AD-A066 262 LITTON MELLONICS SYSTEMS DEVELOPMENT DIV SPRINGFIELD VA F/G 5/9
RESERVE COMPONENT UNIT EVALUATION ANALYSIS. VOLUME I.(U)
OCT 76 J BERCOS, J R CHIORINI, R C EAKINS DAAG39-75-C-0135

UNCLASSIFIED NL

1 OF 2
AD A066262

Prepared for the
Department of the Army
Contract DAAG 39-75-C-0135

16 October 1976

Final Report

Reserve Component Unit Evaluation Analysis

Volume I

Litton
Mellonics Systems Development Division
Defense Sciences Laboratories
8111 Gatehouse Road
Falls Church, Virginia 22042

Prepared for the
Department of the Army
Contract DAAG 39-75-C-0135

16 October 1976

FINAL REPORT

RESERVE COMPONENT UNIT EVALUATION ANALYSIS

VOLUME I

by
James Bercos
John R. Chiorini
Richard C. Eakins
Andrew P. Lokie
Warren B. Stevens

Litton
Mellonics Systems Development Division
Defense Sciences Laboratories
8111 Gatehouse Road
Falls Church, Virginia 22042

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): Reserve Component Unit Evaluation Analysis	5. TYPE OF REPORT & PERIOD COVERED: Final; 17 Feb-16 Oct 76 / 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): James Bercos, John R. Chiorini, Richard C. Eakins, Andrew P. Lokie, Warren B. Stevens	8. CONTRACT OR GRANT NUMBER(s): DAAG 39-75-C-0135
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Litton Systems, Inc., Mellonics Systems Dev. Div. Defense Science Labs, 8111 Gatehouse Rd., Falls Church, Va. 22042	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: Office of the Deputy Chief of Staff for Oper. & Plans, HQ DA (DAMO-ODU), Rm. 3D526, Pentagon, Wash., D.C. 20310	12. REPORT DATE: October 1976 / 13. NUMBER OF PAGES: 133
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): Unclassified / 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

DISTRIBUTION STATEMENT A
Approved for public release; Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Army Training & Evaluation Program (ARTEP), Reserve Component (RC), Candidate ARTEP Evaluation Implementation Option, Prime Candidate Option, Cost, Effectiveness, Average Evaluation Cost (AEC), Estimated Cost Based on ARTEP Document (ECD), Individual Respondent Option Score, Respondent Group Option Index, Respondent Group Option Choice, Option Effectiveness Index, Rank, Assessment System, Sensitivity Analysis.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report documents research & presents methodology used to develop options for implementing Reserve Component unit evaluations using the Army Training & Evaluations Program (ARTEP) to determine & select cost-effective options, & to design an assessment system based on the selected options for different type unit with consideration of unit deployment objectives. The report also provides recommendations for substituting qualified noncommissioned officers for officer evaluators in selected positions in conducting evaluations with ARTEP. Finally, the report provides a survey - classification of training sites suitable for conducting ARTEP evaluations.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

INSTRUCTIONS FOR PREPARATION OF REPORT DOCUMENTATION PAGE

RESPONSIBILITY. The controlling DoD office will be responsible for completion of the Report Documentation Page, DD Form 1473, in all technical reports prepared by or for DoD organizations.

CLASSIFICATION. Since this Report Documentation Page, DD Form 1473, is used in preparing announcements, bibliographies, and data banks, it should be unclassified if possible. If a classification is required, identify the classified items on the page by the appropriate symbol.

COMPLETION GUIDE

General. Make Blocks 1, 4, 5, 6, 7, 11, 13, 15, and 16 agree with the corresponding information on the report cover. Leave Blocks 2 and 3 blank.

Block 1. Report Number. Enter the unique alphanumeric report number shown on the cover.

Block 2. Government Accession No. Leave Blank. This space is for use by the Defense Documentation Center.

Block 3. Recipient's Catalog Number. Leave blank. This space is for the use of the report recipient to assist in future retrieval of the document.

Block 4. Title and Subtitle. Enter the title in all capital letters exactly as it appears on the publication. Titles should be unclassified whenever possible. Write out the English equivalent for Greek letters and mathematical symbols in the title (see "Abstracting Scientific and Technical Reports of Defense-sponsored RDT/E," AD-667 000). If the report has a subtitle, this subtitle should follow the main title, be separated by a comma or semicolon if appropriate, and be initially capitalized. If a publication has a title in a foreign language, translate the title into English and follow the English translation with the title in the original language. Make every effort to simplify the title before publication.

