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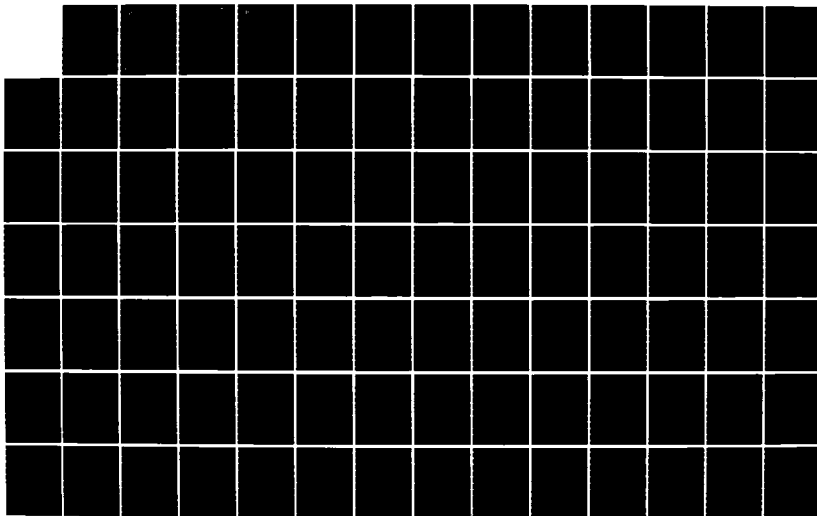
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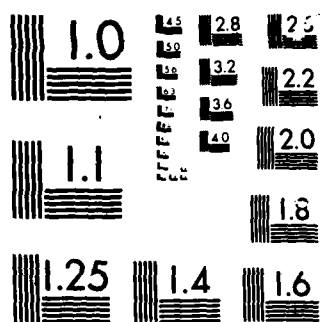
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RECRUITMENT EARLY WARNING SYSTEM PHASE II

FINAL REPORT

VOLUME II: SYSTEM DOCUMENTATION AND USERS' MANUAL FOR THE AUTOMATED EWS

by

Sigurd Hermansen, Sherry Andrews, and Christine Kennicott

September 1985



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FOR THE PROJECT ANALYST

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PART I

AN INTRODUCTION TO THE AUTOMATED EWS

FOR THE PROJECT ANALYST

PART I

**AN INTRODUCTION TO THE AUTOMATED EWS
FOR THE PROJECT ANALYST**

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CHAPTER I

OVERVIEW

✓ The purpose of the Recruitment Early Warning System and Accession Contingency Planning Process is to assist the Office of Accession Policy (OAP) and the Services in meeting and maintaining accession goals. The REWS/ACPP is designed to reduce time lags in recognition of recruiting difficulties, and to streamline the process for effectively allocating resources. The role of the automated EWS in achieving these goals is to provide an ongoing flow of timely, credible information on the condition of the recruiting market. The system provides reliable evidence of impending recruiting difficulties and objective data for assessing the efficacy of the Services' accession plans. →

The automated EWS contains an historical database of monthly observations for enlistment contracts, supply factors, leading economic indicators, and policy variables; models for forecasting civilian earnings, unemployment and enlistments by cohort for each Service; programs to perform statistical analyses; and procedures to generate tabular and graphic output. Each month the system automatically updates the database, re-estimates the models, forecasts earnings, unemployment and enlistments for each of the next 12 months, and generates a report which provides data trends, summaries, comparisons, and illustrations. Historical and projected enlistments are compared to goals over the past two and current fiscal years and the next 12 months. The presentation-quality tables and graphs provide command-level decision makers in OAP and the Services with relevant and reliable information on the current and impending status of the recruiting market.

Not only does the automated EWS meet an important need, it provides a reliability that cannot be matched by non-automated procedures. Furthermore, it is accessible, economical, and simple to use. The automated EWS reduces an enormous, time-consuming task to a simple one that requires relatively few person-hours per month. Reliable information, useful to decision makers, can be obtained only by processing vast series of primary data, conducting many complex analytical procedures, and performing painstaking report-production

tasks. The EWS accomplishes all of this quickly, accurately and automatically, and it operates on standard micro-computer systems currently installed at OAP.

The next six chapters will introduce the system to the project analyst, and outline some supervisory procedures and responsibilities. Part II of this volume is written specifically as a users' manual for the keyboard operator, and provides step-by-step directions for operation. More technical information is reserved for a systems engineer, and can be found in Part III. R

Handwritten notes:
The first chapter is devoted to system documentation.
The second chapter is devoted to system operation.
The third chapter is devoted to system maintenance.
The fourth chapter is devoted to system troubleshooting.
The fifth chapter is devoted to system security.
The sixth chapter is devoted to system backup and recovery.

CHAPTER II

REQUIREMENTS ANALYSIS

The automated EWS must meet the requirements of the accession policy analysts for whom it is designed. This chapter summarizes the findings of the requirements analysis conducted by the study team, describes some of the implementation alternatives considered, and reports the final selection of components to be included in the system.

A. Requirements Identified

The requirements analysis addressed the users' data requirements as well as operational requirements. The specific needs of OAP and the Services have been determined through numerous discussions with technical officers in charge of the Recruitment EWS project, meetings and telephone conversations with the Services' Recruiting Command staffs, response of Recruiting Command representatives at briefings, and other feedback from the Recruiting Commands and from within OSD.

1. Source Data Requirements

Analysts need, first of all, an accurate and relevant collection of source data. These data include, at a minimum, observations of numbers of contracts per critical cohort, contract goals, unemployment rates, leading economic indicators, military pay, civilian earnings, and numbers of production recruiters. The minimum set of source data exceeds fifty data series. The available series begin as early as 1970.

Information on changes in recruiting policy by Service greatly enhances the analytical power of the system. "Dummy variables" defined within the automated EWS are used to estimate the effects of these policy changes.

Seasonal variation can be reduced by combining cohorts and by using "seasonal dummies" to estimate seasonal efforts. These variables, as well as the policy dummies, can be created by programs at the point of analysis.

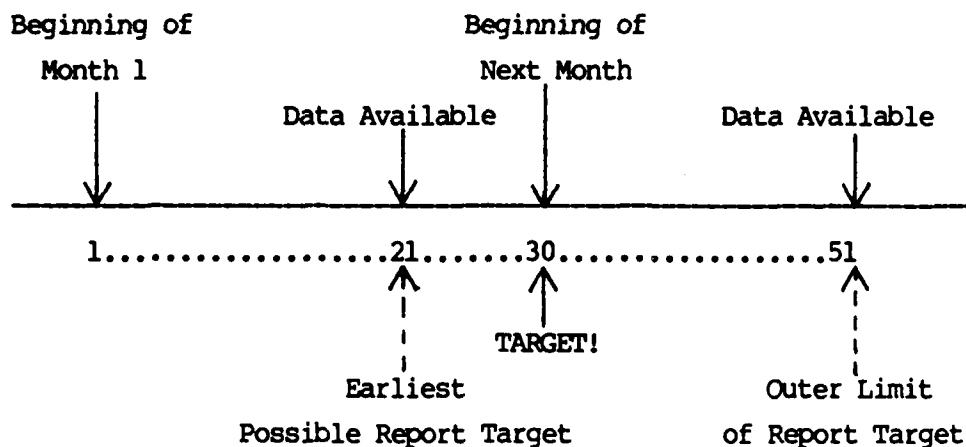
Final data requirements for the Recruitment EWS have been determined gradually as ERL's time-series study of the recruiting market has evolved. The data measure enlistments and supply and demand factors. Volume I of this report discusses in detail the construction of variables and the development of models. Sources of data include the Defense Data Manpower Center (DMDC), the Services' Recruiting Command Staffs, the Bureau of Labor Statistics and the Bureau of Commerce.

2. Quick Turnaround

To meet users' needs for up-to-date short-term information, once a month the EWS must produce new forecasts for each of the next 12 months, based on the addition of the most recent month's data. To update forecasts monthly, monthly data must be used for modeling and forecasting factors affecting enlistments, and enlistment forecasting models must be re-estimated. Using a monthly updating schedule also permits respecification of models to capture the effects of intertemporal policy changes.

The amount of time allowed for monthly updating of data, re-estimation, and forecasting depends on several factors: How quickly after the end of a month can data for that month be obtained from outside sources? What is the shortest amount of time in which these updating tasks can be completed? Can accuracy be improved by allowing a longer time period? Will costs be affected by extending the time period? How will an earlier or later delivery date affect the usefulness of the report? We find that producing a forecast update for a given month (e.g., August) by the end of the month following (September), meets the user's needs and is feasible.

Allowing slightly longer periods of time for updating forecasts does little to reduce costs or improve accuracy; however, delaying the update of next month's forecast, until after the next month's actual result becomes known, calls into question the value of the forecast. Assuming DMDC and Services provide required data by the 21st of the month (a reasonable expectation given our experience with the data collection process) we can depict the choice of the target date in a simple diagram.:



Time allowed for update = nine days

In order to accomplish the updating task within nine days, and to repeat the task monthly, an automated data handling, estimation, and updating procedure must be used.

3. Accessibility and Flexibility

The automatic nature of the required system implies greater ease of operation but less accessibility and flexibility than a manual system. A "black box" system would operate automatically, but it would be difficult to modify and adapt to different issues. It would shield the intermediate steps and the data from the analyst. Potential users prefer an automatic system that sacrifices some degree of operating speed and efficiency for greater

accessibility and flexibility. The strong possibility of system modifications during the development process also suggests a need for flexibility.

To provide for accessibility and flexibility, the requirements include a modular system design and the ability to edit values of variables in a full-screen editor environment. These features allow modifications of the system by component and direct access to the data series. Both the data definitions and the components of the system match the natural Service-cohort-date organization of national monthly enlistment information.

4. Validated Methods for Analysis and Forecasting

The political and economic importance of accession policy requires that EWS use powerful yet reliable estimation and forecasting methods. This requirement means that the EWS has to have the ability to use econometric time series estimation and forecasting algorithms. These algorithms include multiple regression, system estimation, ARIMA, ARMA, and forecasting model implementations.

5. Useful and Confidential Reports by Service

The Recruitment EWS serves to keep both OAP and the individual Recruiting Services informed about changes in enlistment supply. The EWS has to generate complete reports by Service for accession policy analysts in OSD. These reports must be broken down into a set of four complete reports: one per Service with all general information included, but all references to other Services excluded. This strategy keeps confidential the proprietary data provided by the Services and the projections of enlistments.

This confidentiality requirement means that EWS must include individual report generation procedures for each Service. A design for EWS that provides for independent database and program modules by Service meets the requirement for individual reports and provides other advantages.

6. Presentation Graphics

From a great mass of source data the EWS must extract information critical to decision makers. Production of presentation quality graphics is an important step in the process of developing relevant information for policy recommendations to the command level.

Specific requirements include line and bar graphs that allow decision-makers to see in a glance the recruiting prospects for each Service. The graphs must include historical trends extended by forecasts for unemployment and enlistment contracts. Confidence bounds on the forecasts indicate the probable range of the forecasts around the most likely value. Graphs should show monthly and annual comparisons of historical contract production and production forecasts relative to goals. Other graphs are needed to show historical unemployment rates and EWS and outside forecasts of unemployment rates.

These graphs can be designed carefully and prepared in a format suitable for formal briefings. Produced as part of the monthly update, they help accession policy analysts stay prepared to brief decision-makers on accession policy issues.

7. Cost Efficiency

In addition to the expected requirement of fiscal responsibility, careful cost control can enhance the success of the EWS in two distinct ways. Lower system development costs mean that more time and computer resources can be channeled to the development

of more sophisticated and effective estimation and forecasting models. Lower operation and maintenance costs increase the chances that the system will be installed, operated continuously, and extended to other uses.

Developmental and operational costs of systems generally increase directly with the speed, capacity, and power of the system required. Selection of an appropriate technology to match the primary requirements of the system helps contain system development and operation costs. For comparable implementation alternatives, cost efficiency becomes the central issue.

B. Implementation Alternatives

Exhibit I.1 summarizes the objectives, system requirements, and implementation alternatives of the system. The implementation alternatives for the system narrow down to a relatively small number of application environments. Except for cost and convenience of data access, the Statistical Analysis System (SAS), running under TSO, meets the requirements admirably. We designed an initial version of EWS for TSO/SAS during an earlier phase of the project.

The new PC version of Regression Analysis of Time Series (RATS) offers an attractive alternative to TSO/SAS. It satisfies the primary requirements for EWS implementation; moreover, it provides for easier data access, and can be developed and operated at an extremely low marginal cost. This application environment allows great flexibility in system design. Its command structure includes the major features of SAS (mathematical functions, statistical operations on database variables, and matrix operations), and, in addition, RATS provides a number of commands that facilitate handling of time series (specification of seasonal and other dummy variables during system run-time; variable leads and lags; database updating by date intervals; forecasting; autocorrelation, and Theil and other forecasting accuracy tests).

EXHIBIT I.1

RECRUITMENT EARLY WARNING SYSTEM

SYSTEM REQUIREMENTS

OBJECTIVE	REQUIREMENTS	Implementation Alternatives (9/84)	
		TSO/SAS	PC DOS/ RATS
Quick turnaround	Automated system; programmable system	Yes	Yes
Accessibility, and flexibility	Full-screen data file editing; modular design	3278 Terminal; SAS Macros	Yes
Validated methods for analysis and forecasting	Econometric and time- series analysis procedures	ETS with forecasting tricks	Yes
Useful reports by service	Report generation	Yes	Partially programmable
Presentation graphics	Graphics package	Yes	.DIF files to Chart- Master
Cost efficiency	Low development and operating costs	No	Yes

The RATS alternative is particularly desirable because it enables us to deliver, not only the EWS system, but the environment (i.e., database and statistical system) within which the EWS operates. The basic hardware and software configuration required to run EWS in the PC DOS/RATS environment costs less than \$5,000. The annual computer costs for the SAS system would probably exceed the total computer costs of the RATS system by a factor of two to three.+

C. Components of the Automated EWS

The final composition of the automated EWS has been determined by the users' requirements we have identified, as well as by the constraints imposed and opportunities offered by the implementation alternatives. The automated EWS consists of the following eleven components:

- o A database containing national-level monthly series on: military enlistment contracts by cohort; economic, demographic, recruiting resource, and policy variables; leading indicators; and other corroborating data.
- o A text file "template" which can be edited with a standard PC word processing package and used to update the primary EWS database.
- o An interactive program for standard PC machines that facilitates database revisions.
- o A leading indicator model used to forecast unemployment rates.
- o A civilian earnings forecasting model.

+ SAS now requires either mainframe and "super mini" hardware, so we assume operating costs at federal government time-sharing rates. SAS has announced a PC version for the third Quarter of 1985, but the details of this version are not available at this time.

- o At least two enlistment forecasting models for each Service, one for the 1-3A cohort, one for the 3B cohort.+
- o PC programs which generate tables of data and descriptive statistics for inclusion in the EWS reports.
- o "Templates" for generating graphs of EWS data suitable for inclusion in reports or for use as transparencies for briefings.
- o Program files for linking the main components of the automated EWS.
- o Extensive documentation and training programs designed for project analysts and administrative support personnel. Documentation includes a manual for the project analyst, an operator's manual, and a manual of technical information for the systems analyst.
- o Commercial application environments (software "packages") required to operate the EWS on an IBM PC XT: specifically, Regression Analysis of Time Series (VAR), TURBO PASCAL (Borland), and CHART-MASTER (Decision Resources). The application software packages include programs for PC's, operator's manuals, and documentation.

Each of these eleven components is being delivered as a part of the total system. The complete system combines the best features of custom software and commercial application environments.

+ Forecasts from the 1-3A and 3B models are combined to forecast enlistments of 1-3s.

D. Summary

The users of the Recruitment EWS require a standardized and reliable automated system for storing and processing data. The volume and quality of data that decision makers expect to see used in support of policy recommendations can only be processed efficiently by a computer database system. The database system permits the analyst to manage data efficiently and to concentrate his or her efforts on effective summaries and analyses.

CHAPTER III

SYSTEM DESIGN

The automated EWS performs statistical analyses on recruiting market conditions, produces estimates and forecasts, and reports the results in tabular and graphic presentations. The information the system uses to accomplish these tasks comes from the source databases and from programs used to process the source data.

We refer to the method used to design the EWS as a "systematic decomposition of a program function." This method, also called "structured programming" or "top-down programming," is used primarily in large-scale programming projects. We have found that this general method can be applied effectively to smaller-scale, microcomputer program development. Proper use of the method leads to more effective designs and makes program modification and system documentation part of the design process.

We begin with a statement of the program function:

(DESIRED OUTPUT) = PROGRAM EXECUTION (REQUIRED INPUTS)

= (EWS REPORTS) = EWS PROGRAM EXECUTION (SOURCE DATA)

The program function maps source data to a range of possible reports. We can refer to it as a function since we require that identical source data produce identical reports as output. We build the system to accept new source data each month and to produce new reports that differ according to the nature of the new data.

Our task is to break this general statement into a simpler composition of procedures that preserves the original program function. For example,

(EWS REPORTS) = PROGRAM EXECUTION (SOURCE DATA)

= PROGRAM EXECUTION 2 (PROGRAM EXECUTION 1(DATASET 1), DATASET 2):

In other words, we will select a roundabout process if it leads to a simpler set of procedures.

Exhibit I.2 lists the steps in the systematic decomposition method. The need for separate procedures by Service and separate procedures by cohort, all with the same basic purpose, suggest a decomposition along Service and cohort lines. First, the system must perform tasks that prepare data used in all Service and cohort procedures: database revision and updating; unemployment forecasting and civilian earnings forecasting. Next comes the preparation of general data and data specific to a Service: computation of relative military pay; unemployment; seasonal dummies; contracts, recruiters, goals, and policy dummies. Finally, the system must compute estimations and forecasts and prepare data for tables and graphs. A few Service and cohort procedures are unique to a Service or cohort. Many are slight modifications of other procedures, and some are procedures called by many different procedures.

Systematic decomposition insures that both the order of procedures in the main sequence of EWS and their level in the EWS structure determine their meaning. The Service and cohort procedures have access to whatever unemployment and earnings data the unemployment and pay forecasting procedures have produced. Basically, the same procedure that produces forecasts for one Service and cohort also produces forecasts for another Service and cohort when run at different starting points and different levels in the EWS.

The general structure of the EWS stands out in the schematic diagram below. The names of EWS programs denote their function and their level in the structure. In general, all EWS programs have the prefix "E_". All RATS Command Language programs have the type extension (suffix) ".RCL". Dropping both the standard prefixes and suffixes, we have:

EXHIBIT I.2

SYSTEMATIC DECOMPOSITION OF PROGRAM FUNCTION

METHODOLOGY

1. SPECIFY PROGRAM FUNCTION (GIVEN OBJECTIVES)
2. FIND A SEQUENCE OF PROCEDURES THAT BOTH PERFORMS PROGRAM FUNCTION AND SIMPLIFIES PROGRAM
3. APPLY STEP 2 TO EACH LEVEL OF PROCEDURES UNTIL ALL PROCEDURES HAVE BEEN REFINED TO EXECUTABLE CODE

ADVANTAGES

1. RIGOROUSLY MATCHES PROGRAM PROCEDURES TO OBJECTIVES
2. PROVIDES NATURAL DIVISION OF PROGRAM INTO SIMPLER PROCEDURES
3. MAKES GOOD USE OF "CANNED" PROGRAMS AND PROCEDURES

EWS STRUCTURE

LEVEL

PROCEDURES

(TOP) REVISE* UPDATE (UN_FC ERNFC) ————— EWS_<SV> —————

(MIDDLE) GNDATA <SV> DATA

(LOWEST) (<SV><COH>_FC <SV><COH>_PT)

*Interactive Procedure

The system requires one execution of the top-level procedures, four executions at the middle level, and 8-12 executions at the lower level. At each level we use multiple calls of standard procedures.

The sequencing of GNDATA and <SV>DATA is unimportant. REVISE should be executed interactively prior to the remainder of EWS.

The entire program sequence can be repeated without causing problems. It can be repeated or restarted at UN_FC, ERNFC, or EWS _ <SV>.

To test variations in input (different unemployment rate forecasts, for example), the database can be edited and the program restarted from an intermediate point. Appendix A contains a complete description of EWS syntax.

A general flow diagram shows the major tasks of the EWS and the order in which they must be performed (Exhibit I.3). Data from the Services, DMDC, and other sources are used to revise and update the EWS databases. From that point on, the data can be retrieved by variable name. The system produces forecasts of the unemployment rate; then, using the unemployment rate forecasts and outside forecasts of inflation rates, the system forecasts civilian earnings. These forecasts enter the databases as extensions of variables.

EWS uses the unemployment and earnings forecasts as "drivers" of the enlistment contract forecasts. Currently, the system estimates NPS male HSDG and senior 1-3A, 3B, and 1-3 cohorts and forecasts NPS male HSDG and Senior 1-3A and 1-3 cohorts for each Service; the forecasts extend 12 months into the future.

The forecasts and historical data go into special output files. Print procedures reformat the data files for tables; the graphics package CHART-MASTER "reads" the data files for graphs.

The description of "What the Recruitment EWS Does" (Exhibit I.4) makes it easy to see the structure of the main EWS procedures. The entries I through V list the tasks at the top level, A through C list the tasks at the middle-level, and 1 through 3 list the lowest level.

The semantics of the EWS correspond to the system syntax. Exhibit I.5 lists the EWS programs and summarizes their meaning or, in other words, what they do.

EXHIBIT I.3

RECRUITMENT EARLY WARNING SYSTEM

-CURRENT SYSTEM-

EWS FORECASTING MODELS

<u>SERVICES</u>	DATA	<u>BLS</u>
<u>DMDC</u>	COLLECTION	<u>OTHER</u>
<u>QFAX VIA MODEM</u>	& MONITORING	

PC DOS	RATS	DATA REVISION & UPDATING UNEMPLOYMENT & CIVILIAN EARNINGS FORECASTING 1-3A & 1-3 NPS MALE ENLISTMENT CONTRACT FORECASTING Chartmaster TABLE PREPARATION	GRAPH PREPARATION
--------	------	--	----------------------

<u>TABLES</u>	MONTHLY REPORT	<u>GRAPHS</u>
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EXHIBIT I.4

WHAT THE RECRUITMENT EWS DOES

- I. PERFORMS DATABASE REVISIONS AND UPDATES
- II. IDENTIFIES LAST FORECAST DATE FROM DATABASE; CALCULATES OTHER REFERENCE DATES
- III. ESTIMATES AND FORECASTS UNEMPLOYMENT; SAVES FORECASTS
- IV. ESTIMATES AND FORECASTS CIVILIAN PAY; SAVES FORECASTS
- V. FOR EACH SERVICE:
 - a. READS UNEMPLOYMENT AND PAY DATA; SETS UP SEASONAL DUMMY VARIABLES
 - d. READS ENLISTMENT CONTRACT, RECRUITER, GOAL AND OTHER POLICY DATA
 - c. FOR EACH COHORT:
 1. ESTIMATES CONTRACT MODEL, FORECASTS CONTRACTS, PREPARES DATA FOR TABLES AND GRAPHS
 2. PRINTS HISTORIES AND FORECASTS OF MONTHLY DATA AND ACCUMULATIONS OF DATA BY FISCAL YEAR AND TWELVE-MONTH INTERVALS
 3. GENERATES .DIF FILES FOR GRAPHICS

EXHIBIT I.5
EWS SEMANTICS

MEANING	PROGRAM
o Database updates & revisions using data from outside sources	REVISE and UPDATE
o All civilian unemployment rate forecasts (t+15) stored in database	UN_FC
o Youth earnings forecasts (t+15) stored in database (unemployment forecasts used to produce earnings forecasts)	ERNFC EWS
o Read in reference dates, general data and data specific to Services	DATES GNDATA <SV>DATA
o Forecasts of enlistment cohorts (t+12) (using unemployment and earnings forecasts)	<SV><COHORT>_FC EWS_<SV>
o Output file with details of cohort estimates and forecasts; preliminary tables; and, data files for graphs	<SV><COHORT>_PT
o File of page images of tables in report	PRINT.PAS
o Graphs for slides and for report	CHART-MASTER

CHAPTER IV

INSTALLATION PROCEDURES

EWS can be installed by a project analyst. Although the task requires several hours to complete, its level of complexity does not require a systems engineer. Total installation time includes substantial periods for the computer to copy application package files from floppy disks to the fixed disk. Running a simple test of the system also is time-consuming. However, once installation has been completed, these procedures need not be repeated.

Provided that there is ample fixed disk space, the entire system can be installed and operated on the fixed disk. Once installed, the system requires little maintenance. If fixed disk space is limited, the contents of new directories created during EWS installation can be erased and reloaded each month. The DOS command "ERASE*.*[CR]" first prompts the user for a "Y [CR]" if the user wants to erase the entire directory, or any other character if the user wants to cancel the command.

To install the EWS system, the following equipment is required:

- o An IBM PC XT with:
640K RAM, or 8087 coprocessor
a graphics card
- o DOS 2.X
- o A H-P 7475A Plotter
- o An IBM or an OKIDATA 93 or EPSON FX100 Printer
with IBM Printer Emulation

The project analyst must verify, at the beginning of the EWS installation process, that the equipment listed above has been installed properly and is in operating order. It is assumed that the analyst has a working knowledge of this equipment and has access to the documentation for each of these items. For further discussion of the hardware environment required for the automated EWS, see Part III of this volume, "Documentation for the Systems Analyst."

The components of the automated EWS are contained on the following floppy disks. Be sure you have each of these disks plus a manual each for RATS, TURBO PASCAL, and CHART-MASTER.

