normal cost percentage factor (PF) is calculated by dividing the present value of future benefits (PBE) by the present value of future composition (PCE).</td>
</tr>
<tr>
<td>RP=VP+IN</td>
<td>MC=PF*TBF The current year active force normal cost is calculated by multiplying the current fiscal year total base pay (TBF) by the normal cost percentage factor (PF).</td>
</tr>
<tr>
<td>NEXT K</td>
<td>VC=QF*UBF The previous normal cost is calculated by multiplying the previous year total basepay by the previous year normal cost &amp; factor.</td>
</tr>
<tr>
<td>SP=(IN*RP)+RP</td>
<td></td>
</tr>
<tr>
<td>PP=(SP+RP+PP)/3</td>
<td></td>
</tr>
<tr>
<td>VP=RP+IN</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D

VARIABLES IN THE ORIGINAL ENTRYAGE COMPUTER PROGRAM

(LISTED IN ORDER OF APPEARANCE)

LISTING OF VARIABLES AND COMPUTATIONS IN
ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

I. INDIVIDUAL ENTRY AGE COST METHOD

CK$ = "PROGRAM CHOICE", i.e., 'IND' for individual method
    cost calculations, 'AGG' for aggregate method cost
    calculations, 'GANG' for expanded multiyear individual
    cost calculations, and 'HALT' to exit the program.

P(x,y) = "CURRENT YEAR PAY MATRIX" with rows defined by pay
    grade and columns defined by years of service.
    Contains base pay for all twenty-six paygrades (E1-E9,
    W1-W4, 01, O1E, 02, O2E, 03, O3E, O4-O10) and for over
    20 years of service (over 20 yrs., over 22 yrs., over
    24 yrs., over 26 yrs., over 28 yrs., over 30 yrs.)

E(x) = "ENLISTED LIFE EXPECTANCY MATRIX" containing thirty-
    one non-disability retired life expectations for ages
    36 yrs. to 66 yrs., inclusive.

O2(x) = "OFFICER LIFE EXPECTANCY MATRIX" containing thirty-one
    non-disability retired life expectations for ages
    36 yrs. to 66 yrs., inclusive.

D(x) = "AVERAGE LOS MATRIX" containing twenty-six length-of-
    service (LOS) values corresponding to the twenty-six
    different paygrades.

F(x) = "AVERAGE AGE AT RETIREMENT MATRIX" containing twenty-
    six average age values for each of the twenty-six
    different paygrades.

FI(x) = "TARGET RETIREMENT GRADE PROBABILITY MATRIX" contain-
    ing a probability of retiring in a particular paygrade
    for each of the twenty-six paygrades.

76
### Listing of Variables and Computations in Order of Appearance in the Computer Program

**OD(x)** = "Officer Accession Matrix" containing thirty-two values for officer accession values for the years 1951-1982, inclusive.

**R(x,y)** = "Previous Year Pay Matrix" containing the same rows and columns as the "Current Year Pay Matrix" \([P(x,y)]\) but with the previous year's data.

**PGS** = "Paygrade at Retirement" input by operator as E1, E9, W1, 01, G3E, 05, etc.

**G** = An integer from 1 to 26 corresponding to "Paygrade at Retirement", e.g., G=1 for E1, G=2 for E2, G=10 for W1, G=26 for 010. Used to determine values from LOS and pay matrices.

**YS** = "Year of Service Entry" input by operator, e.g., 1972.

**LOS** = Either "Average Length of Service for This Paygrade" taken from the "Average LOS Matrix" [LOS=G(G)] contained in the program, or an "Estimated Length of Service at Retirement" input by the operator.

**L** = An integer ranging from 1 to 6 depending upon the value of LOS, e.g., if 20<LOS<22 then L=1, etc. Used with "G" to determine values from the pay matrix.

**BP** = "Monthly Base Pay at Retirement Grade" based upon paygrade and length of service. Taken from the current (1983) pay matrix:

\[
BP = P(G,L)
\]

**CF** = "Current Fiscal Year", contained in program as a fixed value (1983).
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

RF = "PROJECTED RETIREMENT YEAR" determined by adding "LENGTH OF SERVICE" (LOS) and "YEAR OF SERVICE ENTRY" (YS) together:

RF = LOS + YS

N = "NUMBER OF YEARS TO RETIREMENT" determined by subtracting "CURRENT YEAR" (CF) from "PROJECTED RETIREMENT YEAR" (RF):

N = RF - CF

IN = "SALARY SCALE INCREASE" default to .055, or can be changed by operator.

PP = "PROJECTED MONTHLY BASEPAY AT RETIREMENT GRADE" computed by compounding "CURRENT MONTHLY BASEPAY AT RETIREMENT GRADE" (BP) by the "SALARY SCALE INCREASE" (IN):

PP = BP
FOR I = 1 TO N
TP = PP * IN
PP = TP + PP
NEXT I

DL = "PERCENTAGE OF BASEPAY PER YEAR OF SERVICE", default value of .025 (i.e., 2 1/2 % per yr. of service), but can be changed by operator.

FAC = "PERCENTAGE OF BASEPAY FOR RETIREMENT" that a retiree has earned for retirement pay. Determined by multiplying "AVERAGE/ESTIMATED LENGTH OF SERVICE" (LOS) by "PERCENTAGE OF BASEPAY PER YEAR OF SERVICE (DL):

FAC = LOS * DL

DM = "MAXIMUM PERCENTAGE OF BASE PAY" that a retiree may receive. Default value is .75 (i.e., 75%), but can be changed by operator. If FAC is greater than DM, then FAC is assigned the value of DM.
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

ANN = "PROJECTED ANNUAL RETIREMENT PAY" computed by multiplying "PERCENTAGE OF BASEPAY FOR RETIREMENT" (FAC) by the "PROJECTED MONTHLY BASEPAY" (PP) and by 12 months:

\[ \text{ANN} = \text{FAC} \times \text{PP} \times 12 \]

DI = "ANNUAL DISCOUNT RATE" default to .09 (i.e., 9% per year), but may be changed by the operator.

AG = "AVERAGE AGE AT RETIREMENT FOR THIS PAYGRADE" taken from the "AVERAGE AGE AT RETIREMENT MATRIX" [AG=F(G)] contained in the program, or can be changed by the operator.

Z = An integer ranging from 1 to 31 depending upon the value of AG (e.g., if 36<AG<37 then Z=1; if 45<AG<46 then Z=31).

LI = "REMAINING LIFE EXPECTANCY (at retirement) FROM ACTUARIAL TABLES" taken from "ENLISTED/OFFICER LIFE EXPECTANCY MATRICES". Determined by "AVERAGE AGE AT RETIREMENT FOR THIS PAYGRADE" [LI=E(Z) or LI=O(Z)], or can be changed by the operator.

Q = An intermediate variable used to eventually compute the present value of future retirement benefits. It is computed by adding "1" to the "ANNUAL DISCOUNT RATE" (DI) and raising that sum to the "LIFE EXPECTANCY" (LI) exponent:

\[ Q = (1 + \text{DI})^{\text{LI}} \]

PRE = "PRESENT VALUE OF FUTURE RETIREMENT BENEFITS" is computed by multiplying the "PROJECTED ANNUAL RETIREMENT PAY" (ANN) as follows:

\[ \text{PRE} = \text{ANN} \times \frac{1 - (1/DI)}{\text{DI}} \]
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

T = An intermediate variable used to eventually compute the current year individual normal cost. It is computed as follows:

\[ T = \left( (1 + DI)^{LOS} - 1 \right) \]

NC = "CURRENT YEAR INDIVIDUAL COST" is computed as follows:

\[ NC = \text{PRE} \times \left( DI/T \right) \]

JN = "SALARY SCALE Z" used to calculate the "PREVIOUS YEAR NORMAL COST" (NC). Can be assigned the same value as current year "SALARY SCALE INCREASE" (IN) or can be changed by the operator.

H = Assigned the value of "G" which is an integer value corresponding to the individual's paygrade.

M = Assigned the value of "L" which is an integer value corresponding to the individual's LOS.

QP = The previous year's "MONTHLY BASE PAY AT RETIREMENT" corresponding to the current year's "BP". Taken from the "PREVIOUS YEAR PAY MATRIX":

\[ QP = R(H,M) \]

O = "NUMBER OF YEARS TO RETIREMENT FROM THE PREVIOUS YEAR" and is determined by adding "1" to the "NUMBER OF YEARS TO RETIREMENT" (N):

\[ O = N + 1 \]

XP = "PROJECTED MONTHLY BASEPAY AT RETIREMENT CALCULATED FROM THE PREVIOUS YEAR". It is computed as follows:

\[
\begin{align*}
\text{XP} &= \text{QP} \\
\text{FOR } J &= 1 \text{ TO } N \\
\text{UP} &= \text{XP} \times \text{JN} \\
\text{XP} &= \text{UP} + \text{XP} \\
\text{NEXT } J
\end{align*}
\]
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

**EI** = "PREVIOUS YEAR DISCOUNT RATE", can be assigned the same value as the current year's "ANNUAL DISCOUNT RATE" (DI), or can be changed by the operator.

**MI** = "PREVIOUS YEAR LIFE EXPECTANCY", can be assigned the same value as the current year's "REMAINING LIFE EXPECTANCY (at retirement)", or can be changed by the operator.

**S** = An intermediate value used to eventually compute the previous year's present value of future retirement benefits. It is computed by adding "1" to the "PREVIOUS YEAR DISCOUNT RATE" (EI) and raising to the "PREVIOUS YEAR LIFE EXPECTANCY" (MI) exponent:

\[ S = (1 + EI)^{MI} \]

**JRE** = "PREVIOUS YEAR PRESENT VALUE OF FUTURE RETIREMENT BENEFITS" is computed as follows:

\[ JRE = BNW \times \frac{1 - (1/S)}{EI} \]

**J** = An intermediate variable used to eventually compute the previous year's individual normal cost. It is computed as follows:

\[ J = [(1 + EI)^{LOD}] - 1 \]

**JC** = "PREVIOUS YEAR INDIVIDUAL NORMAL COST" is computed as follows:

\[ JC = JRE \times (EI/S) \]

**FC** = "CURRENT YEAR GAINS OR LOSSES" computed by subtracting "PREVIOUS YEAR INDIVIDUAL NORMAL COST" (JC) from the "CURRENT YEAR INDIVIDUAL NORMAL COST" (NC):

\[ FC = NC - JC \]
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

V = An intermediate variable used in the calculation of the "APPLIED GAIN OR LOSS" (AP). It is computed by adding "1" to the "NUMBER OF YEARS TO RETIREMENT" (N):

\[ V = N + 1 \]

X = An intermediate variable used in the calculation of the "APPLIED GAIN OR LOSS" (AP). It is calculated as follows:

\[ X = \frac{1}{(1 + I)} \times V \]

GL = "DEFERRED GAINS OR LOSSES". This value is either input by the operator if known, or defaults to a "0" value if unknown.

AP = "APPLIED GAIN OR LOSS" computed as follows:

\[ AP = (FC + GL) \times \frac{O1}{(1 - I)} \]

RC = "CURRENT YEAR (total) RETIREMENT COST" equals the "CURRENT YEAR INDIVIDUAL NORMAL COST" (NC) plus any "APPLIED GAINS OR LOSSES" (AP):

\[ RC = NC + AP \]

PRO = "PROBABILITY OF A NEW ENTRANT RETIRING". It has a default value of .12 for enlisted and .4 for officers, but can be changed by the operator.