Block 5. Type of Report and Period Covered. Indicate here whether report is interim, final, etc., and, if applicable, inclusive dates of period covered, such as the life of a contract covered in a final contractor report.

Block 6. Performing Organization Report Number. Only numbers other than the official report number shown in Block 1, such as series numbers for in-house reports or a contractor/grantee number assigned by him, will be placed in this space. If no such numbers are used, leave this space blank.

Block 7. Author(s). Include corresponding information from the report cover. Give the name(s) of the author(s) in conventional order (for example, John R. Doe or, if author prefers, J. Robert Doe). In addition, list the affiliation of an author if it differs from that of the performing organization.

Block 8. Contract or Grant Number(s). For a contractor or grantee report, enter the complete contract or grant number(s) under which the work reported was accomplished. Leave blank in in-house reports.

Block 9. Performing Organization Name and Address. For in-house reports enter the name and address, including office symbol, of the performing activity. For contractor or grantee reports enter the name and address of the contractor or grantee who prepared the report and identify the appropriate corporate division, school, laboratory, etc., of the author. List city, state, and ZIP Code.

Block 10. Program Element, Project, Task Area, and Work Unit Numbers. Enter here the number code from the applicable Department of Defense form, such as the DD Form 1498, "Research and Technology Work Unit Summary" or the DD Form 1634, "Research and Development Planning Summary," which identifies the program element, project, task area, and work unit or equivalent under which the work was authorized.

Block 11. Controlling Office Name and Address. Enter the full, official name and address, including office symbol, of the controlling office. (Equates to funding/sponsoring agency. For definition see DoD Directive 5200.20, "Distribution Statements on Technical Documents.")

Block 12. Report Date. Enter here the day, month, and year or month and year as shown on the cover.

Block 13. Number of Pages. Enter the total number of pages.

Block 14. Monitoring Agency Name and Address (if different from Controlling Office). For use when the controlling or funding office does not directly administer a project, contract, or grant, but delegates the administrative responsibility to another organization.

Blocks 15 & 15a. Security Classification of the Report: Declassification/Downgrading Schedule of the Report. Enter in 15 the highest classification of the report. If appropriate, enter in 15a the declassification/downgrading schedule of the report, using the abbreviations for declassification/downgrading schedules listed in paragraph 4-207 of DoD 5200.1-R.

Block 16. Distribution Statement of the Report. Insert here the applicable distribution statement of the report from DoD Directive 5200.20, "Distribution Statements on Technical Documents."

Block 17. Distribution Statement (of the abstract entered in Block 20, if different from the distribution statement of the report). Insert here the applicable distribution statement of the abstract from DoD Directive 5200.20, "Distribution Statements on Technical Documents."

Block 18. Supplementary Notes. Enter information not included elsewhere but useful, such as: Prepared in cooperation with . . . Translation of (or by) . . . Presented at conference of . . . To be published in . . .

Block 19. Key Words. Select terms or short phrases that identify the principal subjects covered in the report, and are sufficiently specific and precise to be used as index entries for cataloging, conforming to standard terminology. The DoD "Thesaurus of Engineering and Scientific Terms" (TEST), AD-672 000, can be helpful.

Block 20. Abstract. The abstract should be a brief (not to exceed 200 words) factual summary of the most significant information contained in the report. If possible, the abstract of a classified report should be unclassified and the abstract to an unclassified report should consist of publicly-releasable information. If the report contains a significant bibliography or literature survey, mention it here. For information on preparing abstracts see "Abstracting Scientific and Technical Reports of Defense-Sponsored RDT&E," AD-667 000.

PREFACE

This report documents the "Reserve Component Unit Evaluation Analysis" research conducted by Litton Mellonics Systems Development Division of Litton Systems, Inc., for the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), Department of the Army, under the provisions of Contract Number DAAG 39-75-C-0135.

The research effort was assisted by the advice and support of many individuals and agencies outside of the Litton Mellonics organization. Officers in the Training Division of the ODCSOPS, other officers of the Army Staff, members of the SAG, and personnel of FORSCOM, TRADOC, USACATB, the CONUSA, the Infantry, Armor, Field Artillery, Engineer, Ordnance, and Military Police Schools, 1st Cavalry Division, 2nd Armored Division, 4th Infantry Division, 9th Infantry Division, the NGB, the OCAR, the ARR, and all the Reserve Component units in the AT 75 and AT 76 ARTEP evaluation programs who assisted in the collection of evaluation cost and effectiveness data, participated in structured interviews, and completed survey/questionnaire forms are too numerous to mention by name, but they are owed special thanks for their cooperation and response to requests for information.