- o The EWS Master Disk
- o The RATS System Disks
- o The TURBO PASCAL System Disk
- o The CHART-MASTER System Disks

To install these components of the system on your microcomputer's fixed disk, complete — in order — the following procedures:

- 1) Create an EWS directory in DOS.
- 2) Using the standard DOS copy procedure, copy the EWS files (located on the EWS Master Disk) into the EWS directory. (For a review of DOS procedures, see Chapter III in the Operator's Manual, Part II of this volume.)
- 3) Copy the RATS system from the RATS System Disks into the EWS directory.
- 4) Copy the TURBO.COM file from the TURBO PASCAL System Disk into the EWS directory.

- 5) Copy the contents of the CHART-MASTER system from the CHART-MASTER System Disks into a graphics directory, following the instructions found in the CHART-MASTER Manual.
- 6) Run the EWS to verify that it produces output files identical to those stored on the EWS Master Disk. Because the programs and data now on your fixed disk are identical to the ones used to produce the output files stored on the EWS Master Disk, the output from your disk should match as well. The entire run is initiated simply by typing "EWS [CR]". However, it would be useful to familiarize yourself with the "Operator's Manual" (Part II of this volume) to become acquainted with other procedures required in EWS operation.
NOTE: The EWS runs for about two and a half hours; you may want to schedule it to run overnight.

CHAPTER V

MAINTAINING A CURRENT DATABASE

The performance of the Recruitment EWS is affected critically by the quality of the data it uses. The quality of its performance also is dependent on the speed with which current data can be added to the database. The automated EWS draws on source data that have to be collected from a variety of sources. The diversity of EWS's data sources is one of the strengths that provides reliability; the price of this diversity is the time and effort that has to be spent collecting the data and updating the database.

ERL has organized and streamlined a collection process that now takes only a few days, not several weeks. Updates (that is, values added to the database for the most recent month) and revisions (changes in values that already exist in the database) are acquired in three basic ways. Enlistment series updates are received on a regular monthly basis from DMDC through preagreed arrangement. Updates and revisions of leading indicator series and macroeconomic variable series usually are acquired from publications. Most policy data series updates and revisions are obtained through regular, monthly, communication, by either letter or telephone, with the Services or related agencies. The analyst must confirm his or her own regular monthly arrangements with the source contact identified in Exhibit I.6.

The EWS gives the analyst full control over the source data used, and some control over intermediate values. The analyst can change values in the RATS database by issuing a few commands. The interactive program, "E_REVISE.RCL", leads the user through the process of displaying and changing database values. The RATS program "E_UPDATE.RCL" leads the user through a step-by-step procedure for adding a monthly value — updating — a series.

EXHIBIT I.6

EWS SOURCE DATA REQUIREMENTS

ENLISTMENT SERIES: GROSS CONTRACTS UPDATE MONTHLY			(MONTHLY OBSERVATIONS) PRIMARY DATA SOURCE: DMDC - 7943	
SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	REQUIRED RANGE
ARMYD13A	E_EWS_DB.RAT	DMDC	7601 8507	7901 DLASTFC-12
NAVYD13A	E_EWS_DB.RAT	DMDC	7601 8507	7910 DLASTFC-12
AFD13A	E_EWS_DB.RAT	DMDC	7601 8507	7901 DLASTFC-12
MCD13A	E_EWS_DB.RAT	DMDC	7601 8507	7901 DLASTFC-12
ARMYD3B	E_EWS_DB.RAT	DMDC	7601 8507	7901 DLASTFC-12
NAVYD3B	E_EWS_DB.RAT	DMDC	7601 8507	7910 DLASTFC-12
AFD3B	E_EWS_DB.RAT	DMDC	7601 8507	7901 DLASTFC-12
MCD3B	E_EWS_DB.RAT	DMDC	7601 8507	7901 DLASTFC-12
ARMYS13A	E_EWS_DB.RAT	DMDC	7801 8507	7901 DLASTFC-12
NAVYS13A	E_EWS_DB.RAT	DMDC	7801 8507	7910 DLASTFC-12
AFS13A	E_EWS_DB.RAT	DMDC	7801 8507	7901 DLASTFC-12
MCS13A	E_EWS_DB.RAT	DMDC	7801 8507	7901 DLASTFC-12
ARMYS3B	E_EWS_DB.RAT	DMDC	7801 8507	7901 DLASTFC-12
NAVYS3B	E_EWS_DB.RAT	DMDC	7801 8507	7910 DLASTFC-12
AFS3B	E_EWS_DB.RAT	DMDC	7801 8507	7901 DLASTFC-12
MCS3B	E_EWS_DB.RAT	DMDC	7801 8507	7901 DLASTFC-12
XMCD13A	E_EWS_DB.RAT	Mr. Steinman	7910 8505	7910 DLASTFC-12
XMCS13A	E_EWS_DB.RAT	HQ USMC	7910 8505	7910 DLASTFC-12
XMCD13	E_EWS_DB.RAT	(301)	7910 8505	7910 DLASTFC-12
XMCS13	E_EWS_DB.RAT	694-1250	7910 8505	7910 DLASTFC-12

EXHIBIT 1.6 cont.

EWS SOURCE DATA REQUIREMENTS

LEADING INDICATOR SERIES

(MONTHLY OBSERVATIONS)

UPDATE MONTHLY PRIMARY SOURCE: BUSINESS CONDITIONS DIGEST

PUB MONTHLY BY U.S. DEP'T OF COMMERCE,
BUREAU OF ECONOMIC ANALYSIS

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	RANGE: RELATIVE
LEI1	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI5	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI7	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI8	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI19	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI20	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI21	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI27	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI28	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI38	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI46	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI74	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI75	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI96	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI106	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13
LEI910	LDINDCAT.RAT	BUS. COND. DIGEST	7001 8506	7001 DLASTFC-13

EXHIBIT I.6 cont.

EWS SOURCE DATA REQUIREMENTS

POLICY DATA SERIES: MILITARY PAY, GOALS, AND RECRUITERS (MONTHLY OBSERVATIONS)
CHECK EACH MONTH FOR REVISIONS

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	RANGE: RELATIVE
FIRSTMIL	E_EWS_DB.RAT	OASD, OFFICE OF COMPENSATION, MR.DOUG McCORMICK LCDR COLLEEN McKENZIE (301) 695-3176	7601 8612	7810 DLASTFC+2
ARMY				
AGLM13A	E_EWS_DB.RAT	USAREC,	8010 8609	8010 DLASTFC
AGLM3B	E_EWS_DB.RAT	DR. JERRY KLOPP (312) 926-3371	8010 8609	8010 DLASTFC
ARECPA	E_EWS_DB.RAT		7601 8609	7901 DLASTFC
NAVY				
TADNCO	E_EWS_DB.RAT	NAVY RECRUITING	8110 8609	8410 DLASTFC
NNAMNCMO	E_EWS_DB.RAT	COMMAND, VAL ERBY	8110 8512	8110 DLASTFC
ACCNG	E_EWS_DB.RAT	LCDR. DAVE CASHBAUGH	7601 8309	7901 8109
NMRSVGL	E_EWS_DB.RAT	(703) 696-4896	7901 8612	7901 DLASTFC
NRECT	E_EWS_DB.RAT		7601 8609	7901 DLASTFC
AIR FORCE				
AFMNRGX	E_EWS_DB.RAT	AFRS, SMSGT TIME BYRO (512) 652-2331 LT. ARI WHISENHUT (512) 652-5116	7601 8609	7901 DLASTFC
FRECPNPS	E_EWS_DB.RAT	CAP'T ROGER MILLER (512) 652-4152	7601 8609	7901 DLASTFC
MARINE CORPS				
RMGL	E_EWS_DB.RAT	HQ-USMC MR. STEINMAN (301) 694-1250 LT.COL. DONALD SELVAGE (301) 694-2162	7601 8609	7901 DLASTFC
MRECREV	E_EWS_DB.RAT	GYSGT ARBO (301) 694-2629	7601 8609	7901 DLASTFC

EXHIBIT I.6 cont.

EWS SOURCE DATA REQUIREMENTS

MACROECONOMIC VARIABLE SERIES: UNEMPLOYMENT (MONTHLY OBSERVATIONS)

UPDATE MONTHLY

PRIMARY SOURCES: BUREAU OF LABOR STATISTICS
PUB. MONTHLY IN EMPLOYMENT AND EARNINGS, TABLE A-3;
ALSO, DEP'T OF LABOR NEWS RELEASE.

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	REQUIRED RANGE
ALLCIVUN	E_EWS_DB.RAT	BLS	7010 8612	7001 DLASTFC-12

MACROECONOMIC VARIABLE SERIES: CIVILIAN YOUTH EARNINGS, INFLATION RATES,
AND UNEMPLOYMENT RATES. (QUARTERLY HISTORIES AND INFLATION FORECASTS)

UPDATE QUARTERLY

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	RANGE: RELATIVE
WE1624	EWSANNEX.RAT	BLS EMP & EARN JAN, APR, JUL, OCT TABLE A-73	78IV 86I	78IV - DLASTFC(QTR)-4
CPI	EWSANNEX.RAT	BUS.COND.DIGEST. SERIES # 320 (HISTORICAL) AND BLUE CHIP ECONOMIC INDICATORS (FORECASTS)	78IV 86IV	78IV - DLASTFC(QTR)
ALLCIVQ	EWSANNEX.RAT	EMP & EARN TABLE A-43 OR AVG OF ALLCIVUN (HISTORICAL) AND AVG OF UNEMP (FORECASTS)	78IV 86IV	78IV - DLASTFC(QTR)

EXHIBIT I.6 cont.

EWS SOURCE DATA REQUIREMENTS

OUTSIDE FORECASTS OF UNEMPLOYMENT (QUARTERLY OBSERVATIONS)
USED ONLY IN RECRUITMENT EWS MONTHLY REPORT

UPDATE MONTHLY

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	REQUIRED RANGE
BEA		BUREAU OF ECONOMIC ANALYSIS MR. BRUCE GRIMM (202) 523-0560	IN REPORT	FORECAST RANGE
BCEI		BLUE CHIP REPORTS CAPITOL PUBL. 1300 N.17TH ST. ARLINGTON, VA 22209	IN REPORT	FORECAST RANGE

UPDATE QUARTERLY

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	REQUIRED RANGE
GSU		GEORGIA STATE U DORTHEA OTT (404) 658-3282	IN REPORT	FORECAST RANGE

UPDATE SEMI-ANNUALLY

SERIES NAME	RATS DB NAME	SOURCE OF DATA	CURRENT RANGE	REQUIRED RANGE
CBO		CONGRESSIONAL BUDGET OFFICE DR. JOEL SLACKMAN (202) 226-2918	IN REPORT	FORECAST RANGE

RATS databases can be copied for back-up and data transfer; the EWS versions of RATS databases also are self-describing and easily transformed. These features make the EWS/RATS databases ideal for storing data used in policy decisions. The analyst can use the databases outside the formal EWS system.

This chapter identifies the contents of the source data database, and presents the procedures the analyst must follow to ensure that this database is kept accurate and current. Updating must take place each month before the enlistment forecasting procedure can be run; revisions in a few of the series tend to occur each month, others more sporadically. EWS should not be run for a new month until the analyst confirms that the updating and required revisions have been completed properly.

A. Source Data

Exhibit I.6 contains a complete listing of the EWS source data and the sources from which it has been collected and from which updates or revisions must be obtained. The analyst may wish to use this listing as a guide to database revisions. The exhibit is organized in five pages: page one lists the enlistment series; page two, the leading indicator series; page three, the policy data series; page four, the macroeconomic variable series; and page five, the outside forecasts of unemployment series. Critical information is given for each series: the series name, the RATS database name, the source of the data -- including current contact persons and telephone numbers, the current range of the series, and the required or relative range. In addition, for the analyst's convenience, there is noted at the top of each series category the task required to keep the series current, e.g., "Update Monthly", "Check Each Month for Possible Revisions", etc.

B. Database Revision Procedure

Many of the source data used by the automated EWS represent economic series and recruiting resource projections. These data are revised frequently, requiring that values contained in the database must be

changed. Keeping up with the revisions is a substantial task.

The listing of source data series that appears in Exhibit I.6 serves as a guide to what may need revision. The entries with asterisks ("*") are the ones more frequently revised. You may wish to catalog the dates of revisions you make along side the series listings.

To revise a fully installed and checked EWS/RATS database, enter DOS (EWS Directory) and type "RATS E_REVISE.RCL [CR]". This command initiates the revise program. The program prints step-by-step instructions for revising a RATS database.

The text of the E_REVISE program appears in Exhibit I.7. A quick reading of the program text will give you an idea of the kind of information needed and the time required to make the revisions.

C. Database Updating Procedure

While the task of revising the databases requires the supervision of an analyst, the updating tasks can be handled by administrative support personnel, once the analyst has collected the data and provided the keyboard operator the correct values to be added. The "Operator's Manual," Part II of this volume, contains detailed instructions for updating the necessary series: enlistment contracts, unemployment, and leading indicator series. Exhibit I.8 provides the text of the "E_UPDATE.RCL" program which the operator uses to accomplish the updating.

EXHIBIT I.7

* RATS INTERACTIVE ENVIORNMENT

```
-- Program Description --
```

This program, executed in the RATS interactive environment, steps the user through the process of updating a RATS monthly or quarterly time series stored in a RATS data base.

✱

cntrl(pause)

-- Introduction --

The RATS interactive environment can be identified by the prompt "?". This prompt will appear in the far left column of your screen.

This RATS environment allows you to enter RATS commands and data directly from the keyboard; nonetheless, the system requires exact forms of commands.

Type " <COMMAND> [CR] " or " <DATA> [CR] " as instructed.

The description inside "< >" tell you what to type in :

Type in character strings (shown in CAPITAL LETTERS) exactly as they appear in the instructions.

Then type in the names of files or other data indicated by the description inside "< >" 's.

✱

cntrl (pause)

32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 10

✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱

```
ctrl (user)
```

✱
✱
✱
✱
✱
✱
✱
✱
✱
✱

```
* If for some reason you wish to terminate the program enter:
```

✱✱✱✱✱✱✱✱✱✱

cntrl (pause)

EXHIBIT I.7 cont.

* >>>>>>>>>>>>>

STEP # 1

< < < < < < < < < < < *

```
* To begin you must define the data base that is being used.
* The DEDIT command selects the RATS data base that contains the
* time series you need to update.
* It has the form:
```

"DEDIT <FILENAME> [CR]".

```
* where <FILENAME> is a legal DOS filename. Use the drive designator
* "A:" or "B:" for a data base on a floppy drive or "C:" for fixed disk
* drive. The filename C:ABC12345.XYZ is legal in RATS. THE "C:"
* is the drive designator. A string of eight or fewer charaters, begining
* with an alphabetic character (A..Z,a..z), follows. A period is used
* to sepearate a type extension of three characters or less ("XYZ" above)
* from the main filename. Rats accepts a minimum of one alphabetic
* character or a maximum of fourteen characters in a filename.
```

```
* Now type in the DEDIT command as specified above; then type in
* "RETURN[CR]".
```

```
ctrl(user)
```

* > > > > > > > > > > >

STEP # 2

<<<<<<<<<<<< *

* Now you are ready to select a series to revise.

```
* Type in "CATALOG(FULL)[CR]" and RATS will show a listing of all
* the data series in the data base that you are editing.
* Return as before by typing "RETURN[CR]".
```

```
ctrl(user)
```

EXHIBIT I.7 cont.

```
* >>>>>>>>>>                STEP # 3                <<<<<<<<<<< *
*
*
*
* Select a series from the catalog. The catalog shows the beginning
* and ending for the current series.
*
* Use the UPDATE command to revise the series. The UPDATE command
* changes a range of consecutive observations of a variable. It
* considers each district period an observation and the whole range
* of observations the series.
* The observations being updated should not leave gaps at the beginning
* or end of the series; for example, an update from 81 8 to 82 9 of
* a monthly series should not be used on a series ending 81 6 or before,
* or one beginning 82 11 or afterwards.
* Note that dates appear as two numbers: the first number representing
* a year and the second represents the period. The abbreviation "YR1"
* stands for "begining year," "P1" stands for "begining period," YR2"
* stands for "ending year" and "P2" stands for "ending period."
*
*
cntrl(pause)
*
*
* The form of the UPDATE command for our purposes is:
*
* "UPDATE <RATS series name> <YR1> <P1> <YR2> <P2>[CR]"
* "<line of data vaules separated by blanks>[CR]"
*
*      .
*
* "<line of data vaules separated by blanks>[CR]"
*
* The UPDATE procedure looks for the exact number of whole numbers or
* decimal numbers, seperated by blanks, that you specify in the UPDATE
* command. Since there are fourteen observations from 81 8 to 82 9, the
* UPDATE procedure reads the next fourteen consecutive numbers as the
* 81 8 to 82 9 observations of the series. If it finds fewer that fourteen
* consecutive and legitimate numbers, RATS prints an error message and
* cancels the update. If more that fourteen consecutive numbers follow
* the UPDATE command, RATS takes only the first fourteen numbers and any
* remaining numbers as commands. (Always put large blocks of numbers in a
* format that makes counting easy. The number of lines used does not matter,
* nor does the number of blanks between numbers; the number of characters
* per line should not exceed eighty).
*
*
cntrl(pause)
*
*
*
```

EXHIBIT I.7 cont.

```
* You may enter as many UPDATE commands as you wish before typing
* "RETURN[CR]". RATS saves the updated observations in a workfile.
* Not until you SAVE the workfile does the UPDATE command "take
* effect."
```

* Type in UPDATE commands (form)

```
"UPDATE (RATS series name) (YR1) (P1) (YR2) (P2) [CR]"
"(line of data vaules separated by blanks) [CR]"
```

```
"(line of data vaules separated by blanks)[CR]"
```

* Then type "RETURN[CR]" to continue execution.

```
cntrl(user)
```

[illegible]

STEP # 4

<<<<<<<<<<< *

```
* The PRTDATA command allows you to view parts of the update workfile.
* It has the form:
```

"PRTDATA <series list> [CR]",

```
* where <series-list> is a sequence of one or more series names from
* the catalog, each name seperated by blanks.
```

```
* Type in the PRTDATA command. (To view the series on the monitor type
* in a different PRTDATA command for each series. You may repeat PRTDATA
* commands.) Check each series revision. If you need to correct changes
* made by UPDATE's simply repeat the UPDATE command procedure and the PRTDATA
* command procedure until you are certian that the workfile is correct.
* When you are satisfied that the series are correct as revised type
* "RETURN[CR]".
```

ctrl1(user)

*****C*****

LAST STEP

< < < < < < < < < < < *

Choice # 2: To save the revisions type "SAVE[CR]". This command replaces the database series with the revised workfile series. (It also takes RATS out of the edit mode). Type "RETURN[CR]" to continue.

> > > > > > > > > > >

LAST STEP

< < < < < < < < < < < *

Now you may wish to check the data in the data base. Repeat the DEDIT and PRTPDATA commands. If the data are correct, they are in the database and ready to be used in RATS procedures; CONGRADULATIONS! If the data are not correct, repeat the DEDIT and UPDATE command procedures. Type "END[CR]" to leave RATS and return to DOS.

>>>>>>>>>>>>

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EXHIBIT I.8 cont.

1. REPLACE THE VALUE FOR LAST MONTH'S UNEMPLOYMENT RATE WITH THE CURRENT VALUE.

UNEMPLOYMENT RATE
(CURRENT MONTH)

UPDATE ALLOD10N YR MO YR MO

7.3

3. NOW REPLACE THE VALUES FOR LAST MONTH'S ENLISTMENT CONTRACTS WITH THE VALUES FOR THE CURRENT MONTH.

4.

UPDATE ARMYD13A YR MO YR MO

3301

UPDATE ARMYD3B YR MO YR MO

1993

UPDATE ARMYS13A YR MO YR MO

1745

UPDATE ARMYS3B YR MO YR MO

1188

UPDATE NAVYD13A YR MO YR MO

1911

UPDATE NAVYD3B YR MO YR MO

1027

UPDATE NAVYS13A YR MO YR MO

995

UPDATE NAVYS3B YR MO YR MO

701

EXHIBIT I.8 cont.

UPDATE AFD13A YR MO YR MO

2336

UPDATE AFD3B YR MO YR MO

1201

UPDATE AFS13A YR MO YR MO

402

UPDATE AFS3B YR MO YR MO

268

UPDATE MCD13A YR MO YR MO

897

UPDATE MCD3B YR MO YR MO

484

UPDATE MCS13A YR MO YR MO

1107

UPDATE MCS3B YR MO YR MO

756

*SAVE

*QUIT

*DEDIT C:LDINDCAT.RAT

*EVAL YRM1 = YR - 1

*EVAL MCY1 = MO - 1

EXHIBIT I.8 cont.

UPDATE LEI910 YRM1 MOM1 YRM1 MOM1

979

UPDATE LEI1 YRM1 MOM1 YRM1 MOM1

979

UPDATE LEI81 YRM1 MOM1 YRM1 MOM1

979.978

UPDATE LEI5 YRM1 MOM1 YRM1 MOM1

907

UPDATE LEI46 YRM1 MOM1 YRM1 MOM1

90

UPDATE LEI74 YRM1 MOM1 YRM1 MOM1

1.23

UPDATE LEI7 YRM1 MOM1 YRM1 MOM1

.089

UPDATE LEI8 YRM1 MOM1 YRM1 MOM1

0.9

UPDATE LEI96 YRM1 MOM1 YRM1 MOM1

111

EXHIBIT I.8 cont.

UPDATE LEI75 YRM1 MOM1 YRM1 MOM1

111

UPDATE LEI20 YRM1 MOM1 YRM1 MOM1

111

UPDATE LEI27 YRM1 MOM1 YRM1 MOM1

111

UPDATE LEI28 YRM1 MOM1 YRM1 MOM1

124

UPDATE LEI29 YRM1 MOM1 YRM1 MOM1

345

UPDATE LEI78 YRM1 MOM1 YRM1 MOM1

56789

UPDATE LEI19 YRM1 MOM1 YRM1 MOM1

9909

UPDATE LEI106 YRM1 MOM1 YRM1 MOM1

106

*SAVE

end

CHAPTER VI

SYSTEM MAINTENANCE AND MODIFICATION

A. Maintenance

The automated EWS operates continuously with minimal maintenance. Aside from necessary updates and revisions of the databases and the file of reference dates, "E_MDATES.RCL", described in the preceding chapter and in the Operator's Manual, the EWS computer system will operate for several years without additional maintenance.

There is one maintenance task which must be completed once every nine years. The file "E_TABLES.RCL" contains a column of two digit integers representing years. At the time of system delivery, the list extends through "95". At the beginning of fiscal year 1994, the list should be updated to extend from "92" through "05". Use the TURBO Editor to change the numbers. Similar extensions should be made at nine-year intervals —should the system still be in operation. The applicable excerpt from the "E_TABLES.RCL" file appears below.

```
EVAL YEAR(82) = '82'  
EVAL YEAR(83) = '83'  
EVAL YEAR(84) = '84'  
EVAL YEAR(85) = '85'  
EVAL YEAR(86) = '86'  
EVAL YEAR(87) = '87'  
EVAL YEAR(88) = '88'  
EVAL YEAR(89) = '89'  
EVAL YEAR(90) = '90'  
EVAL YEAR(91) = '91'  
EVAL YEAR(92) = '92'  
EVAL YEAR(93) = '93'  
EVAL YEAR(94) = '94'  
EVAL YEAR(95) = '95'
```

B. Modifications

1. Modifying the Estimation and Forecasting Models

Modification of the estimation and forecasting models requires expert guidance; these kinds of modifications affect the performance of the estimation and forecasting system, not just the supporting computer system.

Here we emphasize the structure of the RATS program segments that perform estimations and forecasts; Volume 1 of the report presents the specifications of the models and their theoretical foundations. We assume that the analyst knows whatever changes he or she wants to make in a model's specification and now wants to know how to change the appropriate EWS program to implement the desired change.

Model specifications appear at the top of each E_ SV COHORT_FC.RCL file. These files can be edited as text files (see Chapter IV).

In the single equation estimation and forecasting models, an EQUATION STATEMENT contains the specifications of the models, while the ITERATE STATEMENT prescribes the interval of time used in the estimation. The procedure SEQ_FC (contained in file P_1EQ_FC.RCL) produces forecasts in log values of enlistment contracts and forecast errors in logs. Procedure XFC_ADJ (contained in file P_XFCADJ.RCL) converts the log forecasts to levels and produces confidence bounds at the 90% (or 95% if the fifth parameter of the procedure call is set to "95") confidence level.

We recommend that you save a copy of the E_ SV COHORT_FC.RCL files before attempting to modify them. Once that precaution has been taken, the analyst can experiment freely with different specifications and models.

Consult the RATS manual for information on the estimation and forecasting techniques available in RATS. Policy dummies (binary variables) are defined in the E_SV DATA.RCL programs.

2. Special Purpose Modification (Reversible)

This procedure substitutes an alternative unemployment forecast for the ERL forecast, using it as a factor in forecasting contracts.

- 1) Revise the series named "UNEMP" on the E_EWS_DB.RAT database, over the forecast interval. (Use the RATS interactive program, "E_REWISE.RCL".)
- 2) Type "RATS E_ERN_FC.RCL [CR]".
(This procedure updates earnings as a function of unemployment and other factors.)
- 3) Type "EWSERNSV [CR]".
(This program restarts EWS beginning with earnings forecasts and proceeding through the cohort forecasts and report generation.)
- 4) The output files "T_UN2???.OUT" (?? = "AR", "NV", "AF", OR "MC") contain the text output.

NOTE: This procedure overwrites the .DIF files for use in generation of graphs. Run it only after producing the graphs for the monthly report.

A generalization of the same procedure applied to source data projections can be used to study the effects of changes in relative military pay and recruiters; nonetheless, the results of these estimation and forecasting exercises should be interpreted cautiously. The forecasting models have been designed to minimize the effects of forecasting errors, not to capture the more probable cause-and-effect relations among recruiting results and individual policy variables.