FZ(G) = "PROBABILITY OF ENTRANT RETIRING AT TARGET GRADE" default to a value from the "TARGET RETIREMENT PROBABILITY MATRIX" (FZ) dependent upon paygrade, or can be changed by operator.

TGT = "PROBABILITY THAT ENTRANT RETIRES AT SELECTED TARGET" is default to the FZ(G) matrix value, or can be changed by the operator.
### LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>ENTRY NAME</th>
<th>AGE</th>
<th>COST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>&quot;PRESENT VALUE OF FUTURE BENEFITS&quot;</td>
<td>PRE</td>
<td>This value must be entered by the operator in millions of dollars, e.g., $25,487.35 entered as 252.48735.</td>
</tr>
<tr>
<td>2.</td>
<td>&quot;PRESENT VALUE OF FUTURE COMPENSATION&quot;</td>
<td>PRE</td>
<td>This value must be entered by operator in millions of dollars, e.g., $25,487.35 entered as 252.48735.</td>
</tr>
<tr>
<td>3.</td>
<td>&quot;NORMAL COST PERCENTAGE FACTOR&quot;</td>
<td>PRE</td>
<td>This value is computed by dividing the &quot;PRESENT VALUE OF FUTURE BENEFITS&quot; (PRE) by the &quot;PRESENT VALUE OF FUTURE COMPENSATION&quot; (PRE).</td>
</tr>
<tr>
<td>4.</td>
<td>&quot;ACTUAL YEAR TOTAL BASE PAY&quot;</td>
<td>PRE</td>
<td>This value must be entered by the operator in millions of dollars, e.g., $18,355.35 entered as 18355.35.</td>
</tr>
<tr>
<td>5.</td>
<td>&quot;CURRENT YEAR ACTIVE FORCE NORMAL COST&quot;</td>
<td>PRE</td>
<td>This value is used to multiply the &quot;NORMAL COST PERCENTAGE FACTOR&quot; of the &quot;CURRENT YEAR TOTAL BASE PAY&quot; (PRE).</td>
</tr>
<tr>
<td>6.</td>
<td>&quot;NORMAL COST &amp; FACTOR&quot;</td>
<td>PRE</td>
<td>This value is entered by the operator in the form of a string, e.g., $25,487.35 entered as &quot;25,487.35&quot;.</td>
</tr>
<tr>
<td>7.</td>
<td>&quot;CURRENT YEAR TOTAL BASE PAY&quot;</td>
<td>PRE</td>
<td>This value is entered by the operator in the form of a string, e.g., $25,487.35 entered as &quot;25,487.35&quot;.</td>
</tr>
</tbody>
</table>
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

VC = "PREVIOUS YEAR NORMAL COST" is entered by the operator if known. Otherwise, it is calculated by multiplying the "PREVIOUS YEAR NORMAL COST & FACTOR" (QF) by the "PREVIOUS YEAR TOTAL BASE PAY" (UBF):

\[ VC = QF \times UBF \]

WC = "CURRENT YEAR'S ACTUARIAL GAIN OR LOSSES" computed by subtracting the "PREVIOUS YEAR ACTIVE FORCE NORMAL COST" (VC) from the "CURRENT YEAR ACTIVE FORCE NORMAL COST" (MC):

\[ WC = MC - VC \]

GI = "DISCOUNT RATE" entered by the operator as a decimal, e.g., 11.2% is entered as .112.

GIS = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ GIS = (1 - GI)^{20} \]

GIST = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ GIST = \frac{1}{GIS} \]

HIST = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ HIST = (1 - GIST) \]

BLIP = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ BLIP = GI / HIST \]
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

FD = "AMOUNT OF DEFERRED GAIN OR LOSS" is entered by the operator if known, or defaults to a "0" value if not known.

FA = "CURRENT YEAR GAINS/LOSSES APPLIED" is computed by adding the "CURRENT YEAR'S ACTUARIAL GAIN/LOSS" (FD) together, and multiplying the sum by "BLIP":

FA = (WC * FD) * BLIP

TRC = "CURRENT YEAR TOTAL RETIREMENT COST" is computed by adding the "CURRENT YEAR ACTIVE FORCE NORMAL COST" (MC) and the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA):

TRC = MC + FA

86
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

III. Multiyear Expanded Individual Normal Cost Method

D1 - "DISCOUNT RATE" entered by the operator as a decimal, e.g., .10 for 10%.

D2 - "SALARY SCALE ESTIMATOR" i.e., the rate of salary increase is entered by the operator as a decimal, e.g., .055 for 5.5% rate for salary increases.

D3 - "RETIRED PAY BASIS PER YEAR OF SERVICE" i.e., the rate of retired pay per year of service is entered by the operator as a decimal, e.g., .75 for 75% per year.

D4 - "RETIRED PAY CEILING AS PERCENTAGE OF BASIC PAY" i.e., the maximum % of pay basis at retirement is entered by the operator as a decimal, e.g., .75 for 75%.

W3 - "MINIMUM % FOR RETIREMENT" i.e., the minimum length of service required in order to retire is entered by the operator as an integer, e.g., 15 for 15 years.

PROR - "ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR OFFICERS" is entered by the operator as a percent, e.g., .10 for a 10% increase. The default value is .15 i.e., 15% probability; a zero (0) is entered for no change to the baseline value.

PROD - "ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR ENLISTED PERSONNEL" is entered by the operator as a percent, e.g., .10 for a 10% increase. The default value is .15 i.e., 15% probability; a zero (0) is entered for no change to the baseline value.
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

ADJ - "ADJUSTMENT TO LOS AND AGE AT RETIREMENT" value is entered by operator as an integer, either unsigned or with a negative sign, e.g., -9 indicating a decrease of two years. A zero is entered for no change.

LONF - "ADJUSTMENT TO LIFE EXPECTANCY AT RETIREMENT" is entered by the operator as an integer, either unsigned or with a negative sign, e.g., -1 for three years. A zero is entered for no change.

CAL - "LEVEL OF DETAIL" for program, i.e., "Sum" for Summary Data, and "Detail" for Full Data; this value is input by the operator.

DEL - A "DELT" factor used to adjust attrition. A value of 0.5 is assigned by the program to "AVERAGE LOSS" for ADJ's greater than "HIGHEST LOSS FOR RETIREMENT" on.

It is calculated by the following formula:

\[ \text{DEL} = \frac{\text{HIGHEST LOSS FOR RETIREMENT}}{\text{SUM OF ADJUSTMENTS AND MINUS 55}} \]

S - An integer from 1 to 20 corresponding to "PAYGRADE A" or "RETIREMENT", e.g., 7 for EL, 37 for ES, 70 for HW, 50 for ILD, used to determine values from LOSS and PAY matrices.

"RC - "REGULAR PAY COST" of the non-regular retiree, computed by the following formula:

\[ \text{RC} = \text{PAY RATE} \times \text{S} \]

"YE - "YEAR OF SERVICE ENTRY" with the initial value of 1,451, and then updated by the year for the next year group cost calculation by the formula:

\[ \text{YE} = \text{YE} + 1 \]
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

**PS** = "PAYGRADE AT RETIREMENT" initially set by program as 1. After computing normal and total costs for this paygrade, resets value to 20 and recomputes normal and total costs. Program continues computations until costs for all are computed.

**TRG** = "TOTAL YEAR GROUP COST" of non-disability retirees by year group, starting with 1953. Computed by the formula

\[ TRG = TRG + TRC \]

**DIS** = "AVERAGE LOS FOR A PARTICULAR PAYGRADE" from the "AVERAGE LOS MATRICE". Determined by the value assigned to the integer variable, "S".

**LOS** = "LENGTH OF SERVICE" is computed by adding "AVERAGE LOS FOR A PARTICULAR PAYGRADE" (DIS) to "ADJUSTMENT TO LOS AND AGE AT RETIREMENT" (ADJ).

\[ LOS = DIS \cdot ADJ \]

*An integer ranging from 1 to 4 depending upon the value of DIS, e.g., if DIS<35 or DIS>22 then LOS = 1, etc., used with "T" to determine values from the pay matrix.*

**PI** = "CURRENT YEAR PAY" taken from the "CURRENT YEAR PAY MATRIX". The current year pay value is determined by the values of "T" and "L", which are assigned values based upon paygrade and years of service over 20 yrs.

**BP** = "MONTHLY BASE PAY AT RETIREMENT GRADE" based upon paygrade and length of service. Taken from the current "PAY MATRIX".

\[ BP = BPI \]

**IF** = "CURRENT FISCAL YEAR" with a program assigned value of 1.
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

RF = "PROJECTED RETIREMENT YEAR" determined by adding "LENGTH OF SERVICE" (LOS) and "YEAR OF SERVICE ENTRY" (YS) together:

\[ RF = LOS + YS \]

N = "NUMBER OF YEARS TO RETIREMENT" determined by subtracting "CURRENT YEAR" (CF) from "PROJECTED RETIREMENT YEAR" (RF):

\[ N = RF - CF \]

PP = "PROJECTED MONTHLY BASEPAY AT RETIREMENT GRADE" computed by compounding "CURRENT MONTHLY BASEPAY AT RETIREMENT GRADE" (BP) by the "SALARY SCALE INCREASE" (IN):

\[
PP = BP \\
\text{FOR } I = 1 \text{ TO } N \\
TP = PP \times IN \\
PP = TP + PP \\
\text{NEXT } I
\]

FAC = "PERCENTAGE OF BASEPAY FOR RETIREMENT" that a retiree has earned for retirement pay. Determined by multiplying "AVERAGE/ESTIMATED LENGTH OF SERVICE" (LOS) by "PERCENTAGE OF BASEPAY PER YEAR OF SERVICE (DL):

\[ FAC = LOS \times DL \]

ANN = "PROJECTED ANNUAL RETIREMENT PAY" computed by multiplying "PERCENTAGE OF BASEPAY FOR RETIREMENT" (FAC) by the "PROJECTED MONTHLY BASEPAY" (PP) and by 12 months:

\[ ANN = FAC \times PP \times 12 \]

F(G) = "AVERAGE AGE AT RETIREMENT", taken from the "AVERAGE AGE AT RETIREMENT MATRIX" [F(x)]. Value of F(G) is determined by the particular value of the integer variable, "G", which corresponds to a particular paygrade.
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

AG = "AVERAGE AGE AT RETIREMENT" taken from the "AVERAGE AGE AT RETIREMENT MATRIX" \([F(G)]\) and modified by the "ADJUSTMENT TO LOS AND AGE AT RETIREMENT" value (ADJ):

\[\text{AG} = F(G) + \text{ADJ}\]

\(Z\) = An integer ranging from 1 to 31 depending upon the value of the retiree's age, "AG" (e.g., if 36<AG<37 then \(Z=1\); if 45<AG<46 then \(Z=31\)).

\(E(Z)\) = "ENLISTED LIFE EXPECTANCY" taken from the "ENLISTED LIFE EXPECTANCY MATRIX" \([E(x)]\). The specific life expectancy value is determined by the integer variable "Z", which corresponds to a specific retirement age.

\(OZ(Z)\) = "OFFICER LIFE EXPECTANCY" taken from the "OFFICER LIFE EXPECTANCY MATRIX" \([OZ(x)]\). The specific life expectancy value is determined by the integer variable "Z", which corresponds to a specific retirement age.