Within Litton Mellonics especial appreciation is expressed to Miss Sue Tepper and Mrs. Kitty Kleisath without whose expert work and patience with the study group the production of this report could not have been accomplished.

TABLE OF CONTENTS

TABLES

FIGURES

ABBREVIATIONS

ARNG	Army National Guard
ARR	Army Readiness Region
ARTEP	Army Training and Evaluation Program
AT	Annual Training
ATEP	Annual Training Equipment Pool
ATT	Army Training Test
C-E	Cost-Effectiveness
CONARC	Continental Army Command
CONUSA	Continental United States Army
COR	Contracting Officer's Representative
DA	Department of the Army
ECD	Evaluation Cost Based on ARTEP document
ECD5,6	Evaluation Cost Based on ARTEP document for AT 75, AT 76
ECS	Equipment Concentration Site
FORSCOM	United States Army Forces Command
MOS	Military Occupational Specialty
MTC	Maneuver Training Command
NATO	North Atlantic Treaty Organization
NCO	Noncommissioned Officer
NGB	National Guard Bureau
OIC	Officer in Charge
POL	Petroleum, Oils and Lubricants

RC	Reserve Component
SAG	Study Advisory Group
SO	Safety Officer
SP	Self-Propelled
TRADOC	US Army Training and Doctrine Command
TY	Training Year
USACATB	United States Army Combat Arms Training Board

RESERVE COMPONENT UNIT EVALUATION ANALYSIS

1. Introduction.

a. General. This report is the last of four on the study Reserve Component Unit Evaluation Analysis (Cost-Effectiveness) under Contract Number DAAG 39-75-C-0135. It is duly submitted in accordance with paragraphs H.6 and H.7 of the contract.

(1) Two interim reports, the draft final report, and this report constitute the four reports required as a part of the Mellonics Systems Development Division of Litton Systems, Inc., performance under the contract. The First Interim Report (in accordance with paragraph H.4 of the contract) was duly submitted to the Contract Officer's Representative (COR) on 15 May 1975. It presented a detailed study plan and a summary of progress from the start of work, 18 February 1975. At a meeting with Litton Mellonics on 10 June 1075 the Study Advisory Group (SAG) discussed and commented on the study methodology proposed in the report. As a part of the discussion the point was made that the United States Army Forces Command (FORSCOM) and Litton Mellonics "should exchange information to insure instructions issued by FORSCOM for Annual Training (AT) 1976 utilization of the Army Training and Evaluation Program (ARTEP) are in consonance with developments in the study."[1] Toward this end and to assist FORSCOM in planning for AT 76, the

---

[1]Disposition Form, DAMO-ODU, dated 13 June 1975, subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (10 June 1975); Inclosure: Minutes of the Meeting.

SAG requested Litton Mellonics to provide an informal report to FORSCOM in mid-November 1975, in advance of the next formal report scheduled for submission in early 1976.

(2) On 17 November 1975 an Informal Report of Preliminary Results was submitted to the COR for forwarding to FORSCOM. It included a Suggested ARTEP Evaluation Program for AT 76.

(3) The Second Interim Report (in accordance with paragraph H.5 of the contract) was duly submitted to the COR on 15 March 1976. It documented all aspects of work during the first twelve months of the contract, presented cost and effectiveness data relevant to the AT 75 Reserve Component (RC) unit ARTEP evaluations, and proposed an ARTEP Implementation Option Test Program (for 1976 data collection) developed in consideration of FORSCOM informal comments on the Informal Report of Preliminary Results and related coordination with FORSCOM. On 29 March 1976 the SAG met, with Litton Mellonics present, to review and discuss the report. Pursuantly, the SAG requested Litton Mellonics "to review the proposed schedule of units to be evaluated during AT 76 with a view toward increasing the number in the Sixth Army area."[2] Accordingly, a Revised ARTEP Implementation Option Test Program was submitted to the COR on 21 April 1976.

(4) The Draft Final Report (in accordance with paragraph H.6 of the contract) was duly submitted to the COR on 18 August 1976. As discussed and

---

[2]Disposition Form, DAMO-ODU, dated 12 April 1976 (Revision dated 5 May 1976), subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (29 March 1976); Inclosure: Minutes of the Meeting.

understood at the 29 March 1976 SAG meeting it was based on data available as of 15 July 1976 in quantities sufficient for meaningful analysis, since at the time of its preparation and submission a significant portion of the planned data collection remained to be accomplished for RC unit evaluations scheduled for the latter two weeks in July, throughout August and early September. Thus, the report presented cost and effectiveness data for all three type ARTEP used during AT 75 and one of the eight type used during AT 76, results based on these data, and detailed explanations of the analysis methodologies. The report was reviewed and accepted at the 20 September 1976 meeting of the SAG.

b. Purpose. The purpose of this report, the final, is to document all aspects of the work performed during the study, describe the data collection effort and provide summary tables of all data used, explain and illustrate the procedures and analytical methods employed, state all assumptions, present results and findings, and recommend assessment systems for use in periodic Reserve Component evaluations with ARTEP.

c. Organization of the Report. The report is divided into six major parts - a Main Report and five Annexes - collectively presented in three volumes.