PART II

AUTOMATED EHS OPERATOR'S MANUAL

PART II

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CHAPTER I

INTRODUCTION

This Operator's Manual presents descriptive discussions and step-by-step "how to" instructions on what must be done to operate the EWS. It is written for the keyboard operator who will issue most of the commands to the computer and the analyst who will review the results.

Some terminology is defined in Chapter II for those who have only a passing familiarity with the PC DOS or MS DOS operating system. DOS stands for Disk Operating Systems and is produced by Microsoft Corporation. DOS controls storing, copying, and reading EWS program and data files. Other computer programs required to operate the EWS — RATS, TURBO PASCAL, and spreadsheet programs — run under DOS. Experienced DOS users will be able to adapt easily to the vocabulary of this chapter. Less experienced users will need to read, with care, the review of technical terms, or read an alternative description of DOS before attempting to copy or edit DOS files.

The EWS operator should know the computer environments he or she will be using and learn the operations necessary to perform basic functions within each one. In Chapter III we provide a few notes on computer environments. We have tried to identify the operations most frequently used. Even for the uninitiated, this should not take long to master. We urge the operator to become familiar with this section before attempting the specific tasks required to run the EWS. Chapter III includes a description of the RATS (statistical package) database system and edit mode, and sets the stage for viewing and printing variable values (data series) from existing RATS databases. Using these notes and the RATS manual as reference, the EWS user should be able to view and verify values of variables used in EWS estimations and forecasts.

For convenience and quick reference, we provide an "Operator's Checklist" in Chapter IV, Section A. The checklist identifies the tasks which must be completed to obtain EWS outputs, and identifies where, in the remaining

sections of the chapter, step-by-step keyboard instructions for accomplishing those tasks may be found.

Section B of Chapter IV will be important to both the keyboard operator and the analyst. The section describes step-by-step procedures required to back up the EWS files and update the database that EWS will use to produce the current month's output. In addition it provides a discussion of procedures required to revise the database when required.

The actual running of the automated estimation and forecasting procedures, as described in Section C, requires only the ability to start the computer running in DOS, find the "root directory" and type in the characters "EWS [CR]". Once the EWS has completed the estimations and forecasts requested, the operator follows additional procedures to obtain tabular and graphical presentations of EWS calculations. These instructions are found in Sections D and E.

The emphasis on input and output operations, described in Chapter IV, reflects two of our primary concerns. First, we know that the quality of EWS estimations and forecasts depends on the data the EWS receives as input. The system has a very limited ability to detect errors in data; it merely acts on whatever data it receives. The quality of source data determines the accuracy of the system. This restriction makes the process of gathering source data, adding them to the databases, and verifying their accuracy a vital part of the total system. Secondly, we know that careful presentation of the output of the system depends in part on visual perspective and common sense. These attributes are almost impossible to program into a system. We leave the data presentation side of the system open-ended so that users can apply their judgment to the task of presenting the system output.

CHAPTER II

A BRIEF REVIEW OF TECHNICAL TERMS AND NOTATION

Characters and Character Strings

Computer systems record each keystroke on the computer keyboard as a code for a character. A sequence of keystrokes followed by an keystroke forms a line of characters. One or more characters in sequence form a character string. To denote a character string, we enclose it in quotes. The quotes at each end are not part of the character string. The phrases 'TYPE "XYZ [CR]" or 'ENTER "XYZ [CR]"' instruct you to strike the "X", "Y" and "Z" keys, in that order, and the end "☐↵" key. Since these keystrokes end with an "☐↵" (also called 'ENTER' or 'carriage return'), they are a line. Note that we shall use the character string "[CR]" in the documentation to represent the "☐↵" key.

The phrase 'ENTER "XYZ <filename> [CR]"' instructs you to strike the "X", "Y", and "Z" keys; strike the space bar; type in a file name of your choice; and hit the 'ENTER' or 'carriage return' key. Note that spaces are characters and can be very important elements of character strings.

Commands

Some character strings can be used as commands to cause a computer to perform actions. For the format (syntax) of DOS commands, see Section 1, pages 13 to 25 of the Disk Operating System, Version 2.10, by Microsoft Corporation.

Programs

Sequences of commands can be used to form programs.

Files and Filenames

A computer system stores lines of character strings (text) in files. These files have names; in fact, the computer locates files by their names. We have to use very specific forms of names. In PC DOS or MS DOS a filename must not contain more than eight characters between a colon (:) and a period (.), nor more than three characters after the period.+

Legal filenames have the form

"?*" or "?*.*" or "?:?*" or "?:?*.?"

where "*" represents character strings of zero or more characters and "?" stands for any character from "A" to "Z", either upper or lower case, or "_" (underscore) and a few special characters. Because "*" and "?" serve as so-called "global characters" in DOS, they do not stand for themselves in filenames. ("*" and "?" have important uses when used in certain commands: see DIR *.* , Section 2, pages 66 to 72 and COPY *.* , Section 2, pages 48 to 60 of the DOS Manual).

+ The inevitable exceptions to this rule are file names containing directory "paths." In most cases paths are optional and can be omitted. When they are used paths appear in a filename as a sequence of directory names separated by reverse backslashes:

"?:<PATH>?*.?"

where <PATH> is /<DIRECTORY NAME>/<DIRECTORY NAME> . . . /<FILE NAME>. See Chapter 1, pp.1-16 through 1-22, and Chapter 5, "Using Tree Structured Directories" in the DOS Manual for a discussion of paths, complete filenames, drive names and directories.

The following are examples of filenames:

C:ZZTOP.REC (legal)

C:ZZZZZZTOP.REC (illegal: too many characters between ":" and ".")

The filename may include the drive name, which identifies a disk drive containing a disk on which the actual file appears. The drive name has the form:

"?:"

where the "?" represents any character from "A" to "Z". In the example "C:ZZTOP.REC", the "C:" is the drive name. "C:" generally refers to the fixed disk, while "A:" generally refers to the primary floppy disk drive.

While working with systems with fixed disk drives, such as the IBM PC XT, the user usually can omit the drive name. We shall omit the drive name until there is a special reason to use it. A standard filename then has the form:

"?????????.???"

where "?" represents the characters "A" to "Z" plus "_". This form of file name is always legal in PC DOS or MS DOS systems.

To see a listing of all filenames on the current directory, type the DOS command "DIR ??????????.??? [CR]". This command should produce a listing of all files with eight characters preceding a period and three characters following a period in a disk drive and directory.

You may also want to try putting quotes (") before and after the command shown above. Does it work? (It should not, since the character strings do not include the quotes that we use to separate special character strings from other text.)

Cursor

The cursor is the little blinking light that moves around the screen as you press the arrow "↑", "↓", "←", or "→" keys or the space bar. When you hit a letter or number key, the character that it represents appears in the location of the cursor, and the cursor moves over one space to the right.

CHAPTER III

FUNDAMENTAL OPERATIONS

A. Computer Environments

Computer "environments" are similar to the channels of a TV. When you want to switch TV programs, you change channels. When you want to make computers perform different tasks, you change the "environment." Many programs may run in one environment, other programs may require their own special environments. But computer systems, in contrast to a TV, allow us to use programs to create environments. We can run a program in one environment to create another environment. Different programs take control of the standard computer and make it behave as a machine that searches for information, calculates, prints tables, play games, or directs a robot. Special programs take control of the computer and act on commands typed on the keyboard; these "interactive systems" create new environments. A single computer may be able to act as the "host" of literally hundreds of these kinds of environments.

Commands that work in one environment often do not work in another environment. Even worse, commands that do work in more than one environment may give different results in different environments. For example, the direction keys that control the cursor may work only in certain environments. In the DOS environment, the up and down arrows do not work. In word processing environments, they do.

Only specially-designed computer environments allow you to enter commands from the keyboard and wait for a response. These "interactive environments" include PC DOS/MS DOS and word processing editors, and the RATS database editor. The following sections illustrate these environments.

B. The DOS Environment

The DOS environment permits the user to enter commands that control the execution of programs, report on the contents of disk drives, and perform specialized functions. DOS stands for Disk Operating System. The operating system is a group of programs that control the internal operations of the computer. Like that part of the human brain that controls the central nervous system, the operating system of a computer works underneath higher levels of control. A higher-level command inserts a character on the screen; the operating system directs a signal from the keyboard to computer memory and directs an echo of the keystroke to the screen. DOS handles the functions of the machine that appear to the user to be automatic.

DOS is often the first environment the computer enters when it is switched on. In DOS, the operator can type in commands that show disk directories, copy disk files, and handle other primary tasks. DOS commands have to be entered line by line. It is a primitive command process. Higher-level computer environments make it easier to perform more complicated tasks. By running programs on DOS, you can create such higher-level environments. Changing environments can be as easy as changing TV channels.

C. How to Use the DOS Environment

A number of EWS procedures involve DOS operations. We specify the commands to be used and their formats; nonetheless, it may be easier to understand some EWS procedures after a quick review of fundamental DOS operations.

1. DOS File Control

DOS controls reading and writing data to the PC's permanent memory: the fixed disk (C:), and floppy disks (A:, B:, . . .). The system writes sequences of data to the disks in locations that it recalls by filenames.

2. Disk Formats

A DOS program file named "FORMAT.COM" divides the surface of the disk into units called "tracks" and "sectors." Each disk has to be formatted before it can be used to store data. The formatting operation sets up a directory for each disk. As you write files to the disk, DOS puts the filename on the disk directory and uses it as a key to the location of the file.

The fixed disk is formatted at the time of system installation. Floppy disks usually are formatted in batches. Ask for a supply of formatted floppy disks. Repeating the format procedure for a disk that is already formatted destroys all the data on the disk. Use the DOS command "FORMAT [CR]" only after you have proper training and a full understanding of the formatting operation.

3. Useful DOS Commands

The fact that each file disk has a directory makes it easy to keep track of the contents of disks. DOS can display a disk directory, copy files from one disk to another, change filenames, and erase filenames from the directory. The system allows the user to handle data transfers from disk to disk by filename alone. DOS takes care of the process of determining the location of the data on the disks and relocation of the data on another disk. DOS also updates and maintains the disk directories.

The command "DIR [CR]" displays a listing of files on the "current directory." At any one time DOS has one directory name that it uses by default if you do not specify a directory. In the usual case, the fixed disk has been divided into named directories, while floppy disks can be referred to by the drive name (A:, B:, C:, etc.) only. We assume in this discussion that the current drive is the fixed disk (C:) and the current directory is called "EWS". The DIR command, therefore, displays the EWS directory on the fixed disk.

The command "DIR A: [CR]" displays the directory of whatever disk is in the primary floppy drive. If that drive is empty, DOS issues an error message.

```
Bad Read, error reading drive A
Abort, Retry, Ignore?
```

(Type "A" to escape.)

Note that the directory shown in Exhibit II.1 includes important information about the files on the disk. Besides the filename, the directory shows the size of the file (number of "bytes") and the date the file was created. A zero under the "bytes" column means that a file is empty. The total number of bytes of data on a standard floppy disk cannot exceed 360k (360,000); at the bottom of the directory appears the number of bytes still available on the disks.

The command "DIR*.RCL/P[CR]" shows a listing of all program files of type "RCL" on the current directory. The "/P" option puts the listing on the screen, one screenfull at a time. The command "DIR T_??*.OUT [CR]" displays the filenames of files "T_AR.OUT", "T_NV.OUT", . . . etc.

To print whatever appears on the screen (called a "printer echo"), press down the control key "[CNTRL]" and the "[PRTSCREEN]" keys at the same time. Repeating this operation cancels the printer echo.

EXHIBIT II.1

C:\rats>dir a:

Volume in drive A has no label
Directory of A:\

E_ARA_PT	RCL	8765	8-23-85	5:51a
E_AR3_PT	RCL	5261	8-19-85	3:00p
E_NV3_PT	RCL	5261	8-19-85	3:01p
E_AF3_PT	RCL	5251	8-19-85	3:02p
E_MC3_PT	RCL	5253	8-19-85	3:02p
E_MCB_PT	RCL	8590	8-22-85	6:35p
E_ARB_PT	RCL	8518	8-22-85	6:31p
E_NV3_PT	RCL	8612	8-22-85	6:33p
E_AFB_PT	RCL	8600	8-22-85	6:34p
E_NVA_PT	RCL	8820	8-22-85	6:25p
E_AFA_PT	RCL	8899	8-22-85	6:28p
E_MCA_PT	RCL	8797	8-22-85	6:30p
E_AFA_FC	RCL	1951	8-19-85	6:24a
E_UNI_FC	RCL	3634	9-06-85	12:31p
E_AR3_FC	RCL	1991	8-19-85	11:01a
E_XMA_FC	RCL	2165	7-31-85	6:24a
E_XM3_FC	RCL	1791	7-31-85	6:24a
E_NV3_FC	RCL	1951	8-19-85	11:06a
E_AF3_FC	RCL	1905	8-16-85	2:06p
E_ERN_FC	RCL	2733	8-21-85	7:54a
E_ARA_FC	RCL	1918	8-19-85	10:59a
E_NVA_FC	RCL	2414	8-19-85	11:04a
E_MC3_FC	RCL	1993	8-19-85	11:12a
E_MCA_FC	RCL	2351	8-19-85	11:12a
E_XMB_FC	RCL	2284	7-16-85	12:16p
E_ARB_FC	RCL	2676	8-19-85	11:02a
E_NV3_FC	RCL	2119	8-19-85	11:07a
E_AFB_FC	RCL	1860	8-19-85	11:10a
E_MCB_FC	RCL	2160	8-19-85	11:13a
E_TABLES	RCL	2216	8-30-85	10:42a
E_FIXDAT	RCL	915	8-19-85	1:11p
E_EWS_AR	RCL	1291	8-16-85	12:47p
E_EWS_XM	RCL	997	7-31-85	7:23a
E_EWS_NV	RCL	1060	8-24-85	5:58a
E_EWS_GO	RCL	2099	3-13-85	5:42p
E_EWS_AF	RCL	1097	8-16-85	12:49p
E_EWS_MC	RCL	1064	8-16-85	12:50p
E_ARDATA	RCL	1462	8-16-85	9:04a
E_MCDATA	RCL	1456	8-15-85	9:30a
E_NVDATA	RCL	2219	8-15-85	9:32a
E_AFDATA	RCL	2600	8-16-85	9:20a
E_XMDATA	RCL	1304	8-15-85	9:41a
E_GNDATA	RCL	1301	7-05-85	12:46p
E_DATES	RCL	1559	8-19-85	10:58a
E_EWS_DB	RAT	51652	8-29-85	4:11p
E_MDATES	RCL	482	8-23-85	12:09p
E_FC_UN	RCL	2678	5-06-85	10:48a
E_UPDATE	RCL	13264	9-12-85	2:42p
EWSANNEX	RAT	1846	8-29-85	4:09p
E_UNC_FC	RCL	5387	9-14-85	9:26a
LDINDCAT	RAT	81444	9-15-85	9:59a
P_XFCADJ	RCL	1038	7-10-85	8:08p
P_AUTOCO	RCL	276	9-06-85	12:43p
P_1EQ_FC	RCL	335	5-24-85	10:43a
E_IREG	RCL	1710	9-06-85	12:33p
E_FIT	RCL	431	9-06-85	12:36p
E_CREG	RCL	2375	9-13-85	3:13p
LDINDOUT	RAT	1408	9-15-85	10:00a
E_BACKUP	BAT	543	9-14-85	9:34a

59 File(s) 13312 bytes free

4. Copying, Renaming, and Erasing Files

The command "COPY A:<FILENAME>/V [CR]" copies a file from the floppy drive A: directory (source) to the current directory on the fixed disk (the destination), assuming the current drive is C:.

The command "COPY<FILENAME>= A:/V[CR]" copies a file from the current directory (source) to the floppy drive A: directory (destination).

The command "COPY A:.* /V [CR]" copies all files from the floppy disk to the fixed disk.

Another variation, "COPY C:<FILENAME1>=C:<FILENAME2>/V [CR]" copies a file on the fixed disk to another location on the fixed disk. The second filename, <FILENAME2>, creates another directory entry. Because all files on one directory must have unique names, the second file must have a different name.

Copying a file from one directory to another, using the same name, leaves the original file intact but deletes that filename from the destination directory and adds it back with a new file location. For example, "COPY A:KEYFILE.OUT [CR]" leaves "KEYFILE.OUT" intact on the A: drive floppy disk, but deletes "KEYFILE.OUT" from the current directory (on the fixed disk C:, in this case) and adds back the name, "KEYFILE.OUT", with a new file location. Take care in using the same filenames in copying files; you will lose the directory entry on the destination directory.

The erase command, "ERASE <FILENAME> [CR]", deletes a filename from the current directory, while "ERASE A:<FILENAME> [CR]" deletes a filename on the primary floppy drive. The rename command simply changes the filename entry on the current directory.

The DOS commands tend to have the same general format and options. We have presented only a few fundamentals in this section.

D. The TURBO Editor Environment

Borland TURBO PASCAL software, an inexpensive programming system for IBM PC's and compatibles, includes a text editor in its main file, TURBO.COM. The DOS command "TURBO [CR]" brings up the TURBO Editor. Respond with a "N" to the first prompt ". . . error messages" and "E" to the second prompt (a screen showing options). Omit carriage returns [CR] after typing "E" and "N".

The text editor allows the user to display and move line-by-line through a text file. The user has the option to erase, insert or rearrange text within the text file. The arrow direction keys permit the user to move along rows and columns to any point within the text file display.

The editor stores the edited file in a work file. If and only if the user specifies that the work file should be saved, does the workfile replace the original file. If a file of the same name exists on disk (that is, it is not a new file), the "save" operation replaces the old file with the current work file. The save operation also creates a backup file by renaming the old file "?*.BAK", where "?*" represents that part of the old file name to the left of the period. In other words, the type extension, ".BAK", replaces the type extension of the old file so that "FILENAME.DAT" has a backup file, "FILENAME.BAK".

The user may choose to quit the editor without saving the changes made in the old file. This option leaves the original file, if one exists, intact; it allows the user to start over with the original file.

E. How to Use the TURBO Editor

The TURBO PASCAL Manual contains a full description of the TURBO Text Editor. The following brief introduction should get you started, but the full range of editing commands in the TURBO Manual can save much time and effort. See especially the sections on "Search and Replace" and "Block Transfer" options.

Entering the TURBO environment is as easy as typing "TURBO [CR]", and returning to DOS is just as easy. Press down the "[CNTRL]" and "K" keys at the same time; then press down the "[CNTRL]" and "D" keys at the same time. (This odd sequence of keystrokes keeps the user from accidentally leaving the editing environment.) After the "[CNTRL]", "K", "D" sequence, a prompt (>) appears at the bottom of the screen. At this point, typing "[CR]" produces a display of options. Typing "S" saves the work file, "Q" returns to DOS, "SQ" saves the work file and returns to DOS, "E" returns to the work file, and "W" allows you to capture another work file or begin a new file. (Other options have nothing to do with the editor; they can be used to process PASCAL programs.)

To create a new text file, enter the TURBO Editor and type in a file name when prompted for a Work File name. Always use a type extension; that is, type a period at the end of the first part of the name. Use "FILENAME." instead of "FILENAME" or use "FILENAME.*" where ".*" means any character string. Type in "[CR]" after typing in the file name and TURBO will give you a blank screen. Whatever you type in becomes the work file.

To edit an existing file, enter the TURBO Editor and type in the name of the file that you wish to edit. Provided that it is not too large (over 50,000 characters), TURBO will read in the file and display it. Make any changes that you wish and save the edited file.

While in the TURBO Editor, the key commands such as the directions arrows and "[DEL]" key (delete) work as they would in WORDSTAR or other word processors. Unless you press the "[INS]" key, you will be in the Insert mode (you can jump in and out of the insert mode by pressing the "[INS]" key). In the insert mode, you may add text by moving the cursor to a point. The "[DEL]" key erases the character under the cursor and shifts the line of text leftward to close the "gap" left by the deletion. The direction arrows, standard insertions, and deletions permit the users to take care of most editing tasks.

Within the Insert mode, placing the cursor at the end of a line of text and hitting "[CR]" creates a new line. The editor normally displays 80 character lines from the left margin. If the user types in more than 80 characters in a line, the editor shifts the display rightward. The maximum line length is 125 characters, but 80 character lines should be the limit for EWS files.

Other word processing environments can be used for EWS file editing tasks if the user prefers. We suggest that if using an editor other than TURBO, you check to make sure the word processing system stores its files as ASCII files with carriage returns and line feeds at the ends of text lines and the standard end-of-file signal ("[CNTRL]", "Z") at the end of the file.

F. The RATS Environment

The Regression Analysis of Time Series system has special features for handling time-series data. It allows us to associate a date with an observation. For example,

UNEMPLOYMENT TIME SERIES

<u>Date</u>	<u>Observation</u>
79,5	6.8
79,6	6.9

The unemployment time series associates the date "79,5" with the value "6.8". This feature makes it easy to find and display time-series data by dates.

RATS also allows users to process time-series data through references to the series name, rather than the details of filenames, positions within files, and the like. All of the data handling operations become transparent to the user. RATS maintains series directories and displays them, much as DOS maintains and displays file

directories. For time-series storage and processing, RATS works faster, uses less computer memory, and simplifies data handling.

RATS, as we use it, consists of the RATS system files, RATS database files, and RATS Command Language files. These are DOS files. The RATS system filenames begin with "RATS"; the RATS database files have the type extension ".RAT"; and the RATS Command Language files have the type extension ".RCL".

G. How to Use the Rats Environment

The RATS Manual contains the details of the RATS system and procedures. Here we present a brief introduction to the RATS Database EDIT mode. Within this mode, the RATS databases describe themselves and allow you to display the data that they contain.

To determine the name of the RATS databases on a disk space, type the DOS command "DIR *.RAT". (We use the type extension ".RAT" to denote RATS database files.)

To enter the RATS environment type "RATS [CR]".

To enter the RATS Database Edit mode type:

"DEDIT DATABASE FILENAME [CR]".

To display data in the database under the edit mode, type:

"RATS [CR]"

"DEDIT DATABASE NAME [CR]"

"CATALOG [CR]" (lists series in database)

"PRIDATA SERIES NAMES FROM CATALOG LIST [CR]"

"QUIT [CR]" (exits edit mode)

CHAPTER IV

HOW TO RUN THE RECRUITMENT EWS

A. CHECKLIST FOR THE EWS KEYBOARD OPERATOR AND ANALYST

The monthly EWS "run," a basic update of EWS forecasts and production of tables and graphs for an updated monthly report, involves five basic tasks.

Before beginning, the operator must receive verification from the project analyst that the EWS has been installed properly and that the EWS databases contain the required data. The analyst will be able to check whether the system is ready for operation. See Part I, Chapter IV on initial installation.

Use the following checklist to monitor progress when operating the EWS:

TASKS

1. Backup the EWS Databases. See Section B.1.
2. Update the EWS databases and verify that they are correct. See Section B.3.
3. Run the EWS estimation and forecast procedures from DOS. See Section C.
4. Produce EWS tables. See Section D.
5. Produce EWS graphs. See Section E.

B. Start-up Procedures

The EWS automated system consists of computer files containing EWS databases and programs. All of these files are located on your fixed disk (C:) under the EWS directory. These files must be backed up and updated with current data each month before the system "run" begins.

1. Operator's Task 1: Backing Up the EWS Files

Each month we save copies of the EWS programs and databases on floppy disks. These copies reflect the state of the databases prior to revisions and updates; that is, they contain the data as they stood at the time of the last monthly report.

Backing up last month's program and databases allows us to restart the system as of any given month and carry it forward. This precaution gives us the ability to replicate other results and test alternative methods.

Assuming the system has been verified ready for operation, backing up the files is operator's first task. The following are step-by-step instructions.

- 1) Switch on the computer. Generally this will put you directly into the DOS environment.
- 2) Type "CD/[CR]". The normal prompt symbol will appear: ">".
- 3) Type "PROMPT \$P\$G[CR]". The prompt will reappear, this time as a reverse backslash plus the normal prompt symbol, e.g., "\>". You are in the "root directory." This assures you that the prompt will give you visual confirmation of whatever directory you may call up.

- 4) Type "CD/EWS [CR]". This takes you to the EWS directory. You should now see "/EWS" as a prefix to the prompt, letting you know that DOS has executed your command correctly.
- 5) Insert a blank, formatted disk in floppy drive A. Type in "C: COPY E_*.RCL=A:/V [CR]". This command copies files from drive C: (the fixed disk) to the floppy disk. The "/V" asks the system to verify the correctness of the copy operation.
- 6) Type "COPY E_*.RAT=A:/B [CR]". This command copies EWS databases which have the type identifier .RAT, because they are stored as binary data, in the form required for RATS databases. The "/B", instead of "/V" specifies a copy operation designed to transfer binary data correctly.
- 7) Type "DIR A:/P [CR]". A list will appear that includes the names and bytes occupied of all the files that have been copied. You may wish to verify this list against Exhibit II.1. Any files in the directory which contain zero bytes are empty files and may be indication of a problem in the EWS system. Check with your supervisor if you discover such a file.
- 8) Remove and store the disk if you will not be working with it immediately. Make sure that you write the month and year of last month's report on the floppy disk label.

2. Database Revisions

Two kinds of database changes may be required each month. Revisions of past values of contract series, projected goals, recruiters, and policy data occur sporadically. Updates of contracts, unemployment rates, and leading indicators occur each and every month. Revisions are not predictable, while updates are.

The REVISE program, located in file "E.REVISE.RCL", serves as a model for a database revision procedure. The REVISE program can be

run to change values in the database. Using a printer echo, it can provide a record of the changes that have been made. The REVISE program should be run under the supervision of an analyst that knows both the structure of the databases and the RATS Command Language. The UPDATE program, discussed in the next section, handles routine month-by-month changes. It can be edited by administrative support personnel.