\(LI\) = "REMAINING LIFE EXPECTANCY AT RETIREMENT" is calculated by setting the value of "LI" to a respective officer or enlisted life expectancy, and then modifying it with the "ADJUSTMENT TO LIFE EXPECTANCY AT RETIREMENT" value ("LONG"):

\[\text{LI} = E(Z) - \text{LONG}\]

\(Q\) = An intermediate variable used to eventually compute the present value of future retirement benefits. It is computed by adding "\(LI\)" to the "ANNUAL DISCOUNT RATE" ([DI]) and raising that sum to the "LIFE EXPECTANCY" \((L)\) exponent:

\[Q = (1 + DI)^{-L}\]
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

PRE = "PRESENT VALUE OF FUTURE RETIREMENT BENEFITS" is computed by multiplying the "PROJECTED ANNUAL RETIREMENT PAY* (ANN) as follows:

\[ \text{PRE} = \text{ANN} \times \frac{1 - (1/Q)}{Q} \]

T = An intermediate variable used to eventually compute the current year individual normal cost. It is computed as follows:

\[ T = [(1 + D) \times Q] - 1 \]

NC = "YEAR GROUP NORMAL COST" is computed as follows:

\[ \text{NC} = \text{PRE} \times (D/T) \]

RC = An intermediate variable assigned the value of the normal cost for a particular year group. It is used later to compute "YEAR GROUP TOTAL COST" (TRC):

\[ \text{RC} = \text{NC} \]

\[ \text{TRC} = \text{PEC} \times \text{RC} \]

PRO = "RETIREMENT PROBABILITY". It has a default value of .12 for enlisted and .4 for officers. It is modified by the program as follows:

\[ \text{PRO} = (\text{PRO} \times \text{PROP}) \times \text{DEL} \]

PROP = An intermediate variable assigned the value of either "ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR OFFICERS" (PROR) or "ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR ENLISTED PERSONNEL" (PROQ). PROR and PROQ are input by the operator.
LISTING OF VARIABLES AND COMPUTATIONS IN ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

\( FIZ(G) = \) "PROBABILITY OF ENTRANT RETIRING AT TARGET GRADE" taken from the "TARGET RETIREMENT PROBABILITY MATRIX" (\( FZ \)). The specific probability is determined by the value of \( G \).

\( TGT = \) "PROBABILITY THAT ENTRANT RETIRES AT SELECTED TARGET" is assigned the value of \( FIZ(G) \):

\[ TGT = FIZ(G) \]

\( NEW = \) "NUMBER OF ENTRANTS IN INITIAL YEAR OF SERVICE". This value is computed as follows:

\[ \text{IF } (G \geq 20) \text{ THEN } NEW = 1000 \times OE(YS-1950) \]
\[ \text{IF } (G < 20) \text{ THEN } NEW = 1000 \times EO(YS-1950) \]

\( OE(x)/ED(x) \) are the "OFFICER and ENLISTED ACCESSION MATRICES" that contain accessions of officer/enlisted personnel for the years 1951-1982, inclusive.

\( PEC = \) "TARGET POPULATION RETIRING" calculated by multiplying the "PROBABILITY OF A NEW ENTRANT RETIRING" (\( PRO \)) by "PROBABILITY THAT THE ENTRANT RETIRES AT SELECTED TARGET" (\( TGT \)) and by the "NUMBER OF ENTRANTS IN THE INITIAL YEAR OF SERVICE" (\( NEW \)):

\[ PEC = PRO \times TGT \times NEW \]

\( TRC = \) "CURRENT TARGET GROUP RETIREMENT COST" is calculated by multiplying the "TARGET POPULATION RETIRING" (\( PEC \)) and the "CURRENT YEAR INDIVIDUAL RETIREMENT COST" (\( RC \)) together:

\[ TRC = PEC \times RC \]
LISTING OF VARIABLES AND CONVERSIONS IN
ORDER OF APPEARANCE IN THE COMPUTER PROGRAM

For "YEAR OF ENTRY" it appears that the following
conversion is used to calculate the last year worked.

\[ \text{YEAR OF ENTRY} \rightarrow \text{LAST YEAR WORKED} \]

1970 - 1975
\[ \text{YEAR} + \text{1970} = \text{NEW YEAR} \]

1976 - 1979
\[ \text{YEAR} + \text{1976} = \text{NEW YEAR} \]

1980 - 1989
\[ \text{YEAR} + \text{1980} = \text{NEW YEAR} \]

1990 - 1999
\[ \text{YEAR} + \text{1990} = \text{NEW YEAR} \]

The cases for the year that is one year before retirement
are calculated.

The cases for the retirement year and previous years
are included. The three cases are added and averaged.
**APPENDIX E**

**VARIABLES IN THE ORIGINAL ENTRY AGE COMPUTER PROGRAM**

(listed in alphabetical order)

---

**ALPHABETICAL LISTING**

of variables and computations

---

**1. Individual Entry Age Cost Method**

**AG** = "AVERAGE AGE AT RETIREMENT FOR THIS PAYGRADE" taken from the "AVERAGE AGE AT RETIREMENT MATRIX" (AG-F[G]) contained in the program, or can be changed by the operator.

**ANN** = "PROJECTED ANNUAL RETIREMENT PAY" computed by multiplying "PERCENTAGE OF BASEPAY FOR RETIREMENT" (FAC) by the "PROJECTED MONTHLY BASEPAY" (PP) and by 12 months:

\[ \text{ANN} = \text{FAC} \times \text{PP} \times 12 \]

**AP** = "APPLIED GAIN OR LOSS" computed as follows:

\[ \text{AP} = (\text{FC} + \text{GL}) \times \frac{\text{DI}}{(1 - X)} \]

**BP** = "MONTHLY BASE PAY AT RETIREMENT GRADE" based upon paygrade and length of service. Taken from the current (1983) pay matrix:

\[ \text{BP} = P(G,L) \]

**CF** = "CURRENT FISCAL YEAR", contained in program as value (1983).

**CKS** = "PROGRAM CHOICE", i.e., 'INC' for annual cost calculations, 'ADD' for additions, 'CALC' for estimated cost calculations, 'GANG' for expected gains, 'ALT' for alternative cost calculations, and 'LAUT' for alternative calculations.

**D(x)** = "AVERAGE LOS MATRIX" containing service (LOS) values across different paygrades.
AN INTERACTIVE COMPUTER FORECASTING MODEL TO DETERMINE THE EFFECTS OF POL (U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA  P G VALKO DEC 86

UNCLASSIFIED

F/G55/9

NL
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

DI = "ANNUAL DISCOUNT RATE" default to .39 (i.e., 9% per year), but may be changed by the operator.

DL = "PERCENTAGE OF BASEPAY PER YEAR OF SERVICE", default value of .025 (i.e., 2 1/2 % per yr. of service), but can be changed by operator.

DM = "MAXIMUM PERCENTAGE OF BASE PAY" that a retiree may receive. Default value is .75 (i.e., 75%), but can be changed by operator. If FAC is greater than DM, then FAC is assigned the value of DM.

E(x) = "ENLISTED LIFE EXPECTANCY MATRIX" containing thirty-one non-disability retired life expectations for ages 36 to 66 years, inclusive.

ED(x) = "ENLISTED ACCESSION MATRIX" containing thirty-two values for accessions of enlisted personnel for the years 1951-1982, inclusive.

EI = "PREVIOUS YEAR DISCOUNT RATE". Can be assigned the same value as the current year's "ANNUAL DISCOUNT RATE" (DI), or can be changed by the operator.

F(x) = "AVERAGE AGE AT RETIREMENT MATRIX" containing twenty-six average age values for each of the twenty-six different paygrades.

FAC = "PERCENTAGE OF BASEPAY FOR RETIREMENT" that a retiree has earned for retirement pay. Determined by multiplying "AVERAGE/ESTIMATED LENGTH OF SERVICE" (LOS) by "PERCENTAGE OF BASEPAY PER YEAR OF SERVICE (DL):

FAC = LOS * DL

FC = "CURRENT YEAR GAINS OR LOSSES" computed by subtracting "PREVIOUS YEAR INDIVIDUAL NORMAL COST" (OC) from the "CURRENT YEAR INDIVIDUAL NORMAL COST" (NC):
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

\[ FZ(x) \] = "TARGET RETIREMENT GRADE PROBABILITY MATRIX" containing a probability of retiring in a particular paygrade for each of the twenty-six paygrades.

\[ FZ(G) \] = "PROBABILITY OF ENTRANT RETIRING AT TARGET GRADE" default to a value from the "TARGET RETIREMENT PROBABILITY MATRIX" (FZ) dependent upon paygrade, or can be changed by operator.

\[ G \] = An integer from 1 to 26 corresponding to "PAYGRADE AT RETIREMENT", e.g., G=1 for E1, G=2 for E2, G=19 for W1, G=26 for O10. Used to determine values from LOS and pay matrices.

\[ GL \] = "DEFERRED GAINS OR LOSSES". This value is either input by the operator if known, or defaults to a "0" value if unknown.

\[ H \] = Assigned the value of "G" which is an integer value corresponding to the individual's paygrade.

\[ IN \] = "SALARY SCALE INCREASE" default to .055, or can be changed by operator.

\[ JN \] = "SALARY SCALE %" used to calculate the "PREVIOUS YEAR NORMAL COST" (OC). Can be assigned the same value as current year "SALARY SCALE INCREASE" (IN) or can be changed by the operator.

\[ L \] = An integer ranging from 1 to 6 depending upon the value of LOS, e.g., if 20<LOS<22 then L=1, etc. Used with "G" to determine values from the pay matrix.

\[ LI \] = "REMAINING LIFE EXPECTANCY (at retirement) FROM ACTUARIAL TABLES" taken from "ENLISTED/OFFICER LIFE EXPECTANCY MATRICES". Determined by "AVERAGE AGE AT RETIREMENT FOR THIS PAYGRADE" (LI=E(Z)) or
ALPHABETICAL LISTING OF VARIABLES AND COMPUTATIONS

LOS = Either "AVERAGE LENGTH OF SERVICE FOR THIS PAYGRADE" taken from the "AVERAGE LOS MATRIX" [LOS=D(G)] contained in the program, or an "ESTIMATED LENGTH OF SERVICE AT RETIREMENT" input by the operator.

M = Assigned the value of "L" which is an integer value corresponding to the individual's LOS.

MI = "PREVIOUS YEAR LIFE EXPECTANCY", can be assigned the same value as the current year's "REMAINING LIFE EXPECTANCY (at retirement)", or can be changed by the operator.

N = "NUMBER OF YEARS TO RETIREMENT" determined by subtracting "CURRENT YEAR" (CF) from "PROJECTED RETIREMENT YEAR" (RF):

\[ N = RF - CF \]

NC = "CURRENT YEAR INDIVIDUAL COST" is computed as follows:

\[ NC = PRE \times (DI/T) \]

NEW = "NUMBER OF ENTRANTS IN INITIAL YEAR OF SERVICE". This value must be input by the operator.

O = "NUMBER OF YEARS TO RETIREMENT FROM THE PREVIOUS YEAR" and is determined by adding "1" to the "NUMBER OF YEARS TO RETIREMENT" (N):

\[ O = N + 1 \]

OC = "PREVIOUS YEAR INDIVIDUAL NORMAL COST" is computed as follows:

\[ OC = QRE \times (EI/U) \]

OD(x) = "OFFICER ACCESSION MATRIX" containing thirty-two values for officer accession values for the years
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

OZ(x) = "OFFICER LIFE EXPECTANCY MATRIX" containing thirty-one non-disability retired life expectations for ages 36 to 66 years, inclusive.