(1) Volume I contains the Main Report and Annexes C, D, and E.

(a) The Main Report comprises six sections:

- The first is this introduction.

- The second reviews the background, lists the objectives, defines the scope, and outlines the approach of the overall study effort.

- The third presents ARTEP implementation options found to be cost-effective in conducting evaluations of RC units.

- The fourth develops systems for periodic RC unit evaluations with ARTEP.

- The fifth presents summaries of two ancillary investigations.

- Potential substitution of qualified noncommissioned officers (NCO) for officers in select evaluator positions.

- Availability of training sites suitable for conducting ARTEP evaluations.

- The sixth is a summary of study findings.

(b) Annex C presents an analysis of ARTEP evaluator tasks and position assignments.

(c) Annex D presents a survey of major training sites in consideration of ARTEP evaluation requirements.

(d) Annex E is a bibliography.

(2) Volume II wholly contains Annex A. The annex identifies the cost elements that in the aggregate constitute RC unit ARTEP evaluation cost, discusses data collection, explicates the methodology used to derive estimates of ARTEP evaluation implementation option costs, and analyzes cost differences. Summary tables of AT 75 and AT 76 RC unit ARTEP evaluation costs are presented, respectively, in Appendixes 1 and 2 to Annex A.

(3) Volume III wholly contains Annex B. The annex describes the ARTEP evaluation implementation options, defines evaluation effectiveness, discusses data collection, and explicates the derivation of option effectiveness indexes. Summary tables of RC unit ARTEP evaluation effectiveness data collected during AT 75 and AT 76 are presented, respectively, in Appendixes 1 and 2 to Annex B. An analysis of interviews held with evaluators and evaluated RC unit personnel to ascertain their reasoning in completing questionnaires relative to ARTEP evaluation implementation options effectiveness is presented in Appendix 3 to Annex B. Appendix 3 also presents a survey of General Officers' views concerning ARTEP evaluation of RC units.

2. Study Overview.

a. Background.

(1) The ARTEP was developed by the United States Army Training and Doctrine Command (TRADOC) during 1973-1974 as a continuation of efforts initiated by the Continental Army Command (CONARC) in 1971. First available were Test Edition ARTEP for Infantry, Armor (Tank), Field Artillery, Signal, and Engineer units. These were distributed and tested in the field with

select Active Army units during the autumn of 1974 and throughout 1975 as a part of the joint TRADOC and FORSCOM ARTEP validation effort. As a part of the same validation effort the available ARTEP were to be distributed to select RC units for use and testing in the field during 1975. Lessons learned, problems, and recommendations presented in the after action and validation reports were considered in revising the field tested ARTEP as well as, where applicable, in the development of first edition other type unit ARTEP, all to receive wider distribution among Active Army and RC units prior to AT 76.

(2) In developing and validating the ARTEP TRADOC and FORSCOM efforts primarily centered on demonstrating the concept's feasibility and improving the ARTEP utility as guides for training and evaluation of Army units by describing critical unit missions and mission-essential tasks. Although the ARTEP was gaining acceptance as a suitable concept for use in training and evaluating Active Army and RC units, efforts were not made systematically to define the most suitable ways of fully implementing the ARTEP as a training and evaluation instrument. Especially, relative to implementing the evaluation portion of the ARTEP, questions of controller/evaluator source, frequency of evaluation, aggressor source, applicability to different type units, and the like were not specifically addressed. For the evaluation of RC units these were particularly cogent questions because of the need for efficacious determination of training readiness, identification of training deficiencies, and planning of remedial training as necessary. Accordingly, the Department of the Army (DA) awarded a contract to Litton-Mellonics for this study entitled Reserve Component Unit Evaluation Analysis.

b. Objectives.

(1) To analyze alternative approaches implementing the ARTEP in assessing the effectiveness of Reserve Component units.

(2) To identify the costs of each alternative approach to include money, men, and collateral impact.

(3) To recommend assessment systems (frequency of testing, manner of application) from among those considered for use in periodic Reserve Component evaluations with ARTEP.