3. Operator's Task 2: Updating the EWS Database

To be effective the EWS must determine how the most current market conditions are likely to affect the level of enlistments in coming months. Therefore, the most up-to-date data must be added to the EWS database before the statistical procedures are run each month. This updating procedure is the operator's second task.

The updating process involves two files. The RATS program (text file) called "E_UPDATE.RCL" provides the EWS with values for those variables that have to be updated monthly. You can edit this file so that updates for this month replace updates for last month. Once the new updates are in the file and it is saved, the file becomes a new program. When the computer executes this program as part of the EWS, it automatically updates the EWS databases. The file "E_MDATES.RCL" contains key reference dates used by all EWS procedures. It must be updated monthly as well.

To accomplish the updating task follow these steps:

- 1) Enter the TURBO Editor (or another text editor or word processor). If you need instructions on using the TURBO Editor, refer back to Chapter III, Sections D and E. Type "E_MDATES.RCL" as the work file name.

- | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 |
|---|---|---|---|---|---|---|---|---|-----|-----|

If the month of the last forecast is in a new quarter, increase the numbers for the quarter (and the year if needed) for "DLASTFC". If the month of the last forecast is October (the October monthly report), also increase the entry number for FIRSTFY YR by one.

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remember how to restore it to its original form, quit the edit mode without saving the work file and start over.

- 5) Once all updates have been completed, save the updated file, according to the procedures of the TURBO Editor (or any other editor you may be using.) If you save an altered file, check to see if the original file has the filename "E_UPDATE.BAK". If so, erase the E_UPDATE.RCL file, and type in "RENAME/E_UPDATE.BAK=E_UPDATE.RCL" (see your DOS manual for the ERASE and RENAME commands).
- 6) You will want to print out the new E_MDATES AND E_UPDATE files and verify that they are correct. The E_UPDATE print-out becomes the old update file used next month in Step 3. (Save it.) To print out the files, use the DOS command "TYPE E_MDATES.RCL [CR]" or "TYPE E_UPDATE.RCL [CR]" to send the file to the printer. (See Chapter III, Section C, on DOS operation.)

C. Operator's Task 3: Producing Estimations, Forecasts, and Report Files

1. Automatic Generation of Output

The EWS program automatically locates the data files required to perform the calculations which produce estimations and forecasts. Once the new forecasts are produced, the EWS automatically updates report files and data files used to generate graphs.

As the EWS programs generate contract forecasts, they produce DOS text files (ASCII) which can be typed out and edited. These files have names of the form T_<SV>.OUT. We refer to them as ".OUT files". These files contain listings of estimations and diagnostic statistics, rough copies of tables, and any error messages that may have been printed during the run. We suggest that an analyst review the T_<SV>.OUT files as soon as the EWS programs have run. Other

programs use these files as input for the process that produces finished tables for the EWS monthly report.

The same procedure that produces the .OUT files also produces a file of a special type of format for data transfers to the CHART-MASTER graphics package. The so-called .DIF (Data Interchange Format) is a file type that facilitates data transfers from one computer environment to another. These files serve as input for a procedure that produces presentation-quality graphs for the monthly report.

2. How to Initiate the Automatic Program

Running the EWS automated estimation and forecasting program is the EWS operator's third task:

- 1) Enter the DOS environment and be sure you are in the EWS directory. (See Task 1.)
- 2) Type "EWS [CR]". The program will begin.
- 3) Messages will flash on the screen from time to time to keep you informed about the progress of the forecasting procedures. The entire run will take about two and a half hours. See Exhibit II.2. If error messages appear or something seems to be going wrong, no need to panic. The following section describes what to do to stop and restart the run.
- 4) A final message tells you when the run has finished.
- 5) To print out the .OUT files produced during the run, use the DOS command, "TYPE T_<SV>.OUT" (where<SV>= AR or NV or AF or MC or UN or ERN) to send the file to the printer. (See Chapter III, Section C, on DOS operation.)

EXHIBIT II.2
(page one)

C:\rats>ews

C:\rats>

C:\rats>REM This program produces the updates, estimations, and forecasts

C:\rats>REM PROGRAM ORIGINALLY DEVELOPED BY SIGURD W. HERMANSEN 2-3-85.

C:\rats>REM MODIFICATIONS BY HERMANSEN, PETER GREENSTON,

C:\rats>REM ROYAL WESTWATER AND BRIAN GOLDBERG.

C:\rats>REM LATEST REV. 8-16-85

C:\rats>CD \RATS

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 15:03:11.53

C:\RATS>RATS E_UPDATE.RCL,T_UPDATE.OUT

Stop - Program terminated.

C:\RATS>REM UNEMPLOYMENT, CONTRACT AND LEI UPDATE COMPLETE.

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 15:06:03.03

C:\RATS>RATS e_UNI_fc.rcl,T_un.out

Stop - Program terminated.

C:\RATS>REM UNEMPLOYMENT FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 15:25:59.13

C:\RATS>RATS E_ERN_FC.RCL,T_ERN.out

Stop - Program terminated. II-24

EXHIBIT II.2
(page two)

C:\RATS>REM CIVILIAN EARNINGS FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 15:29:42.93

C:\RATS>RATS e_ews_ar.rcl,t_ar.out

C:\RATS>REM ARMY CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 15:54:14.32

C:\RATS>RATS e_ews_nv.rcl,t_nv.out

? Error: Device full error in file t_nv.out
Error Code 1008, Status 0008

PC = 1DE0: 0002; SS = 335E, FP = 2064, SP = 1DDC

C:\RATS>REM NAVY CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 15:57:29.84

C:\RATS>RATS e_ews_af.rcl,t_af.out

? Error: Device full error in file t_af.out
Error Code 1008, Status 0008

PC = 1DE0: 0002; SS = 335E, FP = 2064, SP = 1DDC

C:\RATS>REM AIR FORCE CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 16:00:24.09

C:\RATS>RATS e_ews_mc.rcl,t_mc.out

EXHIBIT II.2
(page three)

C:\RATS>REM MARINE CORPS CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 16:03:18.88

C:\RATS>dir *.out

Volume in drive C is ERLXT1
Directory of C:\RATS

T_UN	OUT	42437	9-17-85	3:25p
UNEMP	OUT	7818	5-06-85	11:22a
NV	OUT	11051	9-04-85	12:11p
UPDATE	OUT	8827	5-06-85	11:19a
AR	OUT	10973	9-04-85	11:58a
T_UPDATE	OUT	13984	9-17-85	3:05p
T_AR	OUT	12288	9-17-85	3:53p
AF	OUT	11233	9-04-85	12:10p
REVISE	OUT	8179	5-06-85	11:16a
T_ERN	OUT	22032	9-17-85	3:29p
MC	OUT	11155	9-04-85	12:12p
T_NV	OUT	0	9-17-85	3:57p
T_AF	OUT	0	9-17-85	4:00p
GRAPH	OUT	1090	8-09-85	11:04a
T_MC	OUT	0	9-17-85	4:03p

15 File(s) 0 bytes free

C:\RATS>dir *.dif

Volume in drive C is ERLXT1
Directory of C:\RATS

E_ARA_CM	DIF	6450	9-17-85	3:54p
E_AR3_CM	DIF	6450	8-29-85	4:46p
E_NVA_CM	DIF	6450	8-29-85	5:03p
E_NV3_CM	DIF	6450	8-29-85	5:09p
E_AFA_CM	DIF	6450	8-29-85	5:28p
E_AF3_CM	DIF	6450	8-29-85	5:45p
E_MCA_CM	DIF	6450	8-29-85	6:07p
E_MC3_CM	DIF	6450	8-29-85	6:15p
TEMP	DIF	0	5-20-85	8:32a
E_XMA_CM	DIF	6311	7-31-85	6:41a
E_XM3_CM	DIF	6311	7-31-85	7:20a

11 File(s) 0 bytes free

C:\RATS>turbo

3. Stopping and Restarting the System

At each milestone in the EWS run, a message goes to the screen. The time between messages varies, but it should be close to the estimated completion times in Exhibit II.2. If the program stops prematurely, or if the messages stop appearing on the screen for an extended period of time, the operator should stop the run and restart it.

a. Stopping the Run: Interrupts

To stop the run and regain control of the machine when it appears to be "locked up," hold down the "[ALT]", "[CNTRL]", and "[DEL]" keys at the same time. This combination of keys "reboots" the computer. The reboot command clears the machine's memory (but not the disk files on the fixed disk or floppies) and allows you to start over.

b. Recovery and Restarting the Run

First make sure that the revisions and updates of the database have been handled properly. If so, two possibilities remain: 1) an unusual occurrence, such as a power surge, which has disrupted the EWS programs, or 2) data or specification problems within the EWS programs. Restarting the EWS programs may work when an unusual occurrence disrupts a run. If the EWS continues to produce error messages or lock up at the same point in the run, check the section on system maintenance in this volume, Part I, Chapter V, and contact ERL.

Because revisions and updates to the database and program controls reside in the EWS program files, restarting the EWS run causes no special problems. Type in "EWS [CR]" as before. This command restarts the program from the beginning.

If part of the EWS has run successfully (as judged from updates of the databases and the text of the T_<SV>.OUT files), you can use alternative restart sequences.

- 1) The command "E_UNI_FC.RCL [CR]" produces and saves an unemployment forecast series names UNEMP.
- 2) The command "E_ERN_FC.RCL [CR]", if run after "E_UNI_FC.RCL [CR]", produces and saves a civilian youth weekly earnings forecast series named "WK1624".
- 3) Where the revisions, updates, unemployment forecasts, and earnings forecast programs have executed successfully, the command "E_EWS_<SV> [CR]", where <SV> = AR, NV, AF, or MC, can be used to forecast contracts for a service and produce the required output for the monthly report. These programs can be executed in any order. They produce the T_<SV>.OUT and E_<SV>_COHORT_.CM.DIF files used to produce tables and graphs.

c. In Case the System Self-Destructs: Backing up Files

Recall that the first step in operating EWS is to back up database and program files on floppy disks. These disks, and your copies of the E_REVISE.RCL run and the E_UPDATE.RCL file, contain all the information you need to reconstruct the system.

Copy all of the back up files from the floppy disk to the C:DRIVE (fixed disk): type "COPY A:E_*.RCL/V [CR]", and the "COPY A:E_*.RAT/B [CR]". Edit the REVISE and UPDATE files as before, and save them. Typing "EWS [CR]" now runs the system, beginning at its status at the end of the prior month.

D. Operator's Task 4: Producing Tables for the Monthly Report

1. Recruiting Outlook Tables

The heart of the information yielded by the EWS each month can be found in the tables entitled "Recruiting Outlook." One Recruiting Outlook Table is produced for each of two cohorts for each Service. These tables give historical data on contracts, goals, and recruiters, by month for two full fiscal years plus the months elapsed in the current year, and present EWS's forecasts of net contracts by month for the next 12 months. The tables show both historical and projected ratios of contracts as a percent of goals. Also, the tables present data totals for the past two and the current fiscal years, and for the past two twelve-month intervals and the one projected by EWS forecasts.

The information presented in the Recruiting Outlook Tables is the culmination of all the modeling, data gathering, and statistical processing accomplished by the EWS. The tables are a refinement of the tables found in the .OUT files which are generated by the monthly EWS run. A specially designed EWS print routine combines the output facilities of the RATS Command Language and the formatting capabilities of TURBO PASCAL to produce these presentation-quality, formatted Recruiting Outlook Tables with appropriate headings.

To execute the EWS print routine and produce the Recruiting Outlook Tables, the operator must follow these simple steps:

- 1) Enter DOS and type "PRT_TABL [CR]".
- 2) In response to the first prompt, type "T_AR.OUT [CR]".
- 3) In response to the second prompt, type "AR.OUT [CR]".
- 4) Type "1 [CR]".

- 5) Enter the TURBO Editor and edit the AR.OUT file. Some minor editing may be required to produce a finished table. Use the previous month's table as a guide. Save the file and exit the TURBO Editor.
- 6) Be sure the printer is set to begin printing at the top of a page, activate the printer echo, and use the DOS command "TYPE AR.OUT [CR]" to print the finished tables.
- 7) Repeat steps 1-6 for:
Navy ("T_NV.OUT", "NV.OUT", and "2"),
Air Force ("T_AF.OUT", "AF.OUT", and "3"),
Marine Corps (T_MC.OUT", "MC.OUT", and "4").
- 8) Use commercial correction fluid or tape to delete "echos" of DOS commands printed on the final hard copy of the tables. Then they will be ready for reproduction.

2. Regression Model Tables

The Regression Model Tables identify the variables in a model, the coefficients estimated, and a number of other descriptive statistics. The data for these tables is contained in appropriate format in the .OUT files. The process which enters these data in the .OUT files is not subject to the EWS print routine as is data for the Recruiting Outlook Tables. However, presentation-quality tables can be created easily by extracting the correct block from the .OUT files and doing some minor editing. The following are step-by-step instructions.

- 1) Turn on the machine and type "CD/RATS [CR]".
- 2) If you want the tables you create to be stored on a floppy disk, insert the disk now and copy the .OUT files from Drive C to Drive A. You want to copy the .OUT file for each Service twice, so that you can create two tables for each Service --

one for the 1-3A cohort and one for the 3B cohort. When the prompt appears type: "COPY C:AR.OUT=A:COEF_ARA.OUT [CR]". When the prompt returns, type "COPY C:AR.OUT=A:COEF_AR3.OUT [CR]". You now have a separate file for each cohort.

- 3) Type "TURBO". The TURBO Editor will ask you two questions. The answer to the first is "N"; the second is "E".
- 4) Enter the file name, e.g., "A:COEF_ARA.OUT". The top of the file will appear on the screen.
- 5) You will create the desired table by erasing from this copy of the .OUT file all data that is not to appear in the table. This is done by "marking" the beginning and end of the blocks of extraneous data and then issuing a delete command. Go to the top of the file and press the "[CNTRL]" key. When issuing edit commands, the "[CNTRL]" key must remain depressed while the other keys are struck. With the "[CNTRL]" key depressed, strike "K", then "B". This marks the beginning of the block of material to be deleted. Now move the cursor to the line of text immediately preceding the data to be included in the Regression Model Table. While depressing the "[CNTRL]" key, strike "K", "K", marking the end of the section to be deleted. To execute the deletion, depress the "[CNTRL]" key and strike "K", "Y". The cursor should now rest at the beginning of the data for the table. Move the cursor to the end of the data you will use and repeat the deletion process, marking the beginning and end of the material to be deleted and issuing the delete command: "[CNTRL]", "K", "Y". Now all that you have left in the file is the block containing the regression model statistics.
- 6) Type in the appropriate title at the top and center it. You may use additional lines if you wish.

- 7) Type in identifiers beside the seasonal variables. To do this go to the middle of the table where the letters "SEAS" first appear. To the right of these letters, in the second numerical column, appears a negative number. The negative number denotes a seasonal lag and refers to a month. The following table shows the months as they correspond to the seasonal numbers:

-10	May
-9	June
-8	July
-7	August
-6	September
-5	October
-4	November
-3	December
-2	January
-1	February
0	March

Following each appearance of "SEAS" type a colon and the name of the month as indicated by the negative number, e.g., "SEAS: August."

- 8) Save the file by depressing the "[CNTRL]" key, and striking the "K" key then the "D" key. When the the prompt reappears strike "S" and then "Q".
- 9) The unedited files are quite large and take up a sizeable number of bytes on the disk. The editing removes unnecessary data, however the automatic backups to these files still contain extraneous material. It is, therefore, a good idea to erase the backup files created from the two new files. To do this type: "ERASE A:*.BAK". IMPORTANT: Be sure to type in "BAK" otherwise you will erase the whole disk and you will lose everything. When you type "BAK" you are erasing only the backup files.

E. Operator's Task 5: Producing Graphs for the Monthly Report

The Recruitment EWS Monthly Assessment Report contains three types of graphs dealing with enlistment contracts. These graphs are illustrations of the historical data collected and the calculations EWS has made in the current month's run. Therefore the values used to plot the graphs should be exactly those found in the Recruiting Outlook Tables. We have designed the formats of these graphs so that the reader can see at a glance the historical performance, relative to goals, and the future prospects for a Service's recruiting program.

- o Graph 1 shows the historical and predicted "Contract-To-Goal Ratios" by month in a line graph.
- o Graph 2 shows a comparison of Net Goals-To-Net Contracts in a bar graph.
- o Graph 3 shows the forecasts of enlistment contracts, with 90% confidence bands, in relation to goals, as extensions of historical data, in a line graph.

The graphs display data for combined HSDG's and seniors in the 1-3A and 1-3 cohorts.

In addition to graphs on enlistments, the Monthly Report includes two line graphs illustrating EWS forecasts of unemployment and comparing outside forecasts of unemployment.

The graphs can be plotted in color on transparent film for use as overheads. Xerox copies of the graphs appear in the Monthly Report.

1. How To Prepare Chart Files for Producing Graphs

- a. The computer files that instruct the plotter to create the graphs are CHART-MASTER files called chart files. The data for the chart files must come from the calculations determined by

the current run of the EWS. In order to transfer these data to CHART-MASTER chart files, the data are stored in special intermediate files identified as .DIF (Data Interchange Format) files. Transfer these data files from the C: drive to the A: drive with the following sequence of commands:

- 1) "DIR C:E_???_CM.DIF [CR]"

(You should see on the screen a listing of the following files:

E_ARA_CM.DIF

E_AR3_CM.DIF

.

.

.

E_MC3_CM.DIF

Check the dates of the files and the number of "bytes" in each file. The date should be the date of the last forecasts and the number of bytes should be greater than zero.

- 2) "COPY C:E_???_CM.DIF=A: [CR]"

(This step requires a floppy disk in Drive A:. Use this disk to store CHART-MASTER chart files — the file on which CHART-MASTER stores all the details of a graph — as well.)

- b. Use the command "CD/Graph [CR]". Enter the CHART-MASTER directory.

(We suggest setting up in advance a CHART-MASTER directory called "GRAPH" and storing the CHART-MASTER programs on the C: disk in that directory. See the installation instructions in the CM Manual.)

- c. Put the CHART-MASTER "Master Disk" in Drive A: and type "CM [CR]".
- d. Follow CHART-MASTER instructions until you reach the main menu. Take out the "Master Disk" and replace it with the "CM Files" disk.
- e. Select "Store/Retrieve/Delete Charts" from the main menu.
- f. Select "Chart Catalog" from the storage menu and write down the numbers corresponding to last month's 1) Contract-to-Goal, 2) Net Goals Vs Net Contracts, and 3) Forecasts of Enlistment Contracts graphs. A good system for naming the current month's chart files is as follows: For the Contract-to-Goal Ratio graphs the abbreviated names are ACOG06A, NCOG06, AFCOG06A, MCCOG06; for the Net Goals Vs Net Contracts graphs the abbreviated names are AOG685A, NCG685A, AFOG685, MCCOG685; and for the Forecasts of Enlistment Contracts graphs the abbreviated names are ARM685, NAV685A, AF685A, MC685. The "6" or "685" at the end of a file name represents the month and year which the file is reporting. This date should be consistent throughout the files for that month, no matter what day of the month they actually are worked on, to keep identification of the files fast and easy. The "A" at the end of the date designates that the file is 1-3A. If there is not an "A", then the file is for 1-3s only.
- g. Create the "Contract-To-Goal Ratio" Chart File
 - 1) Select "Retrieve Chart" from the main menu (or the storage menu) and enter the number corresponding to last month's "Contract-To-Goal" graph. Return to the main menu.
 - 2) Verify the chart file by selecting the "Verify" option from the main menu. Respond to the question "Screen or Printer" with "P". Your printer will print out a copy of

the chart file. By doing this you can make sure you have retrieved the right file, and you have a copy of the file on which to identify and pencil in the required changes from the prior month to the current one.

The printout of the chart file will list the title lines of the graph, the x and y axis labels, and all of the observations for the first variable, then all of the observations for the second variable, and so on. Each observation will be identified by a label (e.g., 8210 for October 1982) and a value depending on the variable (e.g., 4,000 for ACTUAL enlistment contracts).

- 3) Identify the changes to be made by comparing last month's values to this month's values as printed in this month's Recruiting Outlook Tables. The typical monthly update to this graph requires the following changes:
 - o Adding an observation for the current month.
 - o Replacing the prior month's 12 FORECAST values with the values from the current EWS run.
 - o Verifying the values for observations of historical ACTUALS.
 - o In addition, at the beginning of a new fiscal year, you must delete the oldest fiscal year, i.e., the first 12 observations on the graph. The graph, and the Recruiting Outlook Table from which the data comes, is designed to hold a maximum of 36 observations — two full fiscal years and up to 12 months of the current year.
- 4) Enter the main menu and select "Edit Chart." (Refer to Chapter Six of the CM Manual for editing charts.) To add

this month's observation, select "Edit All Data for One Observation." Since the observation is new, it is not listed. You must create a new observation number and add it to the existing list.

- 5) When you tell CHART-MASTER to create a new observation, it will add that observation to the list for each variable (e.g., ACTUALS, FORECASTS, and ALERT). CM will ask you to assign values to the new observation for each variable; in response, enter the new values for the month.
- 6) To change the revised values for the other observations, select "A Single Datum." This category will show you all of the variables in the file. Select the variable with the changes in it. CHART-MASTER will display all of the observations for that variable and will ask you to select the one that you want to change. When you have selected an observation, it will ask you to change the single datum. Enter the current value.
- 7) If all or many of the values for a variable are different from last month, select "Edit All Data for One Variable" and then change all of the values at one time.
- 8) In order to maintain a continuous line on the graph between the the historical ACTUALS variable and the projected FORECASTS variable, the observation point where ACTUALS end and FORECASTS begin must be the same value. For example, when for ACTUALS the last observation that has a numerical value is M (for May 1985), and that value is .89, the May 1985 observation for the FORECAST variable must also be .89. (This procedure also must be followed in preparing the Forecasts of Enlistment Contracts graph.)
- 9) You may want to verify the changes you have made in the chart file. You should still be in the edit menu. Select

"Verify Chart." Check your changes/additions now. You can put the revised file on the screen or have the printer print out a copy.

10) Read the following section, Section E.2, on plotting procedures. Then, plot the graph.

h. Save the chart file by returning to the main menu and selecting "Store/Retrieve/Delete Chart." This will put you into the storage menu. Now select "Store Chart." CM will ask you to name the new chart file. Use the same name as before except, be sure to change the number designating the month (and year if necessary). After you have done so the chart file will be saved under that new name, and CM will return you to the storage menu. From here you can select "Retrieve Chart" and begin the editing process for the next chart file. If you need another category, return to the main menu.

i. Create the "Net Goals Vs Net Contracts" Chart File:

- 1) As you did for the chart file described above, enter the main menu. Retrieve last month's Net Goals vs Net Contracts chart file.
- 2) Now enter the edit menu, verify the file by printing out a copy, and identify the changes to be made. There are six numerical values in this graph because it is a bar chart by fiscal year. Compare the numbers from this month's Recruiting Outlook Table to those in last month's report.
- 3) Because there are so few changes to be made, you can select the "Single Datum" option, and change single observations quickly and simply.
- 4) When you have entered "Single Datum", CHART-MASTER will ask you which variable you want to change. Enter this

number and you will see the values for each observation from last month. Change only the values that need to be updated.

NOTE: You must go through this procedure for each observation that needs to be changed. CHART-MASTER will not allow you to change all of the values at once.

- 5) Return to the main menu after changing values.
- 6) Plot the graph, and save the chart file under a new name.

Reminder: Refer to Chapter Six of the CM Manual when editing charts. In this manual, instructions for plotting appear in Section E.2 of this chapter.

j. Create the "Forecasts of Enlistment Contracts" Chart File:

The two chart files just discussed require only minor data updating; for them, automatic data entry would be more trouble than it is worth. The "Forecasts" chart file would require a considerable amount of manual data entry, however. So we use an automatic procedure for transferring data from EWS output files to CHART-MASTER.

- 1) Enter the main menu and retrieve last month's file. Re-enter the main menu. This time you will choose the option "Create a Chart", rather than "Edit a Chart", as you have previously. Although you are creating a new chart, you do want to retain some critical settings from the old one. Therefore, when CM asks you if you want to reset the default values, type in "N" for no, and return.
- 2) Titles must be entered. You will need to have a copy of last month's report close at hand for reference. In the appropriate spaces, type in the titles exactly as they appeared in the last month's graph.

NOTE: At the bottom of the screen you see text format options. Normally you do not need to change the format settings in the title lines. If you do need to gain access to the format settings at the bottom of the screen, strike the "[PGDN]" key. The right and left arrow keys will get you to each category so you can make changes. To get back to the title line strike "[PGUP]". Refer to CM Manual, pp. 3-7 - 3- 10.

- 3) Next, a data entry prompt with two choices will appear. Select "D)IF format". Choose category #1 (Retrieve DIF Files) from the .DIF interface menu. The .DIF directory will appear. Choose the .DIF file you want and type in the name exactly as it appears on the screen. NOTE: If the .DIF files have not been transferred over to the floppy disk on Drive A, this step will not work. See step a.1) in this section.
- 4) Load data automatically (category #1) and load columns as variables. The .DIF interface menu will appear again. Select: "Return to Main Menu" (#4).
- 5) CHART-MASTER's main menu will appear. Go into the edit menu and verify the chart file by printing it out and checking the data entered by the .DIF file against the current Recruiting Outlook Table.
- 6) Re-enter the edit menu and select the "Variable Label" option. Three variable labels within the legend must be changed. The three are: LOWER_90, UPPER_90, and NETGOAL. Change these to LOWER 90, UPPER 90, and GOAL, respectively. (The underscore character, "_", does not print correctly in CHART-MASTER.)
- 7) Next select the "Observation Labels" option. The observation labels must be changed from numbers to

letters. CM will ask you which label you want to change. Select "Change All Observations." CM may flash a message saying "THAT'S QUITE A FEW OBSERVATIONS, AND QUITE A FEW LABELS. I MAY NOT BE ABLE TO FIT THEM ALL, SO I WILL PLOT A LABEL EVERY ... OBSERVATIONS. (ENTER A NUMBER FROM 1 TO 44)". Respond to this message by entering a "1". The regular procedure will continue, and a prompt will appear saying "Label 1:". Respond by typing "O" (for October) and [CR]. If you continue to strike [CR], CM will revise the rest of the file automatically by replacing each number label with the correct letter.