P(x,y) = "CURRENT YEAR PAY MATRIX" with 26 rows defined by pay grade and 6 columns defined by years of service. The rows contain basepay amounts for all twenty-six pay-grades (EI-E9, 01, 01E, 02, 02E, 03, 03E, 04-016). The columns correspond to pay entitlements for 20, 22, 24, 26, 28, and 30 years of service.

PEC = "TARGET POPULATION RETIRING" calculated by multiplying the "PROBABILITY OF A NEW ENTRANT RETIRING" (PRO) by "PROBABILITY THAT THE ENTRANT RETIRES AT SELECTED TARGET" (TGT) and by the "NUMBER OF ENTRANTS IN THE INITIAL YEAR OF SERVICE" (NEW):

PEC = PRO * TGT * NEW

PGS = "PAYGRADE AT RETIREMENT" input by operator as EI, E9, W1, 01, 03E, 05, etc.

PP = "PROJECTED MONTHLY BASEPAY AT RETIREMENT GRADE" computed by compounding "CURRENT MONTHLY BASEPAY AT RETIREMENT GRADE" (BP) by the "SALARY SCALE INCREASE" (IN):

PP = BP
FOR I = 1 TO N
TP = TP + PP
NEXT I

PRE = "PRESENT VALUE OF FUTURE RETIREMENT BENEFITS" is computed by multiplying the "PROJECTED ANNUAL RETIREMENT PAY" (ANN) as follows:

PRE = ANN x \frac{1 - \left(\frac{1}{Q}\right)}{Q}
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

PRO = "PROBABILITY OF A NEW ENTRANT RETIRING". It has a
default value of .12 for enlisted and .4 for
officers, but can be changed by the operator.

Q = An intermediate variable used to eventually compute
the present value of future retirement benefits. It is
computed by adding "I" to the "ANNUAL DISCOUNT RATE"
(DI) and raising that sum to the "LIFE EXPECTANCY"
(LI) exponent:

Q = (1 + DI)**LI

QP = The previous year's "MONTHLY BASE PAY AT RETIREMENT"
corresponding to the current year's "BP". Taken from
the "PREVIOUS YEAR PAY MATRIX":

QP = R(H,M)

QRE = "PREVIOUS YEAR PRESENT VALUE OF FUTURE RETIREMENT
BENEFITS" is computed as follows:

QRE = BNN x \( \frac{1 - (1/s)}{EI} \)

R(x,y) = "PREVIOUS YEAR PAY MATRIX" containing the same rows
and columns as the "CURRENT YEAR PAY MATRIX" \( P(x,y) \)
but with the previous year's basepay data.

RC = "CURRENT YEAR (total) RETIREMENT COST" equals
the "CURRENT YEAR INDIVIDUAL NORMAL COST" (NC) plus
any "APPLIED GAINS OR LOSSES" (AP):

RC = NC + AP

RF = "PROJECTED RETIREMENT YEAR" determined by adding
"LENGTH OF SERVICE" (LOS) and "YEAR OF SERVICE ENTRY"
(YS) together:

RF = LOS + YS
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

S = An intermediate value used to eventually compute the previous year's present value of future retirement benefits. It is computed by adding "I" to the "PREVIOUS YEAR DISCOUNT RATE" (EI) and raising to the "PREVIOUS YEAR LIFE EXPECTANCY" (MI) exponent:

\[ S = (1 + EI)^{MI} \]

T = An intermediate variable used to eventually compute the current year individual normal cost. It is computed as follows:

\[ T = ((1 + DI)^{LOS} - 1 \]

TGT = "PROBABILITY THAT ENTRANT RETIRES AT SELECTED TARGET" is default to the FZ(G) matrix value, or can be changed by the operator.

TRC = "CURRENT TARGET GROUP RETIREMENT COST" is calculated by multiplying the "TARGET POPULATION RETIRING" (PEC) and the "CURRENT YEAR INDIVIDUAL RETIREMENT COST" (RC) together:

\[ TRC = PEC \times RC \]

U = An intermediate variable used to eventually compute the previous year's individual normal cost. It is computed as follows:

\[ U = ((1 + EI)^{LOS} - 1 \]

V = An intermediate variable used in the calculation of the "APPLIED GAIN OR LOSS" (AP). It is computed by adding "I" to the "NUMBER OF YEARS TO RETIREMENT" (N):

\[ V = N + 1 \]
ALPHABETICAL LISTING OF VARIABLES AND COMPUTATIONS

X = An intermediate variable used in the calculation of the "APPLIED GAIN OR LOSS" (AP). It is calculated as follows:

\[
X = \frac{1}{(1 + DI)^5}
\]

XP = "PROJECTED MONTHLY BASEPAY AT RETIREMENT CALCULATED FROM THE PREVIOUS YEAR". It is computed as follows:

\[
XP = QP \\
\text{FOR } J = 1 \text{ TO } O \\
\text{UP} = XP \times JN \\
\text{XP} = \text{UP} + \text{XP} \\
\text{NEXT J}
\]

YS = "YEAR OF SERVICE ENTRY" input by operator, e.g., 1972.

Z = An integer ranging from 1 to 31 depending upon the value of AG (e.g., if 36<AG<37 then Z=1; if 45<AG<46 then Z=31).
II. AGGREGATE ENTRY AGE COST METHOD

BLIP = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ BLIP = \frac{GI}{HIST} \]

FA = "CURRENT YEAR GAINS/LOSSES APPLIED" is computed by adding the "CURRENT YEAR'S ACTUARIAL GAIN/LOSS" (FD) together, and multiplying the sum by "BLIP":

\[ FA = (WC \cdot FD) \cdot BLIP \]

FD = "AMOUNT OF DEFERRED GAIN OR LOSS" is entered by the operator if known, or defaults to a "0" value if not known.

GI = "DISCOUNT RATE" entered by the operator as a decimal, e.g., 11.2% is entered as .112.

GIS = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ GIS = (1 + GI)^{20} \]

GIST = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ GIST = \frac{1}{GIS} \]

HIST = An intermediate variable used to eventually calculate the "CURRENT YEAR GAINS/LOSSES APPLIED" (FA). It is calculated as follows:

\[ HIST = (1 - GIST) \]
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

MC = "CURRENT YEAR ACTIVE FORCE NORMAL COST" is equal to
the "NORMAL COST PERCENTAGE FACTOR" (PF) multiplied
by the "CURRENT FISCAL YEAR TOTAL PAY BASE" (TBF):

\[ MC = PF \times TBF \]

PBE = "PRESENT VALUE OF FUTURE BENEFITS". This value must be
entered by the operator in millions of dollars, e.g.,
$4,334,785,192.32 entered as 4334.785.

PCE = "PRESENT VALUE OF FUTURE COMPENSATION". This value
must be entered by operator in millions of dollars,
e.g., $9,127,589,203.63 is entered as 9127.589.

PF = "NORMAL COST PERCENTAGE FACTOR" is computed by
dividing the "PRESENT VALUE OF FUTURE BENEFITS" (PBE) by
the "PRESENT VALUE OF FUTURE COMPENSATION" (PCE):

\[ PF = \frac{PBE}{PCE} \]

The program allows the operator to change the value.

QF = "PREVIOUS YEAR NORMAL COST % FACTOR" is entered by the
operator as a decimal, e.g., 43.2% is entered as .432.

TBF = "CURRENT FISCAL YEAR TOTAL BASE PAY". This value must
be entered by the operator in millions of dollars,
e.g., $27,485,552,035.89 is entered as 27485.552.

TRC = "CURRENT YEAR TOTAL RETIREMENT COST" is computed by
adding the "CURRENT YEAR ACTIVE FORCE NORMAL COST"
(MC) and the "CURRENT YEAR GAINS/LOSSES APPLIED"
(FA):

\[ TRC = MC + FA \]

UBF = "PREVIOUS YEAR TOTAL BASE PAY" is entered by the
operator in millions of dollars, e.g., $22,432,518,317
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

VC = "PREVIOUS YEAR NORMAL COST" is entered by the operator
if known. Otherwise, it is calculated by multiplying
the "PREVIOUS YEAR NORMAL COST & FACTOR" (QF) by the
"PREVIOUS YEAR TOTAL BASE PAY" (UBF):

\[ VC = QF \times UBF \]

WC = "CURRENT YEAR'S ACTUARIAL GAIN OR LOSSES" computed by
subtracting the "PREVIOUS YEAR ACTIVE FORCE NORMAL
COST" (VC) from the "CURRENT YEAR ACTIVE FORCE NORMAL
COST" (MC):

\[ WC = MC - VC \]
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

III. MULTYEAR EXPANDED INDIVIDUAL NORMAL COST METHOD

ADJ = "ADJUSTMENT TO LOS AND AGE AT RETIREMENT" value is entered by operator as an integer, either unsigned or with a negative sign, e.g., -2 indicating a decrease of two years. A zero (0) is entered for no change.

AG = "AVERAGE AGE AT RETIREMENT" taken from the "AVERAGE AGE AT RETIREMENT MATRIX" [F(G)] and modified by the "ADJUSTMENT TO LOS AND AGE AT RETIREMENT" value (ADJ):

\[ AG = F(G) + ADJ \]

ANN = "PROJECTED ANNUAL RETIREMENT PAY" computed by multiplying "PERCENTAGE OF BASEPAY FOR RETIREMENT" (FAC) by the "PROJECTED MONTHLY BASEPAY" (PP) and by 12 months:

\[ ANN = FAC \times PP \times 12 \]

BP = "MONTHLY BASE PAY AT RETIREMENT GRADE" based upon paygrade and length of service. Taken from the current (1983) pay matrix:

\[ BP = F(G,L) \]

CS = "LEVEL OF DETAIL" for program, i.e., 'Sum' for Summary Totals and 'Detail' for Full Detail. This value is input by the operator.

CF = "CURRENT FISCAL YEAR" with a program assigned value of 1983.
DELTA = A "DELTA" factor used to adjust attrition. A value of

(1) "1" is assigned by the program if "AVERAGE LOS"
    \[ D(G) + \text{ADJ} \] is greater than "MINIMUM LOS FOR
    \text{RETIREMENT}" (MRT), or

(2) is calculated by the following formula if
    \[ (D(G) + \text{ADJ}) < \text{MRT} \text{ and } (\text{MRT} > 20 \text{ yrs.}) \] :

\[
\text{DELTA} = 1.08^{*}[\text{MRT} - (D(G) + \text{ADJ})]
\]

\[ D(G) \] = "AVERAGE LOS FOR A PARTICULAR PAYGRADE" from the
    "AVERAGE LOS MATRIX". Determined by the value
    assigned to the integer variable, "G".

\[ D(I) \] = "DISCOUNT RATE" entered by the operator as a decimal,
    e.g., .08 for 8%.

\[ D(L) \] = "RETIREMENT PAY BASIS PER YEAR OF SERVICE" (i.e., the
    \% rate of retired pay per year of service) is entered
    by the operator as a decimal, e.g., .025 for 2.5\% per
    year.

\[ D(M) \] = "RETIREMENT PAY CEILING AS PERCENTAGE OF BASIC PAY"
    (i.e., the maximum \% of pay basis at retirement) is
    entered by the operator as a decimal, e.g., .75 for
    75\%.

\[ E(Z) \] = "ENLISTED LIFE EXPECTANCY" taken from the "ENLISTED
    LIFE EXPECTANCY MATRIX" \[ E(x) \]. The specific life
    expectancy value is determined by the integer variable
    "Z", which corresponds to a specific retirement age.

\[ F(A) \] = "PERCENTAGE OF BASEPAY FOR RETIREMENT" that a retiree
    has earned for retirement pay. Determined by multi-
    plying "AVERAGE/ESTIMATED LENGTH OF SERVICE" (LOS) by
    "PERCENTAGE OF BASEPAY PER YEAR OF SERVICE (DL)"

\[
F(A) = \text{LOS} \times D(L)
\]

13
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

F(G) = "AVERAGE AGE AT RETIREMENT", taken from the "AVERAGE AGE AT RETIREMENT MATRIX" [F(x)]. Value of F(G) is determined by the particular value of the integer variable, "G", which corresponds to a particular paygrade.