(4) To identify units (by type, deployment objectives, mission to be tested) with which the assessment systems should be used.

c. Scope.

(1) In the main the title, background, and objectives of the study concisely define its scope. They are specific that the study concern only RC units and implementation of the evaluation portion of the ARTEP, and that it employ cost-effectiveness (C-E) analysis methods.

(2) Alternative approaches (options) for implementing ARTEP in assessing training readiness of RC units were developed from discussions with TRADOC, FORSCOM, and other agencies involved in defining unit proficiency assessment methods. The thirty-six options finally considered in the study were approved by the SAG as submitted in the Second Interim Report after its review of a larger list presented in the First Interim Report.

(3) Six ARTEP (test editions) were available at the start of the study. Of these, four (Mechanized Infantry, Tank, Field Artillery (155mm), and Combat Engineer) were used by nine RC battalions and one RC company during AT 75 in the TRADOC/FORSCOM ARTEP validation program. These ten (10) were the only RC units evaluated using ARTEP during AT 75.

(4) Cost and effectiveness data for the ten evaluations were collected through coordination with the United States Army Combined Arms Training Board (USACATB), FORSCOM, the National Guard Bureau (NGB), State Adjutants General of the RC units involved, the Directorates of Reserve Components (or Directorates of Reserve Affairs) at Fort Hood, Texas, Fort Carson, Colorado, and Fort Lewis, Washington, and personnel of the participating RC units and the controller/evaluator groups. Cost data from this experience were extrapolated to options not employed in AT 75 RC unit evaluations. Cost data, in addition, were developed for suggested evaluations outlined in the several ARTEP documents. Quantitative expressions (indexes) of ARTEP evaluation implementation option effectiveness were developed from rating data obtained in survey/questionnaire forms completed by branch school personnel involved in the development of ARTEP, evaluators/controllers and evaluated RC unit personnel in the AT 75 TRADOC/FORSCOM ARTEP validation program, and cognizant DA, FORSCOM, TRADOC, USACATB, and SAG personnel.

(5) ARTEP for approximately forty (40) different type units were available for training year (TY) 75-76. In accordance with FORSCOM guidance the three Continental United States Armies (CONUSA) scheduled in excess of one hundred RC units (all company size) to be evaluated during AT 76 using ten different ARTEP. Eighty-one of the evaluations were selected to provide cost and effectiveness data for the study. Data were collected with coordinated assistance from the three CONUSA, cognizant Army Readiness Regions (ARR), and

the agencies that assisted during AT 75. These data, the data collected during AT 75, and other data obtained from planning documents and schedules, from personnel at cognizant Army agencies, from interviews with personnel who completed survey/questionnaire forms and a survey of Army General Officers constitute the basic data base for the study.

(6) Ancillary Investigations. As suggested by the SAG two supplementary investigations were incorporated into the study. The first concerned a consideration of testing site adequacy for ARTEP evaluation implementation.[3] The second was based on a recognized need to differentiate between requirements for officer evaluators versus enlisted evaluator/data collectors.[4]

(7) The end product of the study is a set of systems, based on the most cost-effective ARTEP evaluation implementation options, recommended for the periodic evaluation of type RC units. The results of the two special investigations, also, are end products.

d. Approach. The work to be performed was divided into three phases corresponding to the three major tasks described in the contract statement of work: Collection of Data, Analysis of Alternatives, and Development of a Recommended Program.

---

[3]Disposition Form, DAMO-ODU, dated 11 April 1975, subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (27 March 1975); Inclosure: Minutes of the Meeting.

[4]Disposition Form, DAMO-ODU, dated 13 June 1975, subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (10 June 1975); Inclosure: Minutes of the Meeting.

(1) The first phase consisted of planning actions and data collection necessary for the start and conduct of subsequent analytical efforts. The planning included the identification of data elements needed for C-E analysis, the review of existing potentially relevant data bases, the development of data collection materials, and visits to a large number of agencies involved with ARTEP to coordinate the foregoing and to facilitate data collection. The identification of data elements involved the definition of implementation options, the identification of major cost elements, and the definition of evaluation effectiveness. Most of the planning and some of the data activities accomplished during this phase were the subjects of sections III and IV of the First Interim Report. Additional information relative to this phase was included in Appendixes 1 (Cost) and 2 (Effectiveness) to Annex A of the Second Interim Report. All this information as it finally pertained was included in Annexes A and D to the Draft Final Report and is included in Volumes II and III of this report.

(2) The second phase involved the completion of data collection, the final definition of analysis parameters and procedures, the analysis of all collected data, the development of ARTEP evaluation implementation option cost estimates and effectiveness