- 8) Go back into the main menu and select "Change Options". You need to change the footnote to coincide with the first forecast month (and year) to be reported this month. Once you are in the options menu, select category #6 - "Footnote". Change the month, and year if necessary. To get out of the options menu, choose "Quit Options" and this will return you to the main menu.

- 9) Plot the graph, and save the chart file under a new name.

k. Create the Unemployment Chart Files:

- 1) Have last month's report out for quick reference.
- 2) Just as before, get into the main menu of CM and retrieve last month's graph. Enter the edit menu. The values for the first graph "EWS-CLI Forecasts of Unemployment" are taken from the table "EWS Forecasts of Civilian Unemployment: Seasonally Adjusted". The Actuals Column must be adjusted by deleting the oldest (first) month in the column and adding the most recent month to the end of the column. Occasionally, values for some of the other months may need slight revision. Make these changes to the Actuals Column by using the "Single Datum" selection.

- 3) The second portion of the table has three columns which must be adjusted by deleting the oldest month and adding the most recent one. The next variable to be plotted can be found under the Mean Column. It is best to use the "Edit All Data for One Variable" option here because most of the values will change. Revise the Lower 90 and Upper 90 variables in the same way.
- 4) This graph has a footnote that must be changed. Enter page one of the options menu, select "Footnote," and follow the instructions to make this change.
- 5) Plot the graph and save the chart file under a new name.
- 6) The next graph, "Outside Unemployment Forecasts," is taken from the table "Quarterly Trends in Unemployment Forecasts". Retrieve last month's chart file, and add all new values to each variable by using the "Edit All Data for One Variable" option. The variables in the graph file are labeled exactly the same as in the table.
- 7) Plot the graph, and save the chart file under a new name.

2. How to Plot the Graphs

a. System Requirements

Some of the information contained in this section is repeated in "System Requirements and Limitations," Chapter I, Part III of this volume.

Graph production requires a graphics software package (CHART-MASTER), a floppy disk labeled "CM Files" with EWS graph files stored on it, a plotter (HP 7475A), transparency film, and special pens for plotting graphs on film. To verify that the system works, create a simple CHART-MASTER file and plot it (see pp. 2-1 - 2-4 of the CHART-MASTER Manual). If the system does not work, the first things to check are the items on this list.

- 1) See that the plotter is plugged in and switched on. Verify that one of the green lights on the plotter is on and that the yellow (error) light is off. No green light indicates a power problem.
- 2) Check the row of nine small switches at the right rear corner of the 7475A plotter. These "DIP" switches have to be set as prescribed on p. 1-26 of the CM Manual. If not, the procedure for changing the settings is:
 - o turn off the plotter
 - o set switches

S2	S1	D/Y	MET/US	A4/A3	B4	B3	B2	B1	
					X				1
X	X	X	X	X		X	X	X	0
 - o turn plotter on (the settings "take" when you turn the plotter on).

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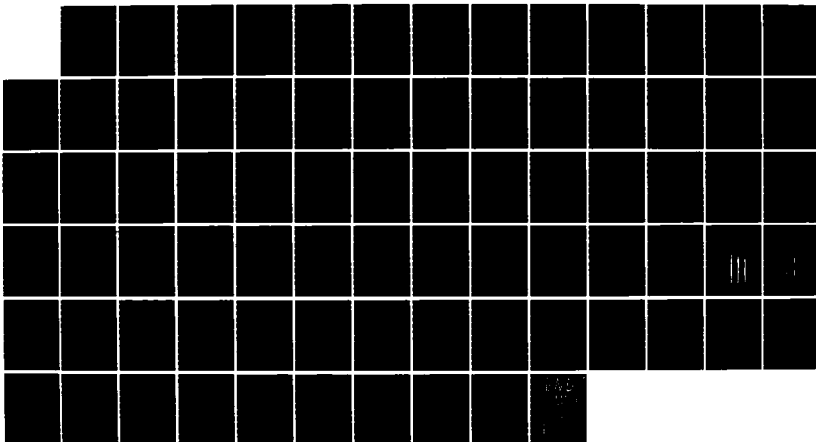
RECRUITMENT EARLY WARNING SYSTEM PHASE II VOLUME 2
SYSTEM DOCUMENTATION A. (U) ECONOMIC RESEARCH LAB INC
RESTON VA S HERHANSEN ET AL. 30 SEP 85 ONR-85-01-VOL-2
N00014-85-C-0033

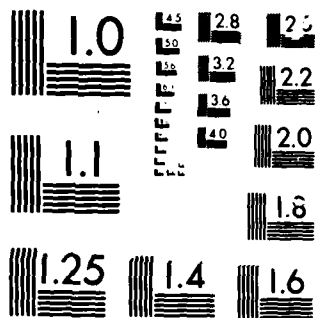
2/2

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F/G 3/9

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CHART

- 3) Check to make sure that the film or paper is placed correctly on the machine and aligned with the guide in the upper left corner. The lever on the right hand side of the plotter should be pulled down to hold the film or paper in place.
- 4) Check the cable connecting the plotter to the computer. (See p. 1-26 of the CM Manual for HP 7475A cable requirements. The right computer connection depends on the placement of the COM1 and COM2 ports at the rear of the IBM CP XT.)
- 5) From the CHART-MASTER Main Menu (see p. 2-1 of the CM Manual), select "miscellaneous" and strike [CR]. Select "display configuration" and check "plotter model" (7475A), "plotter adapter" (try "COM1", then "COM2").
- 6) Reread Chapter One of the CM Manual and repeat the installation steps.
- 7) For problems you can't solve, call Decision Resources at (203) 222-1974 or ERL at (703) 476-5500.

NOTE that the CM Manual lists different installation procedures for different plotters.

b. Operating the Plotter

To plot transparencies you first must verify that the equipment is ready for operation, as described in the preceding section. Remember that the plotting process is done after editing each chart file. A given chart file is still in the computer's working space when you return to the main menu after editing, so you may proceed directly with the plotting.

- 1) Load the plotter with special pens and transparency film or paper, making sure the left upper corner is aligned with the 90 degree angle guide on the machine. Pull down the lever on the right hand side of the plotter to hold the paper or film in place.

NOTE: The transparency pens that are used for plotting dry out quickly. Remember to cap all pens before leaving work for the day. They must be special ordered; therefore, they are sometimes difficult to obtain quickly.

- 2) Before plotting, go into the option menu and check the selections on the "All Charts" page. Look at #3, "Location, This Chart". In order to fit comfortably on a transparency, the graphs should be sized to cover 95% of the available space. Strike key #2. Notice that CM will ask you to respond for left, middle, right. For left and right enter 95%. You must also change the top and bottom placement of the graph. These two selections should be 95%.
- 3) Go back into the option menu and select "Pen Speed". When plotting on transparencies, the pen speed must always be slow.
- 4) The next selection is "Frame". Some graphs have frames; some don't. Check with your supervisor to see if a frame is needed. If not, strike key #4. If so, strike the appropriate key. For more detailed instructions on choosing options, refer to pp. 5-3 - 5-8 of the CM Manual.
- 5) Once you are back in the main menu select "Plot Graph". CM now shifts to the plot menu. The "Contract-to-Goal Ratio" chart and the "Forecasts of Enlistment Contracts" graph are line graphs. Enter #4. Another menu will appear on the screen.

- 6) To view this graph on a color monitor, turn the color monitor on and press 1, 2 or 3. These categories refer to the colors in which the chart will be drawn. (NOTE: They will not match the colors produced by the plotter. The color of the pen in a given pen position determines the color on a plot. CHART-MASTER uses the following scheme for pen selection: default choice for labeling and axes - Pen 1; Variable 1 - Pen 2; Variable 2 - Pen 3, etc. CM automatically assigns pen number i+1 to the ith variable.)
- 7) Once you have looked at the graph on the color monitor and everything appears to be in order, you are ready to proceed. Press the plotter key. CHART-MASTER will instruct you to turn the plotter on, load the paper and pen(s) (if you have not already done so) and press "Enter" to start. After you have completed this process, just sit back and watch the plotter draw your graph.
- 8) If a problem occurs while plotting, the plotter can be stopped by pressing "F10". This key will return you to the main menu.
- 9) When plotting the "Contract-to-Goal Ratio" chart, the plotter will stop after it has drawn the first line (Actuals). You will notice that on the PC screen you will have a choice of positions for placing the word "ACTUAL". This happens when you have a heading other than "Legend". Determine where you want the word ACTUAL to appear above the line. Press the left, right, up or down arrow keys to place the pen in position. When you are in position, press the appropriate selection (#1 through #4). Follow this same procedure with the forecast line in the graph. When the plotter stops for the variable ALERT, strike "NO LEGEND", or key #5. This will tell the plotter that there is no heading for this particular line, and it will

complete the graph. Refer to p. 5-14 of the CM Manual for further discussion of this topic.

- 10) Repeat the plotting procedure for the "Net Goals to Net Contracts" graph. The only difference is that this graph is a clustered bar chart. For more on plotting and previewing charts see Chapter Four of the CM Manual.
- 11) Once in a while the graph will plot too high or too low on the transparency. If that happens, enter the options menu. The category that controls the height of the line is the Right Y-Axis option. Check to see if #3 (MAX Y) and #4 (MIN Y) in this option says AUTO. If so, you must change both to get the line in the middle of the graph. Look at last month's report and check the numbers used to plot the graph. Now estimate this month's report and put in numbers you think are in the middle of the graph. Check the chart on the color display screen before you plot it. If it looks correct, plot as discussed above. If it stills needs more adjustment, go back into the options menu and try again.

PART III

DOCUMENTATION FOR THE SYSTEMS ANALYST

PART III
DOCUMENTATION FOR THE SYSTEMS ANALYST

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CHAPTER I

SYSTEM REQUIREMENTS AND LIMITATIONS

The EWS operates on standard, low-cost microcomputer hardware and software. MS DOS is the primary operating system. While the EWS can be adapted easily to a wide variety of MS DOS systems, the hardware and software configurations that we specify in this section support the system fully.

A. Hardware Environment

We have designed the EWS to run on hardware currently in place in OAP. This equipment is reliable and part of the local computer environment favored by many analysts.

1. Microcomputer

The automated EWS runs on an IBM PC XT with 640K of RAM, an 8087 coprocessor, and an IBM or other standard graphics card. Except for the capability of previewing of graphs on the system monitor, a standard monitor meets the requirements of EWS. We use an AST or QUADRAM memory expansion board and an IBM graphics card. The XT includes a 10 MB fixed disk system and a 360 K floppy disk drive.

2. Printer

Report preparation requires the use of a printer. Any printer capable of typing (command "TYPE") a text file received from the parallel or serial ports of the IBM PC XT, or printing under the control of a word processing package that can read in text files stored on the IBM PC XT disk storage, will support EWS. We use Okidata 93's and Epson FX 100's with IBM printer emulation enhancement.

3. Plotter

The graph files developed under CHART-MASTER drive a Hewlett-Packard 7475A Plotter. This machine uses special pens and either transparency film or paper to plot graphs.

CHART-MASTER supports many plotters and other graphics devices.

B. Disk Directory Configurations

All EWS files (except for those specified in the sections on .BAT files and graphics) reside on the fixed disk (C: drive) under the directory named "EWS" and the graphics directory named "GRAPH". To create the directory from the ROOT DIRECTORY named "/", type

```
"CD [CR]"  
"MKDIR EWS [CR]"  
"CD EWS [CR]"
```

with the EWS floppy disk in the floppy disk (A:) drive, type

```
"COPY A:*.RCL/V [CR]"  
"COPY A:*.RAT/B [CR]"
```

The RATS system has to be loaded into the EWS directory. One at a time, put the three RATS floppy disks in the floppy (A:) drive and type:

```
"COPY A:*/V [CR]"
```

to copy each disk in turn. Load the TURBO Editor into the same directory by putting the TURBO disk in the floppy disk in the floppy drive (A:) and repeating the copy statement.

To load the CHART-MASTER graphing system, type:

```
"CD [CR]"    (to return to Root Directory)
"MKDIR GRAPH [CR]"
"CD GRAPH [CR]"
```

Then copy, as before, the CHART-MASTER system disks from the floppy drive. After copying the CHART-MASTER system, follow the configuration procedure specified in the CHART-MASTER Manual to configure the graphics package for your machine. The CM configuration program will display questions about your system and prompt you for the answers.

C. Operating Speeds

EWS operating speeds vary around standard operating speeds; the variations depend on the number of iterations required by the estimation procedures. The revision, updating, table preparation, and graphing procedures take varying amounts of time, depending on the skills of the operator. Data collection currently requires a number of days.

Data Collection:	3.0 days
Revision and updating:	.5 days
Automated EWS and table preparation:	.5 days
*Graph preparation:	1.5 days
*Monthly reporting editing and distribution (4 Services)	1.5 days

* These tasks overlap. Plan on a minimum of 1.5 days

Exhibit III.1 shows the checkpoints of the automated EWS. Note that the intervals between checkpoints are approximations.

EXHIBIT III.1
(page one)

C:\rats>ews

C:\rats>

C:\rats>REM This program produces the updates, estimations, and forecasts

C:\rats>REM PROGRAM ORIGINALLY DEVELOPED BY SIGURD W. HERMANSEN 2-3-85.

C:\rats>REM MODIFICATIONS BY HERMANSEN, PETER GREENSTON,

C:\rats>REM ROYAL WESTWATER AND BRIAN GOLDBERG.

C:\rats>REM LATEST REV. 8-16-85

C:\rats>CD \RATS

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 15:03:11.53

C:\RATS>RATS E_UPDATE.RCL,T_UPDATE.OUT

Stop - Program terminated.

C:\RATS>REM UNEMPLOYMENT, CONTRACT AND LEI UPDATE COMPLETE.

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 15:06:03.03

C:\RATS>RATS e_UNI_fc.rcl,T_un.out

Stop - Program terminated.

C:\RATS>REM UNEMPLOYMENT FORECASTS COMPLETE

C:\RATS>ASTCLOCK

A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85

Current time is 15:25:59.13

C:\RATS>RATS E_ERN_FC.RCL,T_ERN.out

Stop - Program terminated.

III-4

EXHIBIT III.1
(page two)

C:\RATS>REM CIVILIAN EARNINGS FORECASTS COMPLETE

C:\RATS>ASTCLOCK
A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 15:29:42.93

C:\RATS>RATS e_ews_ar.rcl,t_ar.out

C:\RATS>REM ARMY CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK
A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 15:54:14.32

C:\RATS>RATS e_ews_nv.rcl,t_nv.out

? Error: Device full error in file t_nv.out
Error Code 1008, Status 0008
PC = 1DE0: 0002; SS = 335E, FP = 2064, SP = 1DDC

C:\RATS>REM NAVY CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK
A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 15:57:29.84

C:\RATS>RATS e_ews_af.rcl,t_af.out

? Error: Device full error in file t_af.out
Error Code 1008, Status 0008
PC = 1DE0: 0002; SS = 335E, FP = 2064, SP = 1DDC

C:\RATS>REM AIR FORCE CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK
A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 16:00:24.09

C:\RATS>RATS e_ews_mc.rcl,t_mc.out

EXHIBIT III.1
(page three)

C:\RATS>REM MARINE CORPS CONTRACT FORECASTS COMPLETE

C:\RATS>ASTCLOCK
A S T c l o c k Version 1.10
(C)Copyright AST Research, Inc.,
1982, 1984.

Current date is 09/17/85
Current time is 16:03:18.88

C:\RATS>dir *.out

Volume in drive C is ERLXT1
Directory of C:\RATS

T_UN	OUT	42437	9-17-85	3:25p
UNEMP	OUT	7818	5-06-85	11:22a
NV	OUT	11051	9-04-85	12:11p
UPDATE	OUT	8827	5-06-85	11:19a
AR	OUT	10973	9-04-85	11:58a
T_UPDATE	OUT	13984	9-17-85	3:05p
T_AR	OUT	12288	9-17-85	3:53p
AF	OUT	11233	9-04-85	12:10p
REVISE	OUT	8179	5-06-85	11:16a
T_ERN	OUT	22032	9-17-85	3:29p
MC	OUT	11155	9-04-85	12:12p
T_NV	OUT	0	9-17-85	3:57p
T_AF	OUT	0	9-17-85	4:00p
GRAPH	OUT	1090	8-09-85	11:04a
T_MC	OUT	0	9-17-85	4:03p

15 File(s) 0 bytes free

C:\RATS>dir *.dif

Volume in drive C is ERLXT1
Directory of C:\RATS

E_ARA_CM	DIF	6450	9-17-85	3:54p
E_AR3_CM	DIF	6450	8-29-85	4:46p
E_NVA_CM	DIF	6450	8-29-85	5:03p
E_NV3_CM	DIF	6450	8-29-85	5:09p
E_AFA_CM	DIF	6450	8-29-85	5:28p
E_AF3_CM	DIF	6450	8-29-85	5:45p
E_MCA_CM	DIF	6450	8-29-85	6:07p
E_MC3_CM	DIF	6450	8-29-85	6:15p
TEMP	DIF	0	5-20-85	8:32a
E_XMA_CM	DIF	6311	7-31-85	6:41a
E_XM3_CM	DIF	6311	7-31-85	7:20a

11 File(s) 0 bytes free

C:\RATS>turbo

D. Random Access Memory and Disk Space Requirements

EWS system memory storage requirements depend on the requirements of the RATS system.

Random Access Memory : 640K
Disk : 2 MB fixed disk

These memory requirements are for free memory and storage space; multi-processing, multiuser, or prior allocations of disk space may interfere with RATS memory requests and disk operations.

The memory and disk space requirements given here leave ample room for the full EWS systems. For special circumstances, the memory and disk storage capacity requirements can be reduced by one half.

E. Other Requirements

EWS uses the programs included in the following operating and application systems.

- o IBM Personal Computer Disk Operating System: Version 2.X

For additional information, contact:

IBM Corporation
P.O. Box 1328-W
Boca Raton, FL 33432

OR

- o Microsoft Disk Operating System: Version 2.X

MD DOS is roughly equivalent to the IBM PC Disk Operating System. For additional information, contact:

Microsoft, Inc.
10700 Northup Way
Bellevue, WA 98004

o RATS

The Regression Analysis of Time Series package runs on the PC DOS or MS DOS operating system. For additional information, contact:

VAR Econometrics
134 Prospect Avenue, South
Minneapolis, MN 55419

o TURBO PASCAL: Version 2.X or 3.X

TURBO PASCAL serves two purposes: its text editing facility can be used to edit the REVISE and UPDATE programs, and it compiles the source code of PRINT routines used to prepare the tables for the EWS Monthly Report. For additional information, contact:

Borland International
4807 Scotts Valley Drive
Scotts Valley, CA 95066

o CHART-MASTER

CHART-MASTER provides a convenient environment for preparing and plotting presentation-quality graphics. For additional information, contact:

Decision Resources, Inc.
25 Sylvan Road South
Westport, CT 06880

LOG OF CHANGES

Changes to the system should be recorded by date. The records should include the purpose of the change, the system components affected, and the nature of the change.

SYSTEM CHANGES

DATE	ANALYST	PURPOSE	NATURE OF CHANGE

III-9

[illegible]

SYSTEM CHANGES			
DATE	ANALYST	PURPOSE	NATURE OF CHANGE

CHAPTER III

DATA TYPE DEFINITIONS

EWS uses several types of data. Some exist in RATS databases; the system generates other data in the EWS job stream.

A. Command Files and Execution Modules

Command files (.COM) and execution modules (.EXE) run on DOS. The application systems used in the EWS include these types of files. EWS also makes available PRINT.COM for table preparation.

B. Data Structures

Data structures combine data storage methods with the programs needed to access and modify the data.

1. Batch Files

Batch (.BAT) files contain DOS commands that operate on DOS files.

2. RATS Files

RATS Database (.RAT) files store data in binary form and can be copied using the "COPY <FILENAME> /B[CR]" form of the DOS copy command. Data can be added, deleted, modified or displayed in the RATS edit mode. Data can be supplied to the RATS process mode functions and procedures by reading it from the database.

To display data in the database under the edit mode, type:

```
"RATS [CR]"
"DEDIT RATS<DATABASE FILENAME> [CR]"
"CATALOG [CR]" (lists series in database)
"PRTDATA <SERIES NAMES FROM CATALOG LIST> [CR]"
"QUIT [CR]" (exits edit mode)
```

To display data in the database under the process mode, type:

```
"RATS [CR]"
"CALENDAR <YEAR><QTR|MONTH><FREQUENCY> [CR]"
"ALLOCATE 0 <INDEX> [CR]"
```

RATS DATABASE FILENAME :: = LEGAL DOS FILENAME
(We use .RAT as a
file type convention)

SERIES LIST :: = series identifiers separated by blanks

SERIES IDENTIFIERS :: = 8 character identifiers, beginning
with an alphabetic character and
containing no blanks, that are in
a RATS database catalog.

The term "SERIES" in the RATS system refers to a sequence of consecutive integers and a corresponding vector of real or complex numbers. RATS procedures operate on this data type and provide a data structure for the analyst. The integers serve as an index to the data vector.

RATS provides the CALENDAR and ALLOCATE procedures for setting up a base and a range for RATS' process mode work file. Each series that is created uses the base and an offset as the lower end of its range. RATS converts the date index format (<YEAR>,<NN>) to integer values, while the DATES option of the PRINT STATEMENT (written as

PRINT(DATES)...) converts the integer index to a date format.

DATE INDEX :: = (<YEAR>,<NN> or <YEAR>)

YEAR :: = YY or YYYY

NN :: = MM or Q

INDEX RANGE :: = Two integers separated by blank(s)
(non-date index) or two date indexes
separated by blanks (date index). In
either case, the date range must be
within 1) the overall range set by the
CALENDAR and ALLOCATE statements (or
ALLOCATE statement by itself), and 2) the
range specified in the database for the
series.

"OPEN(BINARY) DATA <RATS DATABASE FILENAME> [CR]"

"DATA(FORMAT = RATS) <INDEX RANGE><SERIES LIST> [CR]"

"PRINT(OPTIONS) <INDEX RANGE> <SERIES LIST> [CR]"

where

YEAR :: = 2 digit or 4 digit integers in CALENDAR
statement sets the lower range of the date
index.

QTR or

MONTH :: = 1 ... 12 in CALENDAR statement.

1 refers to annual data

2 refers to semi-annual data

4 refers to quarterly data

12 refers to monthly data

Frequency :: = 1 ... 12 in CALENDAR statement.

INDEX :: = Integer that sets upper range of indexes used in RATS procedures (non-date index used with ALLOCATE statement but without CALENDAR statement) or a date index used in the ALLOCATE statement to set upper range of date index (date index used with CALENDAR - ALLOCATE statements).

3. RCL Files

Files with the suffix ".RCL" store text of RATS programs in standard ASCII format. They can be copied and edited as any other ASCII files.

Comments appear as an asterisk at the beginning of a line, followed by text. Lines can be terminated by a "[CR][LF]" or a semi-colon. The RATS command "SOURCE<FILENAME> [CR]" includes a RATS program file named <FILENAME> in place of that command line in the original program file.

The DOS command "RATS <FILENAME> [CR]" begins executing the RATS system and then executes the .RCL program in the RATS environment. The DOS command, "RATS<FILENAME1>,<FILENAME2> [CR]", and executes <FILENAME1> as a RATS program and stores the program output in the DOS (ASCII) file <FILENAME2>.

You can use the TURBO Editor to construct and modify .RCL files. Also, you can edit the program output files. Samples of .RCL files appear in Appendix A.

4. CHART-MASTER Graph Files

CHART-MASTER stores plotting instructions and data in DOS (ASCII) files with special formats. See the CHART-MASTER Manual for details. These files can be constructed and edited either in the CHART-MASTER environment or the TURBO Editor environment. The former method is far less tedious and exacting.

5. Data Interchange Files

RATS creates output files in .DIF format. CHART-MASTER accepts .DIF files as input. The "E<SV><COHORT>_CM.DIF" files serve as intermediary data files.

The .DIF files appear as ASCII files in DOS and can be edited in the TURBO Editor environment. They can be copied as ordinary ASCII files.