FZ(G) = "PROBABILITY OF ENTRANT RETIRING AT TARGET GRADE" taken from the "TARGET RETIREMENT PROBABILITY MATRIX" (FZ). The specific probability is determined by the value of "G".

G = An integer from 1 to 26 corresponding to "PAYGRADE AT RETIREMENT", e.g., G=1 for E1, G=2 for E2, G=18 for W1, G=26 for O18. Used to determine values from LOS and pay matrices.

IN = "SALARY SCALE ESTIMATOR" (i.e., the rate of salary increase) is entered by the operator as a decimal, e.g., .055 for 5.5% yearly rate for salary increases.

L = An integer ranging from 1 to 6 depending upon the value of LOS, e.g., if 20<LOS<22 then L=1, etc. Used with "G" to determine values from the pay matrix.

LI = "REMAINING LIFE EXPECTANCY AT RETIREMENT" is computed by setting the value of "LI" to a respective officer or enlisted life expectancy, and then modifying it with the "ADJUSTMENT TO LIFE EXPECTANCY AT RETIREMENT" value ("LONG"):  

\[
LI = E(2) \\
LI = LI + LONG
\]

LONG = "ADJUSTMENT TO LIFE EXPECTANCY AT RETIREMENT" is entered by the operator as an integer, either unsigned or with a negative sign, e.g., 3 for three years. A zero is entered for no change.
ALPHABETICAL LISTING OF VARIABLES AND COMPUTATIONS

LOS = "LENGTH OF SERVICE" is computed by adding "AVERAGE LOS FOR A PARTICULAR PAYGRADE" (D(G)) to "ADJUSTMENT TO LOS AND AGE AT RETIREMENT" (ADJ).

\[ \text{LOS} = D(G) + ADJ \]

MRT = "MINIMUM LOS FOR RETIREMENT" (i.e., the minimum length of service required in order to retire) is entered by the operator as an integer, e.g., 25 for twenty-five years.

\[ N = \text{MRT} \]

N = "NUMBER OF YEARS TO RETIREMENT" determined by subtracting "CURRENT YEAR" (CF) from "PROJECTED RETIREMENT YEAR" (RF):

\[ N = RF - CF \]

NC = "YEAR GROUP NORMAL COST" is computed as follows:

\[ NC = \text{PRE} \times \frac{DI}{T} \]

NEW = "NUMBER OF ENTRANTS IN INITIAL YEAR OF SERVICE". This value is computed as follows:

\[ \text{IF} (G>20) \text{ THEN NEW} = 1000 \times \text{OD(YS-1950)} \]
\[ \text{IF} (G<20) \text{ THEN NEW} = 1000 \times \text{ED(YS-1954)} \]

OD(x)/ED(x) are the "OFFICER and ENLISTED ACCESSION MATRICES" that contain accessions of officer/enlisted personnel for the years 1951-1982, inclusive.

OZ(Z) = "OFFICER LIFE EXPECTANCY" taken from the "OFFICER LIFE EXPECTANCY MATRIX" [OZ(x)]. The specific life expectancy value is determined by the integer variable "Z", which corresponds to a specific retirement age.
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

PEC = "TARGET POPULATION RETIRING" calculated by multiplying
the "PROBABILITY OF A NEW ENTRANT RETIRING" (PRO) by
"PROBABILITY THAT THE ENTRANT RETIRES AT SELECTED
TARGET" (TGT) and by the "NUMBER OF ENTRANTS IN THE
INITIAL YEAR OF SERVICE" (NEW):

\[
P EC = PRO \times TGT \times NEW
\]

PGS = "PAYGRADE AT RETIREMENT" initially set by program as
"E1". After computing normal and total costs for this
paygrade, resets value to "E2" and recomputes normal
and total costs. Program continues computations until
costs for "O10" are computed.

\[
P(G,L) = \text{"CURRENT YEAR PAY" taken from the "CURRENT YEAR PAY}
\text{MATRIX". The current year pay value is determined by}
\text{the values of "G" and "L", which are assigned values}
\text{based upon paygrade and years of service over 26 yrs.}
\]

PP = "PROJECTED MONTHLY BASEPAY AT RETIREMENT GRADE"
computed by compounding "CURRENT MONTHLY BASEPAY AT
RETIREMENT GRADE" (BP) by the "SALARY SCALE INCREASE"
(IN):

\[
PP = BP \\
\text{FOR } I = 1 \text{ TO } N \\
TP = PP \times IN \\
PP = TP + PP \\
\text{NEXT } I
\]

PRE = "PRESENT VALUE OF FUTURE RETIREMENT BENEFITS" is
computed by multiplying the "PROJECTED ANNUAL
RETIREMENT PAY" (ANN) as follows:

\[
PRE = \text{ANN} \times \frac{1}{\text{DI}}
\]

PRO = "RETIREMENT PROBABILITY". It has a default value of
.12 for enlisted and .4 for officers, but is
modified by the program as follows:

\[
PRO = (PRO + PROP) \times \text{DELT}
\]
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

PROP = An intermediate variable assigned the value of either
"ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR
OFFICERS" (PROR) or "ADJUSTMENT TO ENTRANT RETIREMENT
PROBABILITY FOR ENLISTED PERSONNEL" (PROQ). PROR and
PROQ are input by the operator.

PROQ = "ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR
ENLISTED PERSONNEL" is entered by the operator as a decimal, e.g., .02 for a 2% decrease. The baseline value is .12 (i.e., 12% probability). A zero is entered for no change to the baseline value.

PROR = "ADJUSTMENT TO ENTRANT RETIREMENT PROBABILITY FOR
OFFICERS" is entered by the operator as a decimal, e.g., .01 for a 1% increase. The baseline value is .40 (i.e., 40% probability). A zero (0) is entered for no change to the baseline value.

Q = An intermediate variable used to eventually compute the present value of future retirement benefits. It is computed by adding "1" to the "ANNUAL DISCOUNT RATE" (DI) and raising that sum to the "LIFE EXPECTANCY" (LI) exponent:

\[ Q = (1 + DI)^{LI} \]

RC = An intermediate variable assigned the value of the normal cost for a particular year group. It is used later to compute "YEAR GROUP TOTAL COST" (TRC):

\[ RC = NC \]
\[ \vdots \]
\[ TRC = PEC + RC \]

RF = "PROJECTED RETIREMENT YEAR" determined by adding "LENGTH OF SERVICE" (LOS) and "YEAR OF SERVICE ENTRY" (YS) together:

\[ RF = LOS + YS \]
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

T = An intermediate variable used to eventually compute
the current year individual normal cost. It is com-
puted as follows:
\[ T = [(1 + DI)^{LOS}] - 1 \]

TGT = "PROBABILITY THAT ENTRANT RETIRES AT SELECTED TARGET"
is assigned the value of FZ(G):
TGT = FZ(G)

TRC = "CURRENT TARGET GROUP RETIREMENT COST" is calculated
by multiplying the "TARGET POPULATION RETIRING" (PEC)
and the "CURRENT YEAR INDIVIDUAL RETIREMENT COST" (RC)
together:
TRC = PEC * RC

TTRC = "TOTAL YEAR GROUP COST" of non-disability retirees by
year group, starting with 1953. Computed by the
formula:
TTRC = TTRC + TRC

TTTRC = "REGULAR NAVY COST" of its non-disability retirees.
Computed by the following formula:
TTTRC = TTTRC + TTRC

YS = "YEAR OF SERVICE ENTRY" with the initial value of
1953, and then updated by one year for the next year
group cost calculations by the formula:
YS = YS + 1

Z = An integer ranging from 1 to 31 depending upon the
value of the retiree's age, "AG" (e.g., if 36<AG<37
then Z=1; if 45<AG<46 then Z=31).
ALPHABETICAL LISTING
OF VARIABLES AND COMPUTATIONS

For "YEAR OF ENTRY" (YS) after 1980, the following subroutine is utilized to calculate last 3 yrs. average salary:

A = N - 2
RP = BP
FOR K = 1 TO A
VP = RP * IN
RP = VP + RP
NEXT K

SP = (IN * RP) + RP

PP = (SP + RP + PP)/3

(The basepay for the year that is two years before retirement is calculated.)

(The basepay for the year that is one year before retirement is calculated.)

(The basepay for the retirement year was previously computed. The three basepays are added and averaged.)
APPENDIX F
ORIGINAL ENTRYAGE COMPUTER PROGRAM

00005 rem start of entryage program
00010 print '**********************************************
00015 print 'This is a three part interactive program. It calculates ind-
00020 print 'vidual and aggregate military retirement costs. At this point'
00025 print 'please type in ind for the individual method cost calculations,'
00030 print 'agg for aggregate method cost calculations, or gang for expanded '
00035 print 'multi year individual cost calculations. If you wish '
00040 print 'to exit '
00045 print 'the program type halt. Program loaded data has been derived from'
00050 print '**********************************************
00055 input ck$
00075 restore
00080 dim p(27,7)
00085 dim e(32)
00090 dim oz(32)
00095 dim d(27)
00100 dim f(27)
00105 rem 1983 pay matrix
00110 read p(1,1),p11,2),p(1,3),p(1,4),p(1,5),p(1,6)
00115 read p(2,1),p(2,2),p(2,3),p(2,4),p(2,5),p(2,6)
00120 read p(3,1),p(3,2),p(3,3),p(3,4),p(3,5),p(3,6)
00130 read p(5,1),p(5,2),p(5,3),p(5,4),p(5,5),p(5,6)
00135 read p(6,1),p(6,2),p(6,3),p(6,4),p(6,5),p(6,6)
00140 read p(7,1),p(7,2),p(7,3),p(7,4),p(7,5),p(7,6)
00145 read p(8,1),p(8,2),p(8,3),p(8,4),p(8,5),p(8,6)
00150 read p(9,1),p(9,2),p(9,3),p(9,4),p(9,5),p(9,6)
00155 read p(10,1),p(10,2),p(10,3),p(10,4),p(10,5),p(10,6)
00160 read p(11,1),p(11,2),p(11,3),p(11,4),p(11,5),p(11,6)
00165 read p(12,1),p(12,2),p(12,3),p(12,4),p(12,5),p(12,6)
00170 read p(13,1),p(13,2),p(13,3),p(13,4),p(13,5),p(13,6)
00175 read p(14,1),p(14,2),p(14,3),p(14,4),p(14,5),p(14,6)
00180 read p(15,1),p(15,2),p(15,3),p(15,4),p(15,5),p(15,6)
00190 read p(17,1),p(17,2),p(17,3),p(17,4),p(17,5),p(17,6)
00195 read p(18,1),p(18,2),p(18,3),p(18,4),p(18,5),p(18,6)
00200 read p(19,1),p(19,2),p(19,3),p(19,4),p(19,5),p(19,6)
00205 read p(20,1),p(20,2),p(20,3),p(20,4),p(20,5),p(20,6)
00210 read p(21,1),p(21,2),p(21,3),p(21,4),p(21,5),p(21,6)
00215 read p(22,1),p(22,2),p(22,3),p(22,4),p(22,5),p(22,6)
00220 read p(23,1),p(23,2),p(23,3),p(23,4),p(23,5),p(23,6)
00225 read p(24,1),p(24,2),p(24,3),p(24,4),p(24,5),p(24,6)
I-1