APPENDIX A

PROGRAM STRUCTURES

APPENDIX A

PROGRAM STRUCTURES

EXHIBIT	FILENAME	PURPOSE	PAGE
A.1	EWS.BAT	Links the EWS programs in prescribed order.	A-1
	E_EWS_SV .RCL	Links EWS programs pertaining to a given Service.	
A.2	E_EWS_AR.RCL	Army	A-2
A.3	E_EWS_NV.RCL	Navy	A-3
A.4	E_EWS_AF.RCL	Air Force	A-4
A.5	E_EWS_MC.RCL	Marine Corps	A-5
A.6	E_GNDATA.RCL	Prepares data used in all contract estimation and forecasting Procedures.	A-6
	E_ SV DATA.RCL	Prepares data used by Services.	
A.7	E_ARDATA.RCL	Army	A-7
A.8	E_NVDATA.RCL	Navy	A-8
A.9	E_AFDATA.RCL	Air Force	A-10
A.10	E_MCDATA.RCL	Marine Corps	A-12
A.11	E_DATES.RCL	Sets up reference dates for monthly forecasts and reports.	A-13
A.12	E_MDATES.RCL	Contains reference dates.	A-17
A.13	EWS SYNTAX	EWS syntax in BNF notation.	A-18

EXHIBIT A.1

```
REM This program produces the updates, estimations, and forecasts.
REM PROGRAM ORIGINALLY DEVELOPED BY SIGURD W. HERMANSEN 2-3-85.
REM MODIFICATIONS BY HERMANSEN, PETER GREENSTON,
REM          ROYAL WESTWATER AND BRIAN GOLDBERG.
REM          LATEST REV. 8-16-85
CD \RATS
ASTCLOCK
RATS E_UPDATE.RCL,T_UPDATE.OUT
REM  UNEMPLOYMENT, CONTRACT AND LEI UPDATE COMPLETE.
ASTCLOCK
RATS e_UNI_fc.rcl,T_un.out
REM  UNEMPLOYMENT FORECASTS COMPLETE
ASTCLOCK
RATS E_ERN_FC.RCL,T_ERN.out
REM  CIVILIAN EARNINGS FORECASTS COMPLETE
ASTCLOCK
RATS e_ews_ar.rcl,t_ar.out
REM  ARMY CONTRACT FORECASTS COMPLETE
ASTCLOCK
RATS e_ews_nv.rcl,t_nv.out
REM  NAVY CONTRACT FORECASTS COMPLETE
ASTCLOCK
RATS e_ews_af.rcl,t_af.out
REM  AIR FORCE CONTRACT FORECASTS COMPLETE
ASTCLOCK
RATS e_ews_mc.rcl,t_mc.out
REM  MARINE CORPS CONTRACT FORECASTS COMPLETE
ASTCLOCK
dir *.out
dir *.dif
```

EXHIBIT A.2

```
SUPPRESS ECHO
BMA express 60 LOCAL 200 global 500 data 200 compiler 1000 operands 50
*
*>>>>>>>>THIS PROGRAM LINKS THE RECRUITMENT EWS PROCEDURES <<<<<<<<<<<<
*
*>>>>>>>>    INITIALIZE RATS'CALENDAR AND SET DATES    <<<<<<<<<<<<
*
SOURCE E_DATES.RCL
*
* Revisions to default reference dates, NONE.
*
* SET DEFAULT VALUES FOR FIRST OBSERVATION ON FORECASTED VARIABLE
* USED IN ESTIMATION AND EARLIEST DATE OF DATA USED
*
dedit c:e_ews_db.rat
*
OPEN(BINARY) DATA C:E_EWS_DB.RAT
*
SOURCE C:E_GNDATA.RCL ; * READ IN VARIABLE VALUES USED
*                      IN ALL COHORT FORECASTING PROCEDURES.
*
* *****
*
SOURCE C:E_RDEDAT.RCL ; * READS IN PROCEDURE CODE FOR COMPILATION.
*
SOURCE C:E_ARDATA.RCL ; * READS IN ARMY DATA.
*SOURCE C:E_NVDATA.RCL ; * READS IN NAVY DATA.
*SOURCE C:E_AFDATA.RCL ; * READS IN AF DATA.
*SOURCE C:E_MCDATA.RCL ; * READS IN MC DATA.
*
SOURCE C:P_1EQ_FC.RCL
SOURCE C:P_XFCADJ.RCL
SOURCE C:P2XFCADJ.RCL
SOURCE C:E_ACCUM.RCL
*
SOURCE C:E_ARA_FC.RCL
OPEN COPY C:E_ARA_CM.DIF
SOURCE C:E_ARA_PT.RCL
*
SOURCE C:E_AR3_FC.RCL
OPEN COPY C:E_AR3_CM.DIF
SOURCE C:E_AR3_PT.RCL
*
SOURCE C:E_ARB_FC.RCL
OPEN COPY C:E_AR3_CM.DIF
SOURCE C:E_ARB_PT.RCL
*
end
```

EXHIBIT A.3

SUPPRESS ECHO

BMA DATA 200 LOCAL 200 GLOBAL 1000 COMPILER 1000

*>>>>>>>THIS PROGRAM LINKS THE RECRUITMENT EWS PROCEDURES <<<<<<<<<<

```
*>>>>>>>>      INITIALIZE RATS'CALENDAR AND SET DATES      <<<<<<<<<<<<
```

```
source e_dates.rcl
```

```
OPEN(BINARY) DATA C:E_EWS_DB.RAT
```

```
SOURCE C:E_GNDATA.RCL ; * READ IN VARIABLE VALUES USED
*                       IN ALL COHORT FORECASTING PROCEDURES.
```

SOURCE C:E_RDEDAT.RCL ; * READS IN PROCEDURE CODE FOR COMPILATION.

```
*SOURCE C:E_ARDATA.RCL ; * READS IN ARMY DATA.
SOURCE C:E_NVDATA.RCL ; * READS IN NAVY DATA.
*SOURCE C:E_AFDATA.RCL ; * READS IN AF DATA.
*SOURCE C:E_MCDATA.RCL ; * READS IN MC DATA.
```

```
SOURCE C:P_1EQ_FC.RCL
SOURCE C:P_XFCADJ.RCL
SOURCE C:P2XFCADJ.RCL
SOURCE C:E_ACCUM.RCL
```

SOURCE C:E_NVA_FC.RCL
OPEN COPY C:E_NVA_CM.DIF
SOURCE C:E_NVA_PT.RCL

SOURCE C:E_NV3_FC.RCL
OPEN COPY C:E_NV3_CM.DIF
SOURCE C:E_NV3_PT.RCL

SOURCE C:E_NV8_FC.RCL
OPEN COPY C:E_NV8_CM.DIF
SOURCE C:E_NV8_PT.RCL

EXHIBIT A.4

[illegible]

EXHIBIT A.5

```
SUPPRESS ECHO
*
BMA DATA 200 LOCAL 500 GLOBAL 500 COMPILER 1000
*
*>>>>>>>>THIS PROGRAM LINKS THE RECRUITMENT EWS PROCEDURES <<<<<<<<<<<<
*
*>>>>>>>>  INITIALIZE RATS'CALENDAR AND SET DATES      <<<<<<<<<<<<
*
source c:e_dates.rcl
*
OPEN(BINARY) DATA C:E_EWS_DB.RAT
*
*
SOURCE C:E_GNDATA.RCL ; * READ IN VARIABLE VALUES USED
                        IN ALL COHORT FORECASTING PROCEDURES.
*
* *****
*
SOURCE C:E_RDEDAT.RCL ; * READS IN PROCEDURE CODE FOR COMPILATION.
*
*SOURCE C:E_ARDATA.RCL ; * READS IN ARMY DATA.
*SOURCE C:E_NVDATA.RCL ; * READS IN NAVY DATA.
*SOURCE C:E_AFDATA.RCL ; * READS IN AF DATA.
SOURCE C:E_MCDATA.RCL ; * READS IN MC DATA.
*
SOURCE C:P_1EQ_FC.RCL
SOURCE C:P_XFCADJ.RCL
SOURCE C:P2XFCADJ.RCL
SOURCE C:E_ACCUM.RCL
*
*
SOURCE C:E_MCA_FC.RCL
OPEN COPY C:E_MCA_CM.DIF
SOURCE C:E_MCA_PT.RCL
*
SOURCE C:E_MC3_FC.RCL
OPEN COPY C:E_MC3_CM.DIF
SOURCE C:E_MC3_PT.RCL
*
SOURCE C:E_MCB_FC.RCL
OPEN COPY C:E_MC3_CM.DIF
SOURCE C:E_MCB_PT.RCL
```

EXHIBIT A.6

[illegible]

EXHIBIT A.7

[illegible]

EXHIBIT A.8
(page one)

```
* Revisions of default reference dates, NONE.
```

```
*  
*>> THIS PROCEDURE CALL READS IN HSDG AND SENIOR NAVY COHORT VARIABLE VALUES.  
EXECUTE RDSVDAT NAVYD13A NAVYD3B NAVYS13A NAVYS3B $  
NAVDS13A NAVDS3B NAVDS13 $  
DFIRST DFIRST D1STAPP  
  
*  
*>>>>>>> SET UP DUMMY VARIABLES <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  
*  
clear rmsam  
units rmsam dbegin 83,9  
zeros rmsam 83,10 dlastfc  
*  
CLEAR NFAT83  
SET NFAT83 DBEGIN 83,5 = 0  
SET NFAT83 83,6 DLASTFC = T.LE.(83,9)  
*  
CLEAR PARITY  
SET PARITY DBEGIN 79,7 = T.GE.(78,11)  
SET PARITY 79,8 DLASTFC = 0  
*  
CLEAR UMG  
SET UMG DBEGIN 81,10 = 60  
SET UMG 81,11 82,9 = 62  
SET UMG 82,10 83,9 = 63  
SET UMG 83,10 84,2 = 64  
SET UMG 84,3 DLASTFC = 65
```

EXHIBIT A.8

(page two)

* >>>>>SET UP NAVY POLICY VARIABLES <<<<<<<<<<<<<<<<<<

clear accng nnamnco nrect tadnco

DATA(FORMAT=RATS) DBEGIN 81.9 ACCNG

DATA(FORMAT=RATS) DBEGIN DLASTFC NRECT

DATA (FORMAT=RATS) 84.10 DLASTFC TADNCO

```
clear nmrvql
```

```
data(format=rats) 79.1 dlastfc nmrvsq1
```

CLEAR NMGL

```
SET NMGL DBEGIN 81.9 = ACCNG(T)
```

SET NMGL 81.10 84.9 = NNAMNCO(T)

SET NMGL 84.10 DLASTFC = TADNCO(T) * .842

CLEAR NMGL13A

```
SET NMGL13A 79.10 81.9 = .60 * NMGL(T)
```

SET NMGL13A 81.10 82.9 = .62 * NMGL(T)

SET NMGL13A 82.10 83.9 = .63 * NMGL(T)

```
SET NMGL13A 83,10 84,2 = .64 * NMGL(T)
```

```
SET NMGL13A 84.3 DLASTFC = .65 * NMGL(T)
```

CLEAR NMGL13

SET NMGL13 79.10 81.9 = .87 * NMGL(T)

```
SET NMGL13 81.10 82.9 = .88 * NMGL(T)
```

```
SET NMGL13 82.10 83.9 = .88 * NMGL(T)
```

```
SET NMGL13 83,10 84,2 = .89 * NMGL(T)
```

```
SET NMGL13 84.3 DLASTFC = .88 * NMGL(T)
```

clear wtql

```
set wtq1 79.1 dlastfc = nmql(t)/(nmql(t) + nmrsval(t))
```

DOFOR I = ACCNG NRECT NMGL NMGL13A NMGL13 nmrsval wtal

LOG I

END DO I

CLEAR LNGPR LNGPR13A LNGPR13

```
SET LNGPR DBEGIN DLASTFC = NMGL(T) - NRECT(T)
```

SET LNGPR13A 79.10 DLASTEC = NMGL13A(T) - NRECT(T)

```
SET LINGPR13 79.10 PLASTEC = NMGL13(T) - NRECT(T)
```

clear inrqr wtnrect

```
set lnrgpr 79.1 dlastfc = nmrsval(t) - nrect(t)
```

```
set wtirect 79.1 dlastfc = nrect(t) + wtq1(t)
```

*>>>>>>>>>>END OF NAVY DATA INPUT PROCEDURE >>>>>>>

*>>>>>>> NAVY DATA ARE READY FOR MODEL ESTIMATION >>

EXHIBIT A.9
(page one)

[illegible]

EXHIBIT A.9
(page two)

[illegible]

EXHIBIT A.10

[illegible]

EXHIBIT A.11
(page one)

```

* e_dates.rcl      8-16-85
*
declare vector dates(10)
*
open data c:e_mdates.rcl
input(unit=data) dates
*
level Dyr = fix(dates(1))
level Dmonth = fix(dates(2))
level Freq = fix(dates(3))
calendar dyr dmonth freq
*
* This section sets up default reference dates.
*
level DLASTFC = cal(fix(dates(4)),fix(dates(5))) ; * date of last forecast.
allocate 0 dlastfc+12
write dlastfc
*
level FYYR = fix(dates(6))
level FYMO = fix(dates(7))
level D1STHIST = cal(fyyr,fymo) ; * Date of 1st values in tables.
level DLSTHIST = dlastfc - 12 ; * Date of last actual observation.
level DFIRSTFC = dlastfc - 11 ; * Date of first forecast in estimation.
*
* (If it differs from that used in tables.)
*
level D1STFC = dlastfc - 11 ; * Date of first forecast shown in tables
level DLAST = dlastfc -12 ; * Default value of last observation used
in estimations.
*
level NMONTHS = dlastfc - dlast ; * Default value of number of months
to be forecasted.
*
level DFIRST = (78,11) ; * First observation used in estimations.
level DBEGIN = (77,8) ; * First source observations used.
level DEND = dlastfc + 12 ; * End of calander.
level D1STAPP = (79,10) ; * Earliest observation on applicant data
*
* evaluates year and month variables for use in PT programs' label vectors
source c:e_fixdat.rcl
*
* evaluates the label vectors for use in the PT programs'
source c:e_tables.rcl

```

EXHIBIT A.11
(page two)

```
*   CREATED 7-22-85                               *   UPDATED 8-18-85
*   E_TABLES.RCL                                SOURCED BY: E_DATES.RCL
*   CREATES TABLES THAT REPRESENT MONTHS .. YEARS OF THE FORECAST PERIOD
*
DECLARE LVECTOR COMMSTR(10) YEAR(95) MONTH(12) WORDSTR(10) HEADSTR
*
EVAL YEAR(82) = '82'
EVAL YEAR(83) = '83'
EVAL YEAR(84) = '84'
EVAL YEAR(85) = '85'
EVAL YEAR(86) = '86'
EVAL YEAR(87) = '87'
EVAL YEAR(88) = '88'
EVAL YEAR(89) = '89'
EVAL YEAR(90) = '90'
EVAL YEAR(91) = '91'
EVAL YEAR(92) = '92'
EVAL YEAR(93) = '93'
EVAL YEAR(94) = '94'
EVAL YEAR(95) = '95'
*
EVAL MONTH(1) = 'JAN'
EVAL MONTH(2) = 'FEB'
EVAL MONTH(3) = 'MAR'
EVAL MONTH(4) = 'APR'
EVAL MONTH(5) = 'MAY'
EVAL MONTH(6) = 'JUN'
EVAL MONTH(7) = 'JUL'
EVAL MONTH(8) = 'AUG'
EVAL MONTH(9) = 'SEP'
EVAL MONTH(10) = 'OCT'
EVAL MONTH(11) = 'NOV'
EVAL MONTH(12) = 'DEC'
*
EVAL WORDSTR(1) = ' '
EVAL WORDSTR(2) = 'FY'
EVAL WORDSTR(3) = '-'
EVAL WORDSTR(4) = '(A)'
EVAL WORDSTR(5) = '(A,F)'
EVAL WORDSTR(6) = '(AVG)'
EVAL WORDSTR(7) = '(F)'
*EVAL WORDSTR(8) = '.'
*EVAL WORDSTR(9) = '.'
*EVAL WORDSTR(10) = '.'
```

EXHIBIT A.11
(page three)

```
*
EVAL COMMSTR(1) = '.HEADS'
EVAL COMMSTR(2) = '.DATAS'
EVAL COMMSTR(3) = '.WSKIP'
EVAL COMMSTR(4) = '.SPAGE'
EVAL COMMSTR(5) = '.INDNT'
EVAL COMMSTR(6) = '.SPAGE'
*EVAL COMMSTR(7) = '.'
*EVAL COMMSTR(8) = '.'
EVAL COMMSTR(9) = '.START'
EVAL COMMSTR(10) = '.CMEND'
*
EVAL HEADSTR(1) = 'YR MO '
EVAL HEADSTR(2) = 'UPPER_90'
EVAL HEADSTR(3) = 'LOWER_90'
EVAL HEADSTR(4) = 'MALE'
EVAL HEADSTR(5) = 'GOALS'
EVAL HEADSTR(6) = 'MEAN'
*EVAL HEADSTR(7) = '7'
*EVAL HEADSTR(8) = '8'
*EVAL HEADSTR(9) = '9'
*EVAL HEADSTR(10) = '10'
*
* THESE LABEL VECTORS WERE DESIGNED TO ASSIST IN THE PRINTING OF THE
* 'FISCAL-YEAR' AND 'TOTALS FOR PRIOR TWELVE MONTH INTERVALS' TABLES
* CREATED IN THE RESPECTIVE PT PROGRAMS.
* THE RECOMMENDED FORMAT SYNTAX FOR FISCAL YEAR'S IS:
* WRITE(NOSKIP,FORMAT='(2HFY,G2)') <LABEL>
* THE RECOMMENDED FORMAT SYNTAX FOR TEWELVE MONTH INTERVALS IS:
* WRITE(NOSKIP,FORMAT='(a3,a2,1H-,a3,a2)') <LABEL> <LABEL> <LABEL> <LABEL>
*
* THE YEAR LABEL VECTOR MUST BE UPDATED BEGINNING IN 1996.
* PROGRAM IS TO RUN CONCURRENTLY WITH E_FIXDAT.RCL
```

EXHIBIT A.11
(page four)

• E_FIXDAT.RCL 8-16-85
•
• SOURCED BY: E_DATES.RCL
•
• READS IN LAST FORECAST YEAR AND MONTH AND CONVERTS THE REALS
• NUMBERS TO INTEGERS FOR USE IN THE PT PROGRAMS -- FISCAL YEAR
• AND TOTALS FOR PROIR YEARS TABLES
•
•
IEVAL YR = FIX(DATES(4))
IEVAL MO = FIX(DATES(5))
•
• EVALUATES FISCAL MONTH VARIABLES
•
BEGIN
IF MO .EQ. 12
IEVAL FMONTH = 1
ELSE
IEVAL FMONTH = MO + 1
END
•
IEVAL LMONTH = MO
•
WRITE(NOSKIP) FMONTH LMONTH
•
• EVALUATES FISCAL YEAR VARIABLES
•
IEVAL FY1 = YR - 3
IEVAL FY2 = YR - 2
IEVAL FY3 = YR - 1
•
WRITE(NOSKIP) FY1
WRITE(NOSKIP) FY2
WRITE(NOSKIP) FY3
•
• EVALUATES PRIOR TWELVE-MONTH TOTALS
•
IEVAL TPYR1B = YR - 3
IEVAL TPYR1E = YR - 2
IEVAL TPYR2B = YR - 2
IEVAL TPYR2E = YR - 1
IEVAL TPYR3B = YR - 1
IEVAL TPYR3E = YR
•
WRITE(NOSKIP) TPYR1B TPYR1E
WRITE(NOSKIP) TPYR2B TPYR2E
WRITE(NOSKIP) TPYR3B TPYR3E
•

EXHIBIT A.12

69	1	12	86	6	82	10	0	86	3
B	B	F	D	D	F	F		D	D
A	A	R	L	L	I	I		L	L
S	S	E	A	A	R	R		A	A
E	E	D	S	S		S	S		
Y	M		T	T	T		T	T	
R	O		F	F	F		F	F	
			C	C	Y		C	C	
			Y	M	Y		Q	Q	
			R	O	R		Y	T	
							R	R	

EXHIBIT A.13

EWS PROGRAM SYNTAX

EWS ::= <<REVISE UPDATE> | <UPDATE>> <FC>

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GNFC ::= <UNFC> | <ERNFC> | <<UNFC> <ERNFC>>
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<NVA_FC> | <NV3_FC> |
<AFA_FC> | <AF3_FC> |
<MCA_FC> | <MC3_FC>
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<MCA_FCPT> | <MC3_FCPT>

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<<NVA_FC> <NV3_FC> <NVB_FC>> |
<<AFA_FC> <AF3_FC> <AFB_FC>> |
<<MCA_FC> <MC3_FC> <MCB_FC>>

SVAB_FCPT ::= <ARAB_FCPT> | <NVAB_FCPT> | <AFAB_FCPT> | <MCAB_FCPT>
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<<MC3_FC> | <MC3_FCPT>>
<<MCB_FC> | <MCB_FCPT>>>

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AFA_FCPT ::= <<AFA_FC> <AFA_PT>>
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MCA_FCPT ::= <<MCA_FC> <MCA_PT>>
MC3_FCPT ::= <<MC3_FC> <MC3_PT>>

APPENDIX B

SAMPLE EMS REPORT

THE RECRUITMENT EWS
RECRUITING MARKET ASSESSMENT REPORT

(sample report for one Service)

The sample report which follows is for the Navy. It is representative of the other Services' reports; all reports contain the same categories of information formatted as they appear in this sample. However, the regression models vary somewhat from Service to Service, resulting in differing variable descriptions or comments on the models. At times additional data may be made available by a Service, enabling additional analysis. For example, the Marine Corps has provided its own contract data, and this has been used to estimate alternative models to those using DMDC contract data. These alternative models are presented in an appendix to the Marine Corps' monthly report.

MAKEUP OF THE
"RECRUITING MARKET ASSESSMENT REPORT"

For the last several months of the project, an EWS report has been produced monthly by the system, assembled and packaged, and distributed to individuals throughout the OSD and the Services. The distributed report consists of 1) the presentation-quality tables and graphs produced by the automated EWS, and 2) descriptive materials, which, in our judgement, enhance the readers' interpretation of the EWS output. Below are listed each of the items you will find in the sample report presented in this exhibit. They are categorized as to origin.

OUTPUT PRODUCED BY THE AUTOMATED EWS	EWS DATA REFORMATTED BY WORD PROCESSOR	EXPLANATORY MATERIAL PRODUCED BY WORD PROCESSOR
- o Contract-to-Goal Ratio Graphs - 1-3A, 1-3 - o Net Goals vs Net Contracts Graphs - 1-3A, 1-3 - o Forecasts of Enlist- ment Contracts Graphs - 1-3A, 1-3 - o Recruiting Outlook Tables Page One - Historical Data and 12 Month Forecasts Page Two - Totals for Fiscal Year and 12 Month Intervals - 1-3A, 1-3 - o Regression Model Tables - 1-3A, 3B	- o EWS Forecasts of Civilian Unem- ployment (Table) - o Forecasts of unem. EWS Compared with Outside Sources (Table) - o Quarterly Trends in unem. Forecasts (Table)	- o New Features Page - o Definition of Terms - o Comments on Models - o Common Variable Definitions - o Service Variable Definitions - o Appendices

RECRUITMENT EARLY WARNING SYSTEM
RECRUITING MARKET ASSESSMENT REPORT

Navy

July 1985

Economic Research Laboratory, Inc.
1914 Association Drive
Reston, Virginia 22091

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NEW FEATURES IN JULY
FOR
THE NAVY EWS RECRUITING MARKET ASSESSMENT REPORT

- o As a complement to the Composite Leading Indicator (CLI) forecaster of unemployment, we have estimated an Individual Leading Indicator (ILI) forecaster (described in the Appendix). This month the ILI has been utilized to generate the unemployment forecasts.
- o During the forecast period (8506-8605):
 - a three percent military pay raise is assumed January 1, 1986;
 - special provision for the effects of the new GI Bill have not been incorporated as yet.

NAVY RECRUITING MARKET ASSESSMENT

DEFINITION OF TERMS

Gross Contracts: This term indicates the number enlisting as direct ships or signing DEP contracts during the month. Source: DMDC. Subsequent cancellation is reflected in the net contract measure.

Net Contracts: The conversion factor used to reduce Navy 1-3 and 1-3A NPS male gross contracts to net contracts is 86.4%. This factor was derived from the ratio of FY 1983 net contracts to gross contracts for the combined male HSDG and HSSR cohorts. It reflects failure to graduate as well as DEP attrition.

Net Goals:

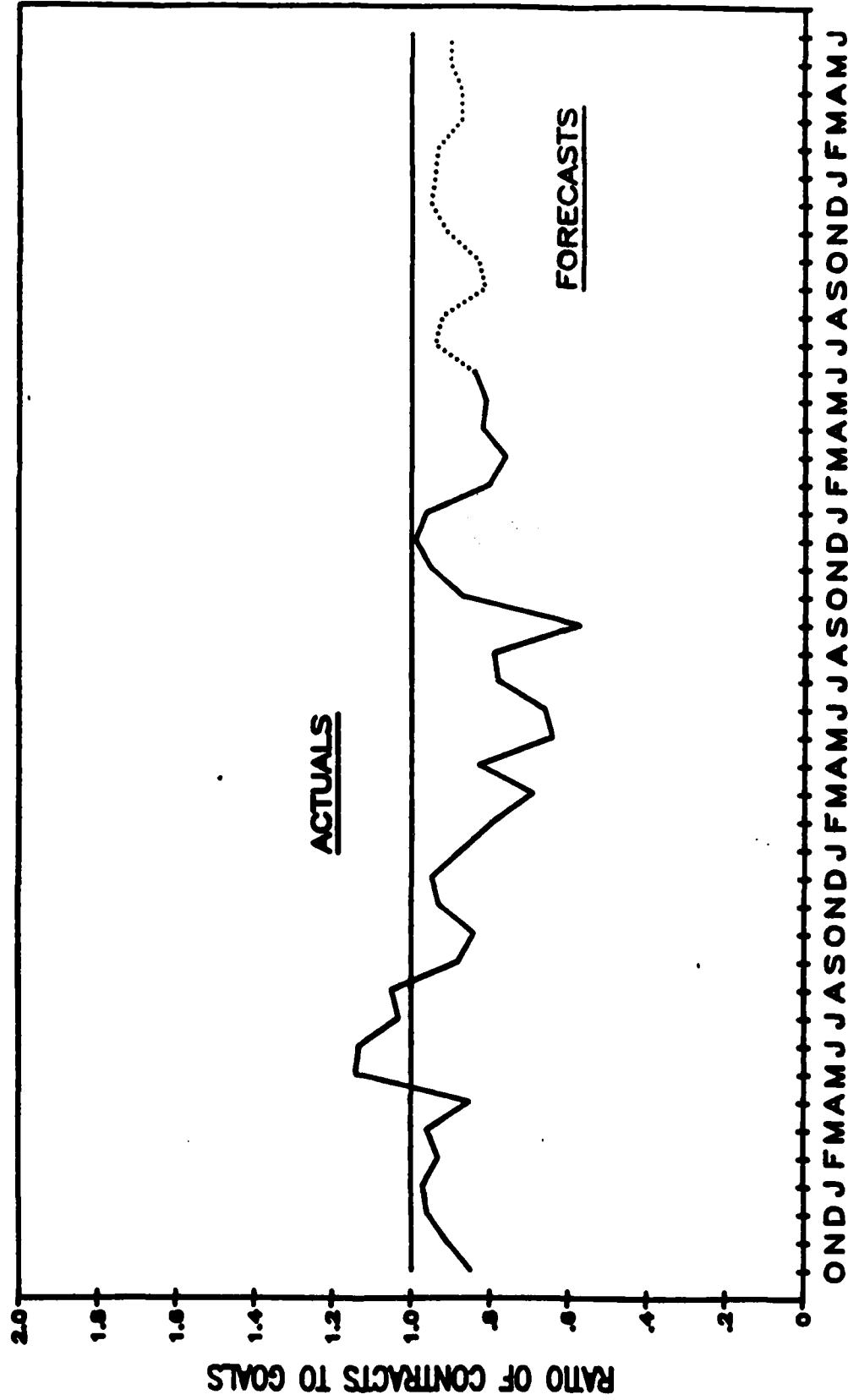
- o For FY 85 and FY 86, net goals refers to the "A-cell" (i.e., 1-3A HSDG's) target that is 50 percent of male new contract objectives (MNCO), and the target for 1-3 HSDG's which is 73 percent.
- o For FY 83 and FY 84, the "A-cell" target is 67 percent of MNCO, and the target for 1-3 HSDG is 84 percent.

Recruiters: In this study, the term recruiters refers to Navy production plus fixed overhead recruiters. Source: NRC.

SECTION A:

NAVY ENLISTMENT FORECASTS

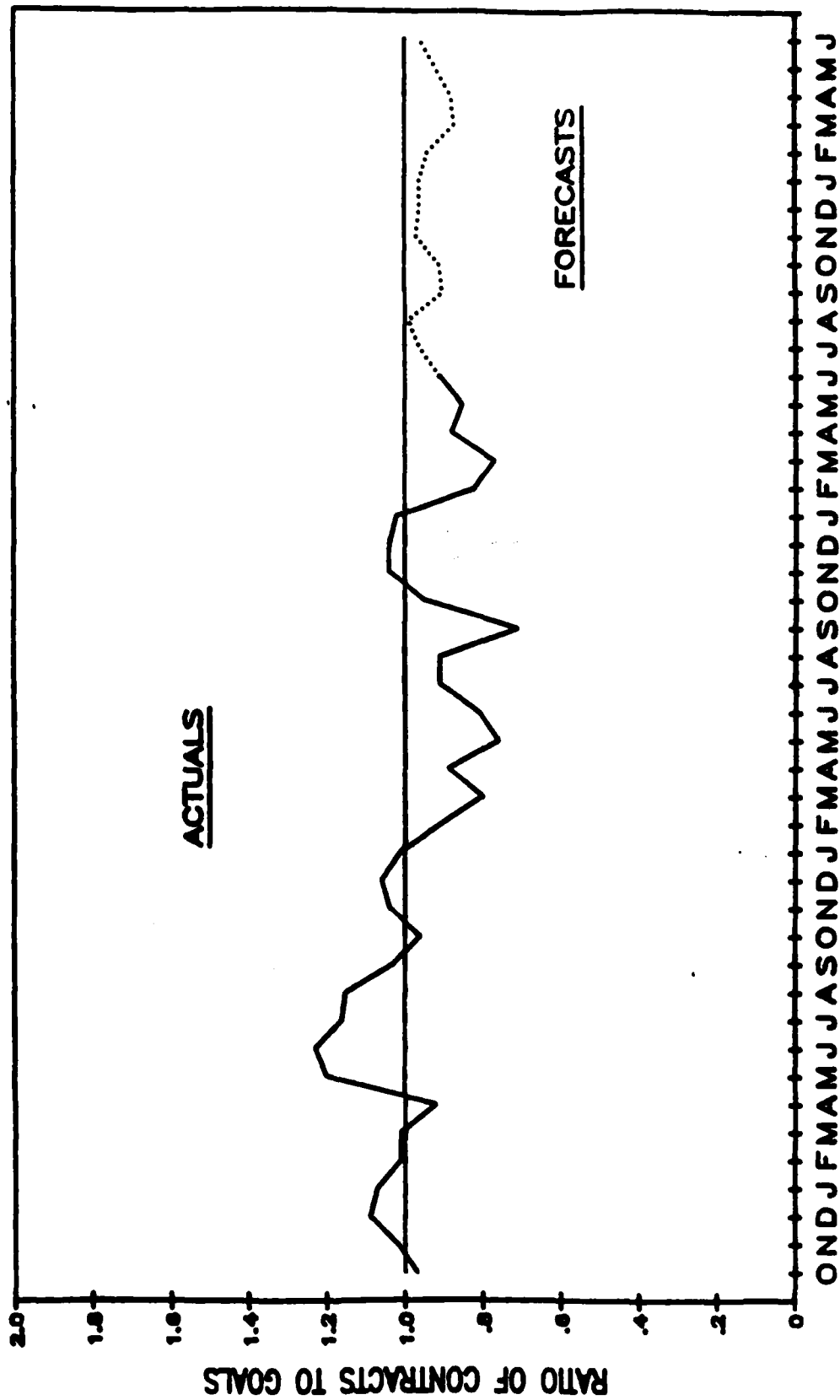
NAVY CONTRACT-TO-GOAL RATIO NPS MALES 1-3A HSDG CONTRACTS



FY1983
FY1984

FY1985

NAVY CONTRACT-TO-GOAL RATIO
NPS MALES 1-3 HSDG CONTRACTS



**MONTH
FY1984**

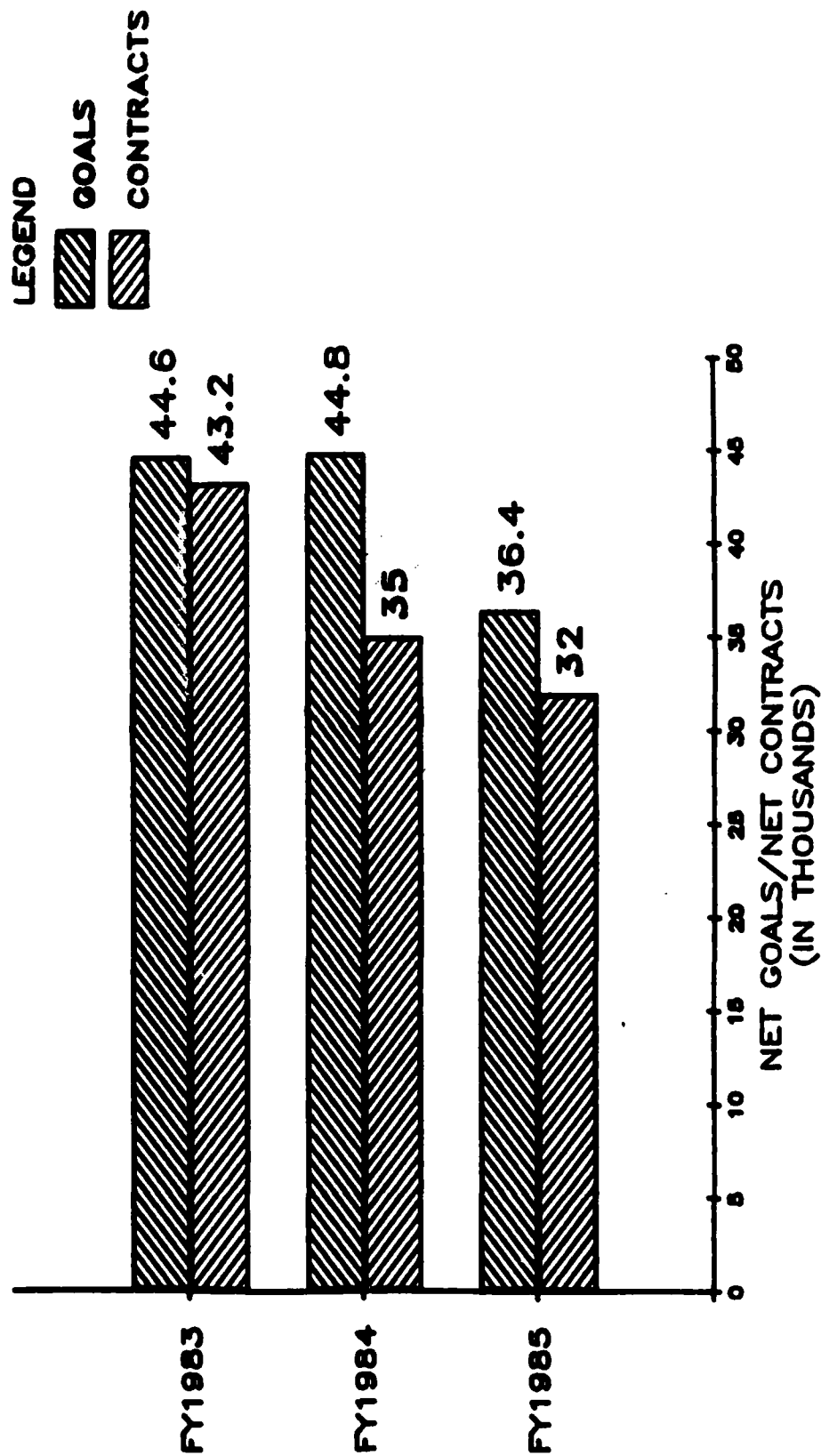
FY1983

FY1985

NAVY NET GOALS VS NET CONTRACTS

NPS MALE 1-3A HSDG'S

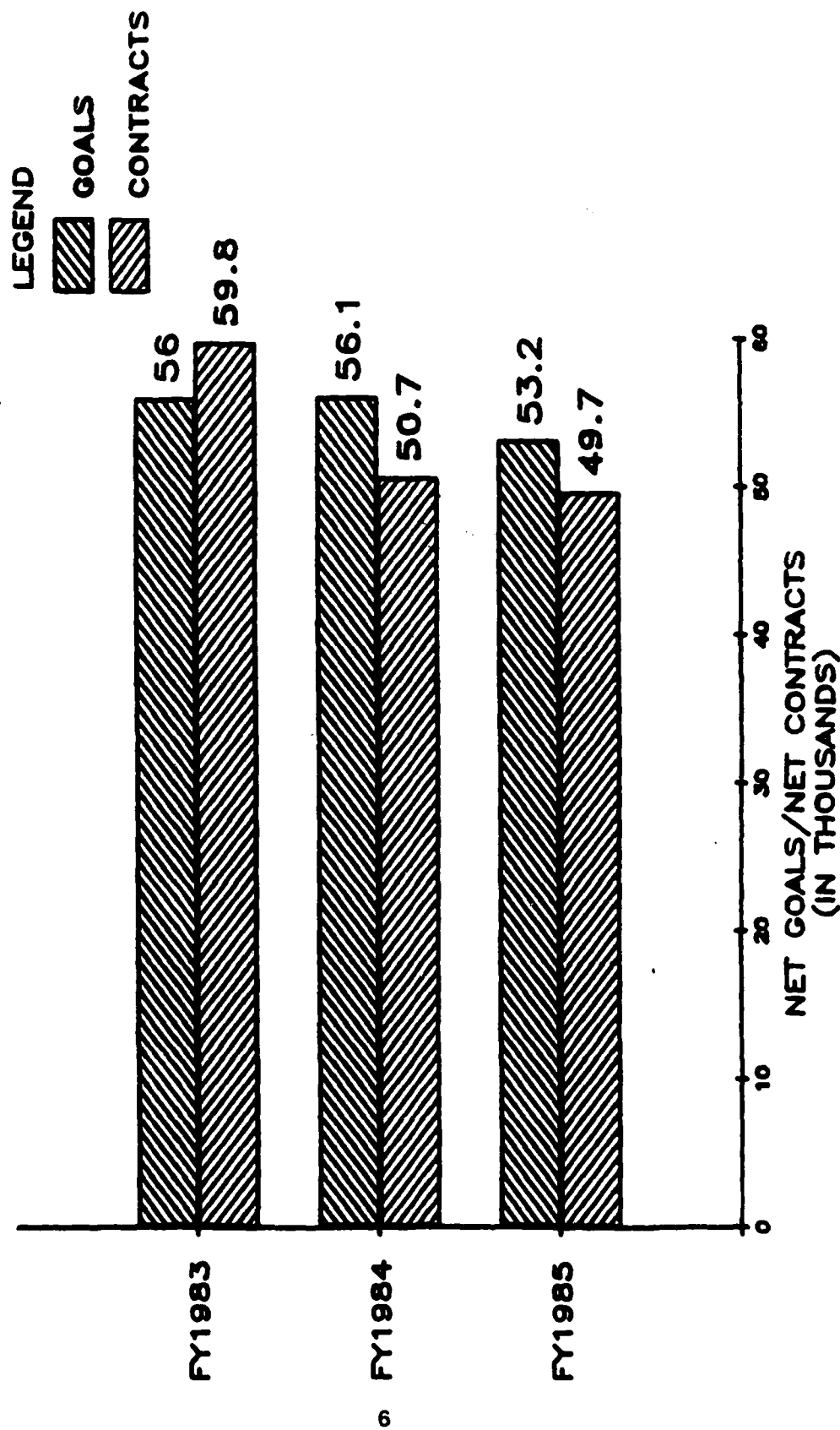
FY1983-FY1985



NAVY NET GOALS VS NET CONTRACTS

NPS MALE 1-3 HSDG's

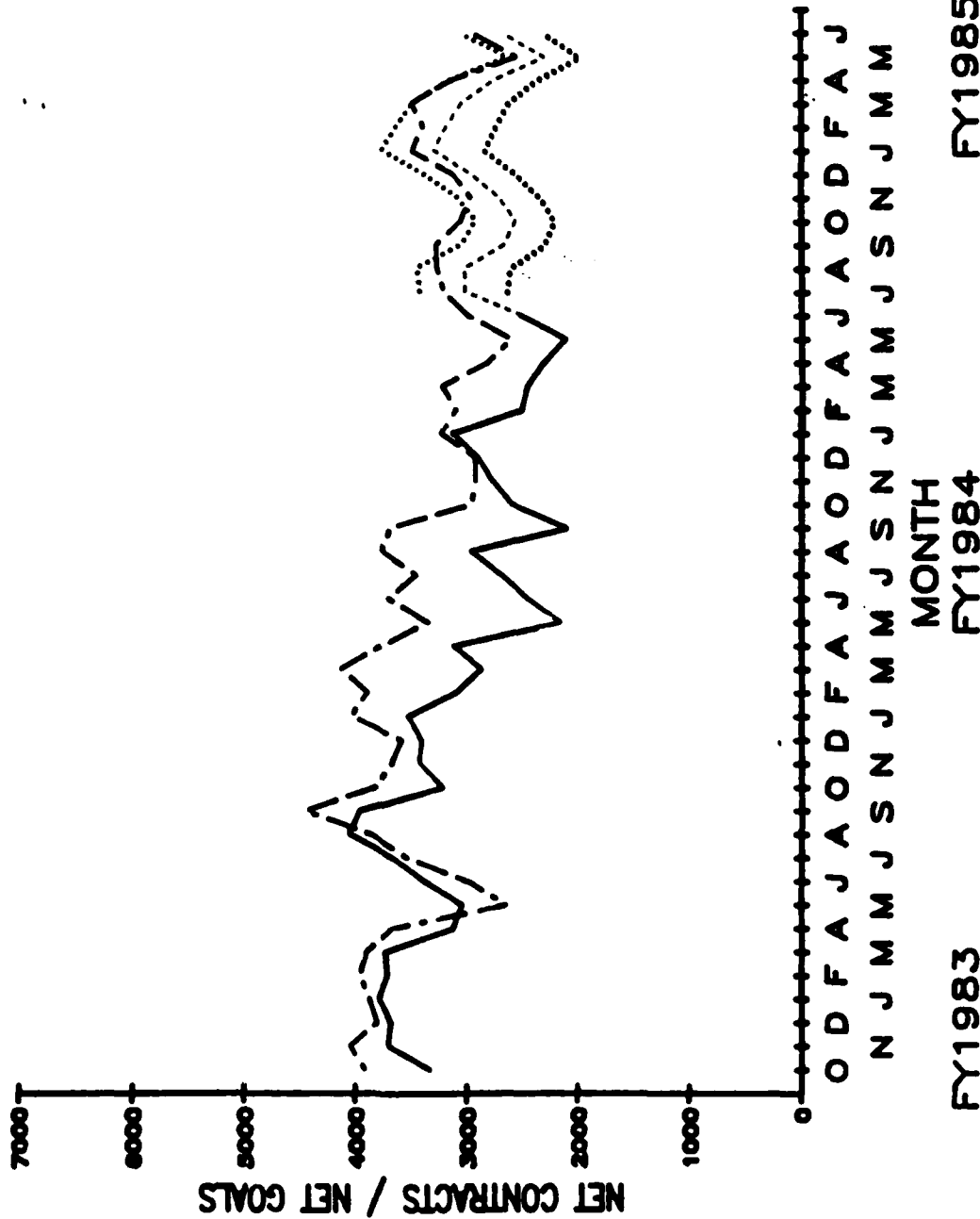
FY1983-FY1985



FORECASTS OF NAVY ENLISTMENT CONTRACTS NPS 1-3A MALE HSDG's

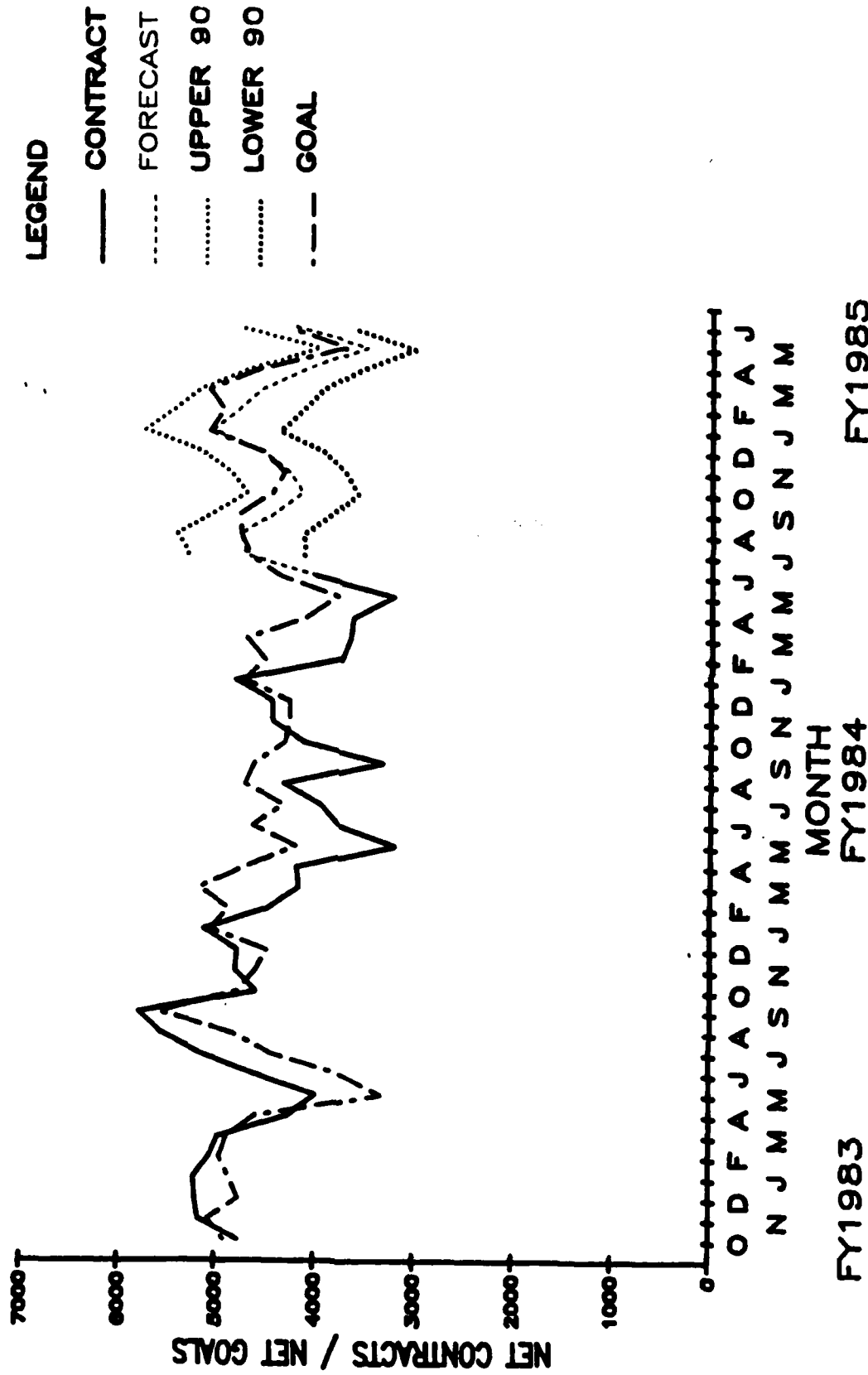
LEGEND

- CONTRACT
- - - - FORECAST
- UPPER 90
- LOWER 90
- ..-- GOAL



FORECASTS BEGIN JULY 1985

FORECASTS OF NAVY ENLISTMENT CONTRACTS NPS 1-3 MALE HSDG'S



NAVY RECRUITING OUTLOOK
NPS MALE 1-3A HSDG AND HSSR CONTRACTS

YR	MO	GROSS CONTRACTS	NET CONTRACTS	MALE NCO	1-3A MALE NCO	CONTRACTS AS PCT OF GOALS	RECRUITERS
82	10	3868	3342	5851	3920	85%	3364
82	11	4300	3715	6048	4052	91%	3404
82	12	4260	3681	5671	3800	96%	3407
83	1	4385	3789	5787	3877	97%	3441
83	2	4293	3709	5905	3956	93%	3427
83	3	4327	3739	5811	3893	96%	3485
83	4	3613	3122	5465	3662	85%	3497
83	5	3516	3038	3953	2649	114%	3484
83	6	3921	3388	4457	2986	113%	3467
83	7	4252	3674	5276	3535	103%	3419
83	8	4697	4058	5762	3861	105%	3408
83	9	4579	3956	6649	4455	88%	3396
83	10	3720	3214	5698	3818	84%	3331
83	11	3972	3432	5477	3670	93%	3283
83	12	3940	3404	5340	3578	95%	3224
84	1	4082	3527	6015	4030	87%	3158
84	2	3584	3097	5797	3884	79%	3067
84	3	3324	2872	6159	4127	69%	3020
84	4	3617	3125	5597	3750	83%	2997
84	5	2491	2152	4995	3347	64%	2999
84	6	2844	2457	5516	3696	66%	3050
84	7	3118	2694	5144	3446	78%	3100
84	8	3440	2972	5610	3759	79%	3140
84	9	2426	2096	5486	3676	57%	3200
84	10	3002	2594	5900	2950	87%	3197
84	11	3209	2773	5834	2917	95%	3234
84	12	3364	2906	5832	2916	99%	3265
85	1	3619	3127	6448	3224	96%	3289
85	2	2898	2504	6191	3096	80%	3251
85	3	2838	2452	6439	3219	76%	3225
85	4	2667	2304	5616	2808	82%	3262
85	5	2434	2103	5182	2591	81%	3251
85	6	2906	2511	5972	2986	84%	3242

-TWELVE MONTH FORECAST PERIOD-

YR	MO	GROSS FORECASTS	-FORECASTS OF NET CONTRACTS-			MALE NCO	1-3A MALE NCO	CONTRACTS AS PCT OF GOALS	RECRUITERS
			MEAN	UPPER_90	LOWER_90				
85	7	3496	3020	3414	2627	6409	3205	94%	3305
85	8	3497	3022	3441	2603	6530	3265	92%	3369
85	9	3083	2663	3036	2291	6545	3272	81%	3433
85	10	2960	2557	2915	2200	6094	3047	83%	3496
85	11	3130	2704	3082	2326	5921	2960	91%	3530
85	12	3427	2961	3375	2546	6232	3116	95%	3520
86	1	3810	3292	3753	2831	6969	3485	94%	3520
86	2	3678	3178	3622	2733	6763	3381	93%	3520
86	3	3521	3042	3468	2617	6974	3487	87%	3520
86	4	3177	2745	3129	2361	6259	3130	87%	3520
86	5	2653	2292	2622	1963	5084	2542	90%	3520
86	6	3089	2669	3054	2284	5876	2938	90%	3520
		-----	-----	-----	-----	-----	-----	---	----
		39520	34146	38911	29382	75658	37829	90%	3481

(AVG)

FISCAL YEAR TOTALS
NAVY 1-3A

		GROSS CONTRACTS	NET CONTRACTS	CONTRACT GOALS	NET GOALS	CONTRACTS AS PCT OF GOALS	RECRUITERS
FY83	(A)	50011	43210	66635	44645	97%	3433
FY84	(A)	40558	35042	66834	44779	78%	3131
FY85	(A, F)	37013	31979	72898	36449	87%	3277 (AVG)

TOTALS FOR PRIOR TWELVE-MONTH INTERVALS
NAVY 1-3A

		GROSS CONTRACTS	NET CONTRACTS	CONTRACT GOALS	NET GOALS	CONTRACTS AS PCT OF GOALS	RECRUITERS
JUL 83-JUN 84	(A)	45102	38968	68281	45748	85%	3196
JUL 84-JUN 85	(A)	35921	31036	69654	37588	83%	3221
JUL 85-JUN 86	(F)	39520	34146	75658	37829	90%	3481 (AVG)