PAGE 2

00250 read p(25,1),p(25,2),p(25,3),p(25,4),p(25,5),p(25,6)
00255 read p(26,1),p(26,2),p(26,3),p(26,4),p(26,5),p(26,6)
00260 rem enlisted life expectancy data
00265 read e(1),e(2),e(3),e(4),e(5),e(6),e(7),e(8),e(9),e(10),e(11)
00270 read e(12),e(13),e(14),e(15),e(16),e(17),e(18),e(19),e(20),e(21)
00275 read e(22),e(23),e(24),e(25),e(26),e(27),e(28),e(29),e(30),e(31)
00280 rem officer life expectancy
00285 read o(1),o(2),o(3),o(4),o(5),o(6),o(7),o(8),o(9),o(10),o(11)
00290 read o(12),o(13),o(14),o(15),o(16),o(17),o(18),o(19),o(20),o(21)
00295 read o(22),o(23),o(24),o(25),o(26),o(27),o(28),o(29),o(30),o(31)
00300 rem average los matrix
00305 read d(1),d(2),d(3),d(4),d(5),d(6),d(7),d(8),d(9)
00310 read d(10),d(11),d(12),d(13),d(14),d(15),d(16),d(17),d(18)
00315 rem average age at retirement matrix
00320 read e(1),e(2),e(3),e(4),e(5),e(6),e(7),e(8),e(9)
00325 read e(10),e(11),e(12),e(13),e(14),e(15),e(16),e(17),e(18)
00330 read e(19),e(20),e(21),e(22),e(23),e(24),e(25),e(26)
00335 rem target retirement grade probability matrix
00340 read f(1),f(2),f(3),f(4),f(5),f(6),f(7),f(8),f(9)
00345 read f(10),f(11),f(12),f(13),f(14),f(15),f(16),f(17),f(18)
00350 read f(19),f(20),f(21),f(22),f(23),f(24),f(25),f(26)
00355 rem enlisted accession matrix
00360 read e(1),e(2),e(3),e(4),e(5),e(6),e(7),e(8),e(9)
00365 read e(10),e(11),e(12),e(13),e(14),e(15),e(16),e(17),e(18)
00370 read e(19),e(20),e(21),e(22),e(23),e(24),e(25),e(26)
00375 rem officer accession matrix
00380 read o(1),o(2),o(3),o(4),o(5),o(6),o(7),o(8),o(9)
00385 read o(10),o(11),o(12),o(13),o(14),o(15),o(16),o(17),o(18)
00390 read o(19),o(20),o(21),o(22),o(23),o(24),o(25),o(26)
00395 rem 1983 pay data
00400 data 573.6,573.6,573.6,573.6,573.6,573.6
00405 data 642.9,642.9,642.9,642.9,642.9,642.9
00410 data 762.3,762.3,762.3,762.3,762.3,762.3
00415 data 888.6,888.6,888.6,888.6,888.6,888.6
00420 data 1028.1,1028.1,1028.1,1028.1,1028.1,1028.1
00425 data 1299.3,1299.3,1299.3,1299.3,1299.3,1299.3
00430 data 1483.5,1483.5,1483.5,1483.5,1483.5,1483.5
00435 data 1681.7,1681.7,1681.7,1681.7,1681.7,1681.7
00440 data 1917.9,1917.9,1917.9,1917.9,1917.9,1917.9
00445 data 2141.7,2141.7,2141.7,2141.7,2141.7,2141.7
00450 data 2660.8,2660.8,2660.8,2660.8,2660.8,2660.8
00455 data 2789.8,2789.8,2789.8,2789.8,2789.8,2789.8
00460 data 3155.5,3155.5,3155.5,3155.5,3155.5,3155.5
00465 data 3488.4,3488.4,3488.4,3488.4,3488.4,3488.4
00470 data 4555.8,4555.8,4555.8,4555.8,4555.8,4555.8
00475 data 4791.6,4791.6,4791.6,4791.6,4791.6,4791.6
00480 data 4791.6,4791.6,4791.6,4791.6,4791.6,4791.6
00485 data 4791.6,4791.6,4791.6,4791.6,4791.6,4791.6
00490 data 4791.6,4791.6,4791.6,4791.6,4791.6,4791.6
00495 rem enlisted life expectancy data
00500 data 37.47,36.57,35.67,34.77,33.86,32.95,32.04,31.14,30.24,29.34,28.46
00560 data 19.62,18.9,18.18,17.47,16.78,16.14,15.44,14.79,14.16,13.54
00565 rem officer life expectancy data
00570 data 40.9,39.97,39.04,38.13,37.2,36.28,35.37,34.45,33.54,32.63,31.73
00575 data 30.83,29.94,29.06,28.18,27.31,26.45,25.6,24.75,23.91,23.09
00580 data 22.27,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00585 rem average los data
00586 rem note there is an entry in this matrix - and the two below - hence Z6 entries
00590 rem average age at retirement data
00595 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00600 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00605 rem average grade data
00610 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00615 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00620 rem target retirement grade data
00625 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00630 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00635 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00640 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00645 rem enlisted accession data
00650 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00655 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00660 rem officer accession data
00665 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00670 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00675 data 20.8,20.4,20.8,21,21,21,21.8,22.7,24.3
00680 data 22.1,21.46,20.65,19.87,19.08,18.31,17.55,16.81,16.07,15.35
00685 rem 1982 pay data
00690 read r(1,1),r(1,2),r(1,3),r(1,4),r(1,5),r(1,6)
00695 read r(2,1),r(2,2),r(2,3),r(2,4),r(2,5),r(2,6)
00700 read r(3,1),r(3,2),r(3,3),r(3,4),r(3,5),r(3,6)
00705 read r(4,1),r(4,2),r(4,3),r(4,4),r(4,5),r(4,6)
00710 read r(5,1),r(5,2),r(5,3),r(5,4),r(5,5),r(5,6)
00715 read r(6,1),r(6,2),r(6,3),r(6,4),r(6,5),r(6,6)
00720 read r(7,1),r(7,2),r(7,3),r(7,4),r(7,5),r(7,6)
00725 read r(8,1),r(8,2),r(8,3),r(8,4),r(8,5),r(8,6)
00730 read r(9,1),r(9,2),r(9,3),r(9,4),r(9,5),r(9,6)
00735 read r(10,1),r(10,2),r(10,3),r(10,4),r(10,5),r(10,6)
00740 read r(11,1),r(11,2),r(11,3),r(11,4),r(11,5),r(11,6)
00745 read r(12,1),r(12,2),r(12,3),r(12,4),r(12,5),r(12,6)
00750 read r(13,1),r(13,2),r(13,3),r(13,4),r(13,5),r(13,6)
00755 read r(14,1),r(14,2),r(14,3),r(14,4),r(14,5),r(14,6)
00760 read r(15,1),r(15,2),r(15,3),r(15,4),r(15,5),r(15,6)
00765 read r(16,1),r(16,2),r(16,3),r(16,4),r(16,5),r(16,6)
00770 read r(17,1),r(17,2),r(17,3),r(17,4),r(17,5),r(17,6)
00775 read r(18,1),r(18,2),r(18,3),r(18,4),r(18,5),r(18,6)
00780 read r(19,1),r(19,2),r(19,3),r(19,4),r(19,5),r(19,6)
00785 read r(20,1),r(20,2),r(20,3),r(20,4),r(20,5),r(20,6)
00790 read r(21,1),r(21,2),r(21,3),r(21,4),r(21,5),r(21,6)
00795 read r(22,1),r(22,2),r(22,3),r(22,4),r(22,5),r(22,6)
00800 read r(23,1),r(23,2),r(23,3),r(23,4),r(23,5),r(23,6)
00805 read r(24,1),r(24,2),r(24,3),r(24,4),r(24,5),r(24,6)
00810 read r(25,1),r(25,2),r(25,3),r(25,4),r(25,5),r(25,6)
00815 read r(26,1),r(26,2),r(26,3),r(26,4),r(26,5),r(26,6)
00820 rem 1982 pay data
00825 data 551.4,551.4,551.4,551.4,551.4,551.4
00830 data 618.3,618.3,618.3,618.3,618.3,618.3
00835 data 732.9,732.9,732.9,732.9,732.9,732.9
00840 data 854.4,854.4,854.4,854.4,854.4,854.4
00845 data 1060.5,1060.5,1060.5,1060.5,1060.5,1060.5
00850 data 1249.2,1249.2,1249.2,1249.2,1249.2,1249.2
00855 data 1426.5,1522.2,1522.2,1711.5,1711.5,1711.5

116
00860 data 1616.4,1711.5,1711.5,1902.3,1902.3,1902.3
00865 data 1596.9,1596.9,1596.9,1596.9,1596.9,1596.9
00870 data 1721.1,1790.7,1790.7,1951.2,1951.2,1951.2
00875 data 2180.4,2438.8,2438.8,2438.8,2438.8,2438.8
00880 data 1844.1,1941.3,1941.3,2130,2130,2130
00885 data 1917.3,1986.9,1986.9,2057.1,2057.1,2057.1
00890 data 2180.4,2253.6,2253.6,2428.8,2428.8,2428.8
00895 data 1329.3,1389.3,1389.3,1329.3,1329.3,1329.3
00900 data 1650.6,1650.6,1650.6,1650.6,1650.6,1650.6
00905 data 1685.1,1685.1,1685.1,1685.1,1685.1,1685.1
00915 data 2180.4,2438.8,2438.8,2438.8,2438.8,2438.8
00920 data 1596.9,1596.9,1596.9,1596.9,1596.9,1596.9
00925 if (ck$='halt') then stop
00930 if (ck$='gang') then goto 2360
00935 rem begin individual subprogram
00940 g=99
00945 print 'Input paygrade at retirement (e.g. e7, w3, o3e, o10).'
00950 input pg$
00955 if (pg$='e1') then g=1
00960 if (pg$='e2') then g=2
00965 if (pg$='e3') then g=3
00970 if (pg$='e4') then g=4
00975 if (pg$='e5') then g=5
00980 if (pg$='e6') then g=6
00985 if (pg$='e7') then g=7
00990 if (pg$='e8') then g=8
00995 if (pg$='e9') then g=9
01000 if (pg$='w1') then g=10
01005 if (pg$='w2') then g=11
01010 if (pg$='w3') then g=12
01015 if (pg$='w4') then g=13
01020 if (pg$='w5') then g=14
01025 if (pg$='w6') then g=15
01030 if (pg$='w7') then g=16
01035 if (pg$='w8') then g=17
01040 if (pg$='w9') then g=18
01045 if (pg$='o1') then g=19
01050 if (pg$='o2') then g=20
01055 if (pg$='o3') then g=21
01060 if (pg$='o4') then g=22
01065 if (pg$='o5') then g=23
01070 if (pg$='o6') then g=24
01075 if (pg$='o7') then g=25
01080 if (pg$='o8') then g=26
01085 if (pg$='o9') then g=27
01090 if (pg$='o10') then g=28
01095 if (pg$='o11') then g=29
01100 if (g=99) then goto 960
01105 print 'Input year of service entry (e.g. 1972).'
01110 input ys
01115 if ys<1776 then goto 1110
01120 if (g<1776) then goto 1110
01125 print using 'Average length of service for this paygrade = ##.##';d(g)
01130 print 'Is this acceptable? if yes type y if no type n.'
01135 input lo$
01140 if (l0$='y') then los = d(g)
01145 if (l0$='n') then goto 2080
01150 if (los <20) then goto 2080

117
if (los<22) and (los>=20) then 1=1
if (los<24) and (los>=22) then 1=2
if (los<26) and (los>=24) then 1=3
if (los<28) and (los>=26) then 1=4
if (los<30) and (los>=28) then 1=5
if (los>=30) then 1=6

bp=p(g,l)

cf=1983
rf=los+ys

print 'Projected retirement year = 'rf

n=rf-cf

print 'Salary scale increase is loaded as .055.'

print 'Is this acceptable? If yes type y if no type n.'

input 3cs

if 3cs$='n' then goto 2000

if (sc$='y') then in=.055

pp=bp

for i=1 to n
  tp=pp*in
  pp=pp+tp
next i

print using 'Current monthly basepay at retirement grade =$t.#t'bp
print using 'Projected monthly basepay at retirement grade =$.#4S.t1'spp

print 'Retirement is currently computed at .025 of basepay.'

print 'Is this acceptable? If yes type y if no type n.'

input dx$

if (dx$='y') then dm=.09
if (dx$='n') then goto 2250

if (fac>dm) then fac=dm

if (ys>1980) then goto 2030

fac=los*d1

print 'Retirement ceiling is currently set at .75 of base pay.'

print 'Is this acceptable? If yes type y if no type n.'

input dm$

if (dm$='y') then dm=.75
if (dm$='n') then goto 2250

if (fac>dm) then fac=dm

print using 'Average age at retirement for this paygrade = q.tt'f(g)

print 'Is this acceptable? If yes type y if no type n.'

input got

if (go$='y') then ag=ag(t)

if (go$='n') then goto 2110

1000 if (ag<50) then goto 2110

1005 if (ag>35) then z=1

1010 if (ag>36) and (ag<38) then z=2

1015 if (ag>39) and (ag<40) then z=3

1020 if (ag>41) then z=4

1025 if (ag>42) then z=5

1030 if (ag>43) then z=6

1035 if (ag>44) then z=7

1040 if (ag>45) then z=8

1045 if (ag>46) then z=9

1050 if (ag>47) then z=10

1055 if (ag>48) then z=11

1060 if (ag>49) then z=12

1065 if (ag>50) then z=13
01470 IF (AG<50) AND (AG>=49) THEN Z=14
01475 IF (AG<51) AND (AG>=50) THEN Z=15
01480 IF (AG<52) AND (AG>=51) THEN Z=16
01485 IF (AG<53) AND (AG>=52) THEN Z=17
01490 IF (AG<54) AND (AG>=53) THEN Z=18
01495 IF (AG<55) AND (AG>=54) THEN Z=19
01500 IF (AG<56) AND (AG>=55) THEN Z=20
01505 IF (AG<57) AND (AG>=56) THEN Z=21
01510 IF (AG<58) AND (AG>=57) THEN Z=22
01515 IF (AG<59) AND (AG>=58) THEN Z=23
01520 IF (AG<60) AND (AG>=59) THEN Z=24
01525 IF (AG<61) AND (AG>=60) THEN Z=25
01530 IF (AG<62) AND (AG>=61) THEN Z=26
01535 IF (AG<63) AND (AG>=62) THEN Z=27
01540 IF (AG<64) AND (AG>=63) THEN Z=28
01545 IF (AG<65) AND (AG>=64) THEN Z=29
01550 IF (AG<66) AND (AG>=65) THEN Z=30
01555 IF (AG<67) THEN Z=31
01560 IF (AG>=10) THEN Z=32
01565 PRINT 'Remaining life expectancy from actuarial tables = ';
01570 PRINT 'Is this acceptable? If yes type y if no type n.'
01575 INPUT CH$
01580 IF (CH$='n') THEN GOTO 1985
01585 Q=(LDI)*F(R)
01590 PRE=ANN*(1-(1/q))/DI
01595 PRINT USING 'Present value of future retirement benefits ='; PRE
01600 T2=(1+DI)**LOS1
01605 NC=PRE*(DI/T)
01610 PRINT USING 'Current year individual normal cost = $'NC
01615 PRINT 'First year of normal costing? If yes type y if no type n.'
01620 INPUT NC$
01625 IF (NC$='y') THEN GOTO 2195
01630 PRINT 'Do you know previous year normal cost? If yes type y if no type n.'
01635 INPUT PN$
01640 IF (PN$='y') THEN GOTO 2015
01645 PRINT USING 'Salary scale % used in current year normal cost ='; IN
01650 PRINT 'Was this your prior year estimator? If yes type y if no type n.'
01655 INPUT SS$
01660 IF (SS$='y') THEN M=IN
01665 IF (SS$='n') THEN GOTO 2310
01670 H=Q
01675 N=1
01680 QR=H,N
01685 O=N+1
01690 XP=QR
01695 FOR J=1 TO O
01700 UP=XP*J
01705 XP=UP*XP
01710 NEXT J
01715 IF (Y>1980) THEN GOTO 2265
01720 BNN=FAC*XP=12
01725 PRINT USING 'Discount rate used in current year normal cost = '; DI
01730 PRINT 'Was this your prior year estimator? If yes type y if no type n.'
01735 INPUT DR$
01740 IF (DR$='y') THEN E=DI
01745 IF (DR$='n') THEN GOTO 2325
01750 PRINT 'Remaining life expectancy used in current year normal cost = ';
01755 PRINT 'Was this your previous estimator? If yes type y if no type n.'
01760 INPUT DH$
01765 IF (DH$='y') THEN M=1
01770 IF (DH$='n') THEN GOTO 2205
01775 S=(1+DI)*M

119
`01780 qre=bnn*(1-(1/s))/eil)
01785 u=(1+ei)**los-1
01790 oc=qre=ei/u
01795 print using 'Previous year individual normal cost='oc
01800 fc=oc-oc
01805 print
01810 print using 'Current year gains or losses =fc'fc
01815 print 'Any deferred gains or losses? If yes type y if no type n.'
01820 input dg$
01825 if (dg$='y')
01830 then goto 2235
01835 if (dg$='n')
01840 then gosub 2145
01845 v=n+1
01850 x=1/(1+ei)*v
01855 ap=(fc+gl)*Idi/1-xl)
01860 if (g<Z01 then pro=.12
01865 if (g>20) then pro=.4
01870 print using 'Current year individual retirement cost =rc'
01875 print using 'Probability of new entrant retiring = rc'
01880 print 'Is this acceptable? If yes type y if no type n.'
01885 input pr$
01890 if (pr$='y')
01895 then goto 1970
01900 if (pr$='n')
01905 then gosub 1895
01910 print 'Input your estimate of retirement probability (e.g. .3456).'
01915 input f2$
01920 if (f2$='y')
01925 then tgt=f2(g)
01930 if (f2$='n')
01935 then gosub 1925
01940 print 'Input number of entrants in initial year of service (e.g. 230000).'
01945 input new
01950 pec=pro*tgt*new
01955 trc:pec*rc
01960 print 'Paygrade at retirement =ipg$
01965 print 'Year of service entry =ys
01970 print using 'Current target group retirement cost =trc'
01975 goto 1800
01980 a=n-2
01985 rp=bp
01990 for k=1 to a
01995 v=vp+rp
02000 next k
02005 print 'Input your estimate length of service at retirement (e.g. 24.8).'
02010 input los
02015 goto 1200
02020 print using 'Retirement basis for post 1980 entrant = ipp'
02025 goto 1335
02030 print using 'Input your estimate of salary scale increase as decimal (e.g. .065).'
02035 input in
02040 print using 'Input previous year normal cost (e.g. 1389.24).'
02045 input oc
02050 goto 1800
02055 a=n-2
02060 rp=bp
02065 for k=1 to a
02070 v=vp+rp
02075 next k
02080 goto 1200`
02000 print 'Input discount rate estimate as decimal (e.g. .11).'
02100 print 'Input your estimate of age at retirement (e.g. 47.86).'
02300 print 'Input your probability that entrant retires at selected target rank/grade (e.g. .235).'
02500 print 'Deferred gains and losses are the amortized value of differences caused by fluctuations in the estimating variables over time. The actuarial model dampens the impact of these fluctuations to a zero entry average over the working life of the individual. Therefore, an entry of zero for this variable does not invalidate the model.'
02700 print 'Input your estimate of remaining life expectancy (e.g. 7.1).'
02900 print 'Input desired retirement rate as decimal (e.g. .025).'
03100 print 'Amount of deferred gain or loss (e.g. 11.34).'
03300 print 'Input prior year salary scale estimator as a decimal (e.g. .06).'
03500 print 'Input prior year discount rate estimator as a decimal (e.g. .09).'
03700 if (g>20) then new=1000*mod(ys-1950)
03800 if (g<20) then new=1000*ed(ys-1950)
03900 print 'Number of regular entrants in intial year of service = new'
04100 print 'You are now in the aggregate method portion of this program.'
04300 print 'All dollar amounts should be input as millions (e.g. $12,332,223.24).'
04500 print 'Should be typed as 12.332.'
PCE = PBE/PCE

Print using 'Normal cost percentage factor as decimal =.####';pf

Print 'Is this acceptable? If yes type y if no type n.'

if (pf$='y') then goto 2635
if (pf$='n') then goto 2605

Print 'Input current fiscal year total base pay (e.g. 27485.55Z).'

Input tbf

mclpf*tbf

Print using 'Current year active force normal cost =#.####';mc

Print 'First year of normal costing? If yes type y if no type n.'

Input an$

if (an$='y') then goto 2650

Print 'Do you know previous year normal cost? If yes type y if no type n.'

Input se$

if (se$='n') then goto 2490

if (se$='y') then goto 2620

Print 'Input previous year normal cost factor as a decimal (e.g. .432).'

Input qt

Input previous year total base pay (e.g. 22432.518).'

Input ubf

vc*qt*ubf

Print using 'Previous year normal cost =#.####';vc

wc-vc

Print using 'Current years actuarial gain or loss =#.####';wc

Print 'Any deferred gain or loss? If yes type y if no type n.'

Input dg$

if (dg$='y') then goto 2635

if (dg$='n') then gosub 2145

Print 'Input discount rate as decimal (e.g. .112).'

Input gi

gi**20

gist=1-gist

hist=1-gist

blip=gi/hist

fa=(wc+fd)*blip

Print using 'Current year gains/losses applied =$###.####';fa

trc-mc+fa

Print using 'Current year total retirement cost =$###.####';trc

Goto 5

Print 'Input override normal cost factor as decimal (e.g. .553).'

Input pf

goto 2435

Print 'Input previous year normal cost (e.g. 4123.237).'

Input vc

goto 2520

Print 'Input amount of deferred gain or loss (e.g. 1213.456).'

Input fd

goto 2550

far

goto 2590

Rem multiyear expanded individual normal cost subprogram

Print 'You are now in the multiyear expanded individual normal cost portion of the program. Note that in this section an answer to an adjustment question of 0 means no change.'

Print 'Input desired discount rate as decimal (e.g. .08).'

Input di

Print 'Input desired rate of salary increase as decimal (e.g. .055).'

Input in

Print 'Input desired % rate of retired pay per year of duty (e.g. .025).'

Input dl
03030 PRINT 'Input desired maximum % of pay basis at retirement (e.g. .75).
03031 INPUT DM
03032 PRINT 'Input minimum los required to retire (e.g. 20).
03033 INPUT MRT
03040 PRINT 'Input adjustment to entrant retirement probability for officers' 
03041 PRINT '(e.g. -.02). The baseline value is 0.4.
03042 INPUT PPR
03043 PRINT 'Input adjustment to entrant retirement probability for' 
03044 PRINT 'enlisted personnel. The baseline value is .12.
03045 INPUT PRO
03046 PRINT 'Input adjustment to LOS and age at retirement (e.g. -2).
03047 PRINT 'Input adjustment to life expectancy at retirement (e.g. +3).
03048 INPUT PRO
03050 PRINT 'Input adjustment to LOS and age at retirement (e.g. -2).
03051 PRINT 'Input adjustment to life expectancy at retirement (e.g. +3).
03052 PRINT 'Input only summary totals, type sum.'
03053 PRINT 'Input full detail, type detail.'
03054 INPUT CS
03055 DEL=1
03056 G=99
03057 TT=0
03058 YS=1953
03059 PG$='el'
03060 PRINT
03061 TT=0
03062 IF (PG$='el') THEN G=1
03063 IF (PG$='e2') THEN G=2
03064 IF (PG$='e3') THEN G=3
03065 IF (PG$='e4') THEN G=4
03066 IF (PG$='e5') THEN G=5
03067 IF (PG$='e6') THEN G=6
03068 IF (PG$='e7') THEN G=7
03069 IF (PG$='e8') THEN G=8
03070 IF (PG$='e9') THEN G=9
03071 IF (PG$='e10') THEN G=10
03072 IF (PG$='e11') THEN G=11
03073 IF (PG$='e12') THEN G=12
03074 IF (PG$='e13') THEN G=13
03075 IF (PG$='e14') THEN G=14
03076 IF (PG$='e15') THEN G=15
03077 IF (PG$='e16') THEN G=16
03078 IF (PG$='e17') THEN G=17
03079 IF (PG$='e18') THEN G=18
03080 IF (PG$='e19') THEN G=19
03081 IF (PG$='e20') THEN G=20
03082 IF (PG$='e21') THEN G=21
03083 IF (PG$='e22') THEN G=22
03084 IF (PG$='e23') THEN G=23
03085 IF (PG$='e24') THEN G=24
03086 IF (PG$='e25') THEN G=25
03087 IF (PG$='e26') THEN G=26
03088 IF (G=99) GOTO 3070
03089 LOSD=(G)+ADJ
03090 IF (LOS<DM) THEN LOS=DM
03091 IF (LOS<22) AND (LOS>=20) THEN 1=1
03092 IF (LOS<26) AND (LOS>=22) THEN 1=2
03093 IF (LOS<28) AND (LOS>=26) THEN 1=3
03094 IF (LOS<30) AND (LOS>=28) THEN 1=4
03095 IF (LOS<30) AND (LOS>=28) THEN 1=5
03096 IF (LOS>30) THEN 1=6
03097 BP=PG$(G,1)
03098 CF=1983
03285 rf=los+ys
03290 n=rf-cf
03295 pp=bp
03300 for i=1 to n
03305 tp=pp*in
03310 pp=tp+pp
03315 next i
03320 fac =los * dl
03325 if (fac>dm) then fac=dm
03330 if (ys > 1980) then goto 3650
03335 ann=fac*pp*12
03340 if (pg = 'el') then goto 3600
03345 if (n<0) then goto 3710
03350 if (I > adj and mrt > 20) then goto 3706
03360 ag=fig+adj
03365 if (ag>17+mrt) then ag=17+mrt
03370 if (ag<37) and (ag>=36) then z=1
03375 if (ag<38) and (ag>=37) then z=2
03380 if (ag<40) and (ag>=39) then z=3
03385 if (ag<40) and (ag>=39) then z=4
03390 if (ag<42) and (ag>=41) then z=5
03395 if (ag<43) and (ag>=42) then z=6
03400 if (ag<44) and (ag>=43) then z=7
03405 if (ag<45) and (ag>=44) then z=8
03410 if (ag<46) and (ag>=45) then z=9
03415 if (ag<47) and (ag>=46) then z=10
03420 if (ag<48) and (ag>=47) then z=11
03425 if (ag<50) and (ag>=49) then z=12
03430 if (ag<51) and (ag>=50) then z=13
03435 if (ag<52) and (ag>=51) then z=14
03440 if (ag<53) and (ag>=52) then z=15
03445 if (ag<54) and (ag>=53) then z=16
03450 if (ag<55) and (ag>=54) then z=17
03455 if (ag<56) and (ag>=55) then z=18
03460 if (ag<57) and (ag>=56) then z=19
03465 if (ag<58) and (ag>=57) then z=20
03470 if (ag<59) and (ag>=58) then z=21
03475 if (ag<60) and (ag>=59) then z=22
03480 if (ag<61) and (ag>=60) then z=23
03485 if (ag<62) and (ag>=61) then z=24
03490 if (ag<63) and (ag>=62) then z=25
03495 if (ag<64) and (ag>=63) then z=26
03500 if (ag<65) and (ag>=64) then z=27
03505 if (ag>65) then z=51
03510 if (g<=9) then li=efz
03515 if (g>=10) then li=oz(x)
03520 li=li+long
03525 g=(1-dl)*11
03530 pre=ann*((1-(1/q))/di)
03535 t=((1+di)*1los-1)
03540 nc=pre*dl/t
03545 rc=nc
03550 if (g>20) then goto 3555
03555 if (g<20) then prog=.12
03560 if (g<20) then prog=pro
03565 goto 3560
03570 if (g>=20) then prog=.4
03575 if (g>=20) then prog=pro
03580 prog=(pro*pro*delt
03585 delt=1
03565 tgt=f ung
03570 if (ys>1950) and (ys<1983) then goto 3695
03575 pec=promgt=new
03580 trc=pec/rc
03585 ttrc=ttrc+trc
03587 if (c$='sum') then goto 3595
03590 print using '************',pg$=nc,trc
03595 goto 3725
03600 print 'Year of entry = ';ys
03601 if (c$='sum') then goto 3645
03605 print 'Discount rate = ';di
03610 print 'Salary scale estimator = ';in
03615 print 'Adjustment to entrant retirement probability for'
03617 print 'officers = 'spror
03618 print 'Adjustment to entrant retirement probability for'
03620 print 'enlisted personnel = 'proq
03622 print 'Adjustment to life expectancy at retirement ='
03624 print 'LOS and age at retirement * adj
03626 print 'Adjustment to life expectancy at retirement ='
03628 print 'for officers
03630 print 'Adjustment to life expectancy at retirement ='
03632 print 'for enlisted personnel
03634 print 'Paygrade Normal Cost Total Cost'
03640 goto 3345
03645 goto 3365
03650 a=n-2
03655 rp=bp
03660 for k=1 to a
03665 vp=rpein
03670 rp=vp~rp
03675 next k
03680 sp=(in+rp)+rp
03685 pp=(sp+rp+pp)/3
03690 goto 3335
03695 if (g>20) then new=1000*odtys-1950
03700 if (g<20) then new=1000*ediys-1950
03705 goto 3575
03706 ag*fig)=mrt-dl(g)-adj
03707 REM FORMULA TO ADJ ATTRITION IF AVG LOS < MLS FOR RETIREMENT
03708 DLT=1.00*(MRT-DIG)-ADJ
03709 goto 3355
03710 nc=0
03715 trc=0
03720 goto 3585
03725 if (pg$='o10') then goto 3845
03730 if (pg$='o9') then pg$='o10'
03735 if (pg$='o8') then pg$='o9'
03740 if (pg$='o7') then pg$='o8'
03745 if (pg$='o6') then pg$='o7'
03750 if (pg$='o5') then pg$='o6'
03755 if (pg$='o4') then pg$='o5'
03760 if (pg$='o3') then pg$='o4'
03765 if (pg$='o2') then pg$='o3'
03770 if (pg$='o1') then pg$='o2'
03775 if (pg$='w4') then pg$='o1'
03780 if (pg$='w3') then pg$='w4'
03785 if (pg$='w2') then pg$='w3'
03790 if (pg$='w1') then pg$='w2'
03795 if (pg$='e9') then pg$='w1'
03800 if (pg$='e8') then pg$='e9'
03805 if (pg$='e7') then pg$='e8'
03810 if (pg$='e6') then pg$='e7'
03815 if (pg$='e5') then pg$='e6'
03820 if (pg$='e4') then pg$='e5'

125
03825 if (pg$='e3') then pg$='e4'
03830 if (pg$='e2') then pg$='e3'
03835 if (pg$='e1') then pg$='e2'
03840 goto 3100
03845 print using 'Total Year Group Cost = $####',tttc
03850 tttrc=tttrc+tttc
03855 if ys=1982 then goto 3870
03860 ys=ys+1
03865 goto 3085
03870 print '**************************************************************************'
03875 print using 'Regular Navy Cost = $####',tttrc
03880 print '**************************************************************************'
03885 goto 10
03890 end
LIST OF REFERENCES


BIBLIOGRAPHY


**INITIAL DISTRIBUTION LIST**

<table>
<thead>
<tr>
<th>No.</th>
<th>Copies</th>
<th>Initial Distribution List</th>
</tr>
</thead>
</table>
| 1.  | 2      | Defense Technical Information Center  
               Cameron Station  
               Alexandria, Virginia 22304-6145 |
| 2.  | 2      | Library, Code 0142  
               Naval Postgraduate School  
               Monterey, California 93943-5002 |
| 3.  | 1      | Mr. Paul Hogan  
               Manpower, Planning, and Analysis  
               Office of the Secretary of Defense  
               Washington, D.C. 20301 |
| 4.  | 1      | Ms. Toni Hustead  
               Chief Actuary for the Department of Defense  
               Defense Manpower Center  
               Office of the Actuary  
               1600 N. Wilson Blvd.  
               Arlington, Virginia 22209 |
| 5.  | 1      | Professor K.J. Euske, Code 54Ee  
               Department of Administrative Science  
               Naval Postgraduate School  
               Monterey, California 93943-5000 |
| 6.  | 1      | LCDR B.A. Frew, USN, Code 54Fw  
               Department of Administrative Science  
               Naval Postgraduate School  
               Monterey, California 93943-5000 |
| 7.  | 2      | LCDR Peter G. Valko, USN  
               1414 Delta Rd. - NAS Miramar  
               San Diego, California 92145 |
END

4-87

DTIC