(A) ACTUAL (F) FORCASTED

NAVY RECRUITING OUTLOOK
NPS MALE 1-3 HSDG AND HSSR CONTRACTS

YR	MO	GROSS CONTRACTS	NET CONTRACTS	MALE NCO	1-3 MALE NCO	CONTRACTS AS PCT OF GOALS	RECRUITERS
82	10	5523	4772	5851	4915	97%	3364
82	11	5998	5182	6048	5080	102%	3404
82	12	6033	5213	5671	4764	109%	3407
83	1	6047	5225	5787	4861	107%	3441
83	2	5853	5057	5905	4960	101%	3427
83	3	5751	4969	5811	4881	101%	3485
83	4	4941	4269	5465	4591	92%	3497
83	5	4612	3985	3953	3321	120%	3484
83	6	5331	4606	4457	3744	123%	3467
83	7	5979	5166	5276	4432	116%	3419
83	8	6453	5575	5762	4840	115%	3408
83	9	6716	5803	6649	5585	103%	3396
83	10	5324	4600	5698	4786	96%	3331
83	11	5566	4809	5477	4601	104%	3283
83	12	5537	4784	5340	4486	106%	3224
84	1	5938	5130	6015	5053	101%	3158
84	2	5185	4480	5797	4869	91%	3067
84	3	4825	4169	6159	5174	80%	3020
84	4	4855	4195	5597	4701	89%	2997
84	5	3701	3198	4995	4196	76%	2999
84	6	4369	3775	5516	4633	81%	3050
84	7	4582	3959	5144	4321	91%	3100
84	8	5017	4335	5610	4712	91%	3140
84	9	3838	3316	5486	4608	71%	3200
84	10	4773	4124	5900	4307	95%	3197
84	11	5136	4438	5834	4259	104%	3234
84	12	5141	4442	5832	4257	104%	3265
85	1	5570	4812	6448	4707	102%	3289
85	2	4332	3743	6191	4520	82%	3251
85	3	4229	3654	6439	4700	77%	3225
85	4	4195	3624	5616	4100	88%	3262
85	5	3726	3219	5182	3783	85%	3251
85	6	4634	4004	5972	4360	91%	3242

-TWELVE MONTH FORECAST PERIOD-

YR	MO	FORECASTS	-FORECASTS OF NET CONTRACTS-			MALE NCO	1-3 MALE NCO	CONTRACTS AS PCT OF GOALS	RECRUITERS
			MEAN	UPPER_90	LOWER_90				
85	7	5450	4708	5297	4120	6409	4679	100%	3305
85	8	5532	4780	5421	4139	6530	4767	100%	3369
85	9	5132	4434	5035	3834	6545	4778	92%	3433
85	10	4796	4144	4706	3582	6094	4449	93%	3496
85	11	4961	4286	4868	3705	5921	4322	99%	3530
85	12	5265	4549	5166	3932	6232	4550	99%	3520
86	1	5858	5061	5748	4374	6969	5088	99%	3520
86	2	5548	4793	5443	4143	6763	4937	97%	3520
86	3	5270	4554	5171	3936	6974	5091	89%	3520
86	4	4739	4094	4650	3539	6259	4569	89%	3520
86	5	4044	3494	3968	3020	5084	3711	94%	3520
86	6	4890	4225	4798	3652	5876	4290	98%	3520
		-----	-----	-----	-----	-----	-----	-----	-----
		61485	53123	60271	45976	75658	55230	96%	3481

(AVG)

FISCAL YEAR TOTALS
NAVY 1-3

		GROSS CONTRACTS	NET CONTRACTS	CONTRACT GOALS	NET GOALS	CONTRACTS AS PCT OF GOALS	RECRUITERS
FY83	(A)	69237	59821	66635	55973	107%	3433
FY84	(A)	58737	50749	66834	56141	90%	3131
FY85	(A, F)	57850	49983	72898	53215	93%	3277 (AVG)

TOTALS FOR PRIOR TWELVE-MONTH INTERVAL
NAVY 1-3

		GROSS CONTRACTS	NET CONTRACTS	CONTRACT GOALS	NET GOALS	CONTRACTS AS PCT OF GOALS	RECRUITERS
JUL 83-JUN 84	(A)	64448	55683	68281	57356	97%	3196
JUL 84-JUN 85	(A)	55173	47669	69654	52634	90%	3221
JUL 85-JUN 86	(F)	61485	53123	75658	55230	96%	3481 (AVG)

(A) ACTUAL (F) FORCASTED

SECTION B:

UNEMPLOYMENT FORECASTS

BNS FORECASTS OF CIVILIAN UNEMPLOYMENT: SEASONALLY ADJUSTED
With Confidence Intervals at 90%

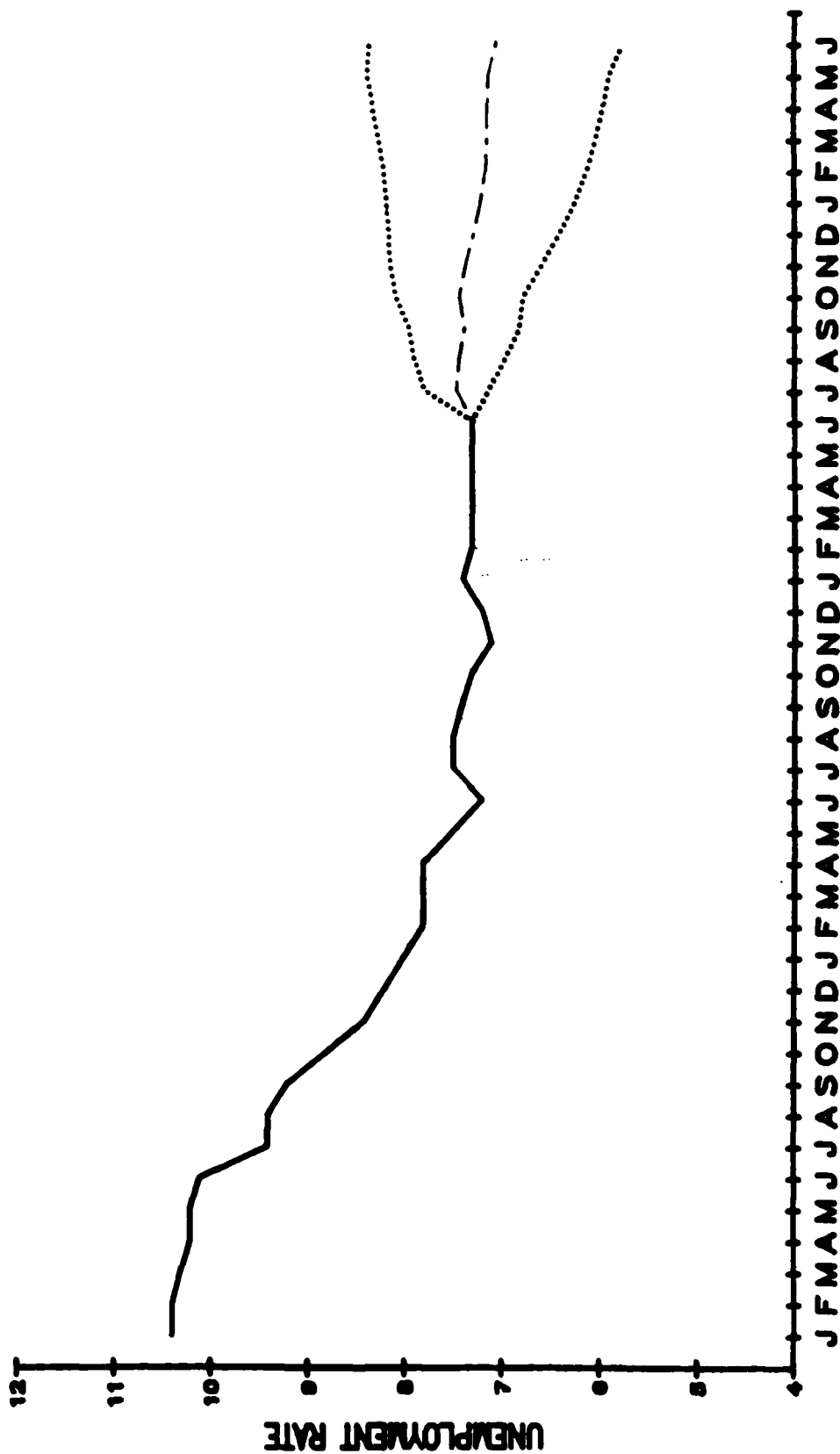
<u>MONTH</u>	<u>ACTUAL*</u>
8301	10.4
8302	10.4
8303	10.3
8304	10.2
8305	10.2
8306	10.1
8307	9.4
8308	9.4
8309	9.2
8310	8.8
8311	8.4
8312	8.2
8401	8.0
8402	7.8
8403	7.8
8404	7.8
8405	7.5
8406	7.2
8407	7.5
8408	7.5
8409	7.4
8410	7.3
8411	7.1
8412	7.2
8501	7.4
8502	7.3
8503	7.3
8504	7.3
8505	7.3
8506	7.3

INDIVIDUAL LEADING INDICATOR
(ILI) FORECASTER

	<u>LOWER 90</u>	<u>MEAN</u>	<u>UPPER 90</u>
8507	7.12	7.46	7.79
8508	6.96	7.43	7.90
8509	6.80	7.37	7.95
8510	6.77	7.43	8.09
8511	6.58	7.36	8.14
8512	6.40	7.28	8.16
8601	6.24	7.21	8.18
8602	6.12	7.16	8.21
8603	6.02	7.14	8.26
8604	5.95	7.14	8.32
8605	5.89	7.13	8.38
8606	5.75	7.05	8.35

* Seasonal weights revised by BLS (January 1985)

EWS-LI FORECASTS OF UNEMPLOYMENT CIVILIAN WORKERS



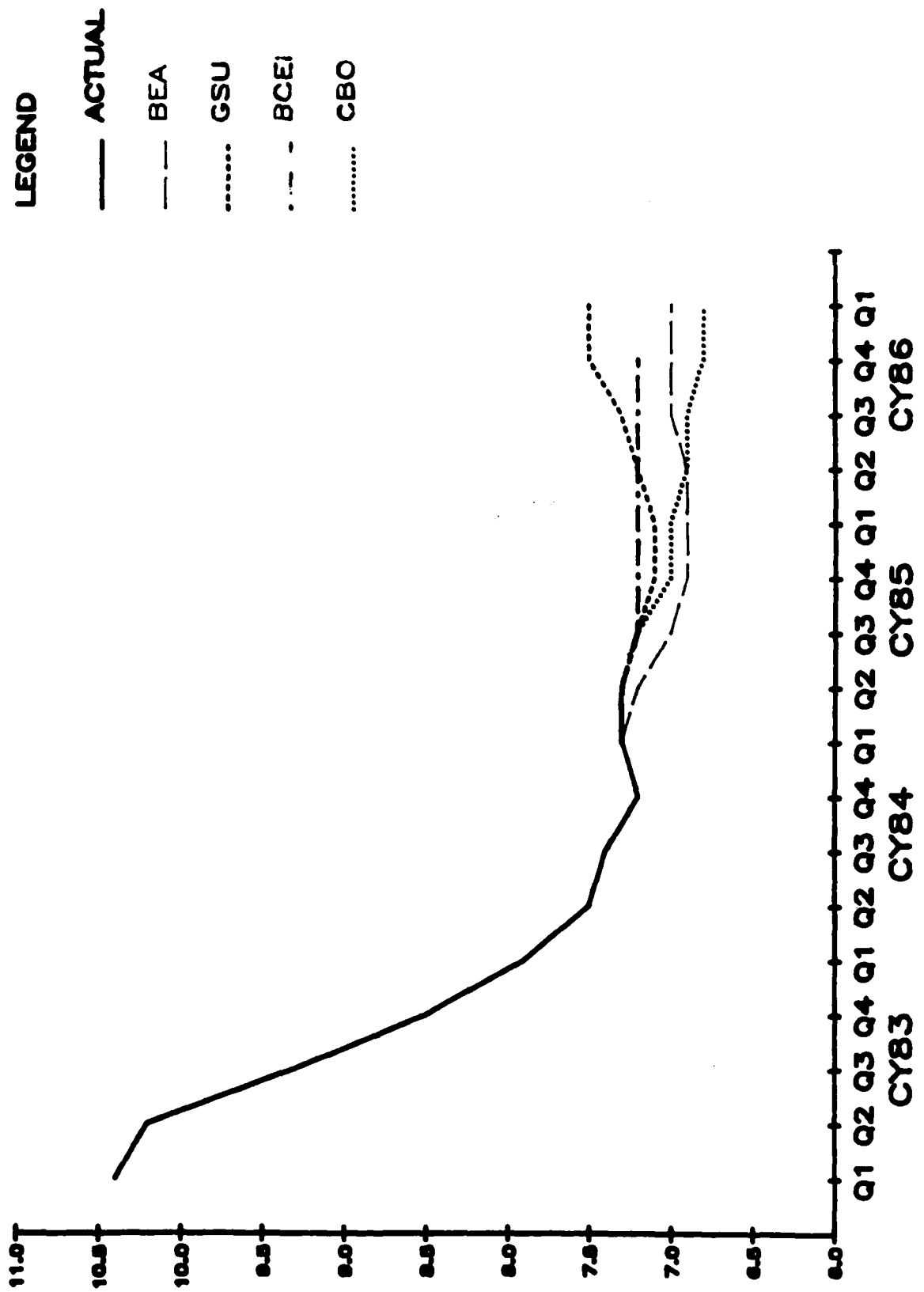
MONTH
FY1984

FY1983

FY1985

FORECASTS BEGIN JULY 1985

OUTSIDE UNEMPLOYMENT FORECASTS



**FORECASTS OF UNEMPLOYMENT
EWS-ILI COMPARED WITH OUTSIDE SOURCES**

For JULY 1985 - JUNE 1986

MONTH	EWS-ILI	CBO ^a ----	BEA ^b (All Civilians)	GSU ^c	BCEI ^d ----
July 1985	7.4	7.2	7.0	7.2	7.2
August	7.5	7.2	7.0	7.2	7.2
September	7.5	7.2	7.0	7.2	7.2
October	7.5	7.0	6.9	7.1	7.2
November	7.4	7.0	6.9	7.1	7.2
December	7.4	7.0	6.9	7.1	7.2
January 1986	7.3	7.0	6.9	7.1	7.2
February	7.3	7.0	6.9	7.1	7.2
March	7.2	7.0	6.9	7.1	7.2
April	7.2	6.9	6.9	7.2	7.2
May	7.2	6.9	6.9	7.2	7.2
June	7.2	6.9	6.9	7.2	7.2

a
b
c
d

CBO = Congressional Budget Office; February 1985.

BEA = Bureau of Economic Analysis; May 2, 1985 forecasts.

GSU = Georgia State University; May 9, 1985 forecast.

BCEI = Blue Chip Economic Indicators; consensus forecasts, August 10, 1985.

QUARTERLY TRENDS IN UNEMPLOYMENT FORECASTS - CY83-87

QUARTER	ACTUALS	EWS-ILI	CBO ——	BEA (All civilians)	GSU	BCEI ——
CY83 I	10.4					
CY83 II	10.2					
CY83 III	9.3					
CY83 IV	8.5					
CY84 I	7.9					
CY84 II	7.5					
CY84 III	7.4					
CY84 IV	7.2					
CY85 I	7.3					
CY85 II		7.3	7.3	7.2	7.3	7.3
CY85 III		7.5	7.2	7.0	7.2	7.2
CY85 IV		7.4	7.0	6.9	7.1	7.2
CY86 I		7.3	7.0	6.9	7.1	7.2
CY86 II		7.2	6.9	6.9	7.2	7.2
CY86 III			6.9	7.0	7.3	7.2
CY86 IV			6.8	7.0	7.5	7.2
CY87 I			6.8	7.0	7.5	

SECTION C:

MODEL DESCRIPTION

COMMON VARIABLE DEFINITIONS IN RECRUITMENT EWS

1. RELPAY = (logarithm of) first year military pay divided by annual earnings of 16-24 year-old civilian males; each series is smoothed with a five month moving average, centered on the current month.

BMC (basic military compensation) weighted by time-in-grade, assuming single status (Source: OSD).

Civilian earnings for full-time workers, quarterly averages are assumed constant for three month periods (Source: Bureau of Labor Statistics from Current Population Survey).

2. UNEMP(X) = (logarithm of) civilian unemployment rate, lagged X periods (Source: Bureau of Labor Statistics from Current Population Survey).

3. JAN ... DEC = binary seasonal variables (relative to the omitted month of April): S-10 = May, S-9 = June, . . . S-0 = March.

4. MVG AVGE(X) = moving average term coefficients at lag(s) = x.

5. REF44 = binary variable to merge the 1944 and 1980 reference population series: equals 1 from first observation through September 1984 (i.e., period for which "1944 series" is used), and zero from October 1984 to the present (i.e., period for which "1980 series" is used).

NAVY VARIABLE DEFINITIONS IN RECRUITMENT EWS

1. NAVDS13(A) = (logarithm of) Navy 1-3 (1-3A) (3B) male HSDG + HSSR gross
(B) contracts (Source: DMDC).
2. WINRECT = (logarithm of) production plus fixed overhead recruiters,
weighted by the share of NPS active duty male contract
objectives to the total active duty and reserve objectives
(Source: NRC).
3. LNGPR = (logarithm of) 1-3A active duty male (net) new contract
objectives divided by recruiters (as defined above);

for FY82 - present: percent active-duty-male accession
goals are applied to total new contract objectives to
estimate active-duty-male new contract objectives; upper
mental group targets ranging from 60 to 65 percent are
subsequently applied;

for FY80 - 81: active-duty-male accession goals are used
as proxy for (nonexistent) active-duty-male new contract
objectives; upper mental group target of 60 percent is
subsequently applied (Source: NRC and own calculations).
4. NFAT83 = binary variable that reflects restrictions on writing
contracts during the June-through-September 1983 period
(negative coefficient expected).
5. UMG = upper mental group (i.e., 1-3A) accession quality
percentage targets in effect from FY1980 to the present.

6. GAP = (logarithm of) the ratio of NPS 1-3A active duty objectives to the expected number of 1-3A enlistments (as predicted by the 1-3A cohort model).
7. NAVDS_(X) = autoregressive term coefficients at lag(s) = x.

NAVY RECRUITMENT MODEL

1-3A H9SR AND H9DB GROSS CONTRIBUTIONS

DEPENDENT VARIABLE 12 NAVDS 04
 FROM 75-10 UNTIL 88-8
 OBSERVATIONS 80 DEGREES OF FREEDOM 48
 R**2 .00054335 SE R**2 .83077882
 SSR .30002141 SEE .79085782E-01
 DURBIN-WATSON 1.50763777
 G(E4)= 14.3884 SIGNIFICANCE LEVEL .937387

NO.	LABEL	VAR	LAS	COEFFICIENT	STAND. ERROR	T-STATISTIC
1	CONSTANT	0	0	.8119495	4.585693	.1770615
2	NAVDS13A	12	1	.3645034	.1111590	3.279118
3	WRECT	32	0	.3974341	.4401413	.9029694
4	LNGPR	28	0	.1554553	.9654360E-01	1.610208
5	UMG	18	0	.7845365E-03	.2385683E-01	.3288520E-01
6	RELPAY	5	3	.3426381	.4621154	.7414558
7	UNEMP	2	0	.4441362	.1485078	2.990559
8	NFAT83	16	0	.1149658	.6069873E-01	1.894040
9	REF44	7	0	.3388653E-01	.7379639E-01	.4654974
10	SEAS:MAY	6	-10	-.1105754	.4895083E-01	-2.258908
11	SEAS:JUNE	6	-9	.8345149E-01	.6442376E-01	1.295353
12	SEAS:JULY	6	-8	.1360241	.5788232E-01	2.350012
13	SEAS:AUG	6	-7	.1261381	.5981181E-01	2.108917
14	SEAS:SEPT	6	-6	-.2161778E-01	.5827180E-01	-.3709818
15	SEAS:OCT	6	-5	-.2185819E-01	.5077549E-01	-.4304871
16	SEAS:NOV	6	-4	.4996433E-01	.5275762E-01	.9470543
17	SEAS:DEC	6	-3	.8487991E-01	.4948513E-01	1.715261
18	SEAS:JAN	6	-2	.1477942	.5037505E-01	2.933877
19	SEAS:FEB	6	-1	.9422027E-01	.5326972E-01	1.768740
20	SEAS:MAR	6	0	.7388208E-01	.4863405E-01	1.519143
21	MVG AVGE	-1	10	-.2504474	.1111651	-2.252932

NAVY REPRESSION: 1940-1945

38 H337 AND H508 GROSS DOMESTIC PRODUCT

REGRESSION						
DEPENDENT VARIABLE		13	NAVDS38			
DATA		75-10	LATE 85- 8			
OBSERVATIONS		69	DEGREES OF FREEDOM			
R**2		.89485497	RBAR**2			
SER		.17216438	SER			
DURBIN-WATSON		1.91781479				
Df (24)		14.5359	SIGNIFICANCE LEVEL			
NO.	LABEL	VAR	LAG	COEFFICIENT	STAND. ERROR	T-STATISTIC
***	*****	***	***	*****	*****	*****
1	CONSTANT	0	0	3.273396	2.097659	1.560499
2	NAVDS38	13	1	.3508738	.1127797	3.139811
3	WTRRECT	32	0	.7993487E-01	.2561515	.3003350
4	GAP	47	0	.1770645	.1216668	1.455323
5	RELPAY	5	3	1.305762	.3948085	3.307329
6	UNEMP	2	0	.2810616	.1504636	1.867971
7	MFAT83	16	0	.7241008E-01	.6491153E-01	1.115519
8	REF44	7	0	-.1053043	.4969980E-01	-2.118807
9	SEAS:MAY	6	-10	-.7533993E-01	.5233562E-01	-1.439554
10	SEAS:JUNE	6	-9	.2212014	.5709455E-01	3.874300
11	SEAS:JULY	6	-8	.2433545	.5804242E-01	4.192701
12	SEAS:AUG	6	-7	.2300514	.6263509E-01	3.672884
13	SEAS:SEPT	6	-6	.2002257	.6986030E-01	2.866087
14	SEAS:OCT	6	-5	.9204226E-01	.5658010E-01	1.626760
15	SEAS:NOV	6	-4	.1483035	.5066066E-01	2.927390
16	SEAS:DEC	6	-3	.1663495	.5212420E-01	3.191406
17	SEAS:JAN	6	-2	.2772539	.5021203E-01	5.521664
18	SEAS:FEB	6	-1	.1441183	.5287862E-01	2.725456
19	SEAS:MAR	6	0	.9318812E-01	.5058316E-01	1.842276

NOTES
FOR RECRUITMENT EWS REGRESSION MODELS

R-SQUARE refers to the proportion of the variation in the dependent variable explained by the regression equation.

ROOT MSE refers to the square root of the mean squared error. In the present model formulation, it can be interpreted as an average percentage error; e.g., 0.104 means a 10.4% error on average.

The null hypothesis is that the residuals are not (auto) correlated.

Correlation is measured by the Box-Pierce Q statistic over lags 1 to 24. SIGNF is the probability that, under the null hypothesis, in repeated tests the Q sample value would be as extreme as the observed Q(24) statistic. Small values for SIGNF indicate small credibility for the null hypothesis. (The range is 0 to 1.00.)

APPENDIX

APPENDIX

LEADING INDICATOR MODELS OF UNEMPLOYMENT

A. Composite Leading Indicator Model (CLI)

The CLI forecaster of civilian unemployment is an ARMA regression model. The component leading indicators — listed in Exhibit A — are deseasonalized, standardized, smoothed, weighted and aggregated into a composite. The weights measure the relative association between current unemployment and each component lagged twelve months. Data and weights are updated monthly; more extensive revisions of series are made periodically. The unemployment rate (first differenced) is regressed against the composite (first differenced) lagged twelve months. An ARMA error structure is selected to model the error.

B. Individual Leading Indicator Model (ILI)

The ILI forecaster of civilian unemployment is a multivariate regression model in which unemployment is regressed against the cyclical components of the 15 leading indicators. An ARMA error structure is selected to model the error.

6/17/85

EXHIBIT A

COMPONENT LEADING INDICATORS IN THE CLI MODEL OF UNEMPLOYMENT

SERIES NO.	COMPONENT SERIES	WEIGHT (percent)
<u>A. Composite Indexes</u>		
910	Index of Twelve Leading Indicators	12.7
<u>B1. Employment and Unemployment</u>		
1	Average weekly hours, production workers, mfg.	8.3
21	Avg. weekly overtime hours, prod. workers, mfg.	8.2
5	Avg. weekly initial claims, State unemployment insurance (inverted)	7.0
46	Index of help-wanted advertising in newspapers	2.8
<u>B2. Production and Income</u>		
74	Index of industrial production, nondurables	4.1
<u>B3. Consumption, Trade, Orders, and Deliveries</u>		
7	Manufacturers' new orders, durables	3.9
8	Manufacturers' new orders, consumer goods	6.7
96	Manufacturers' unfilled orders, durables	5.2
75	Index of industrial production, consumer goods	6.7
<u>B4. Fixed Capital Investment</u>		
20	Contracts and orders for plant and equipment	1.0
27	Manufacturers' new orders, nondefense capital goods	0.8
28	New private housing units started	17.6
29	Index of housing starts authorized by local building permits	NI

continued on next page

B5. Inventories and Inventory Investment

78	Manufacturers' inventories, materials and supplies on hand and on order	NI
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B6. Prices, Costs, and Profits

19	Index of stock prices, 500 common stocks	2.8
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B7. Money and Credit

106	Money supply M2	11.9
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Note: NI = not included

Source of Series: Business Conditions Digest, Bureau of Economic Analysis,
Department of Commerce.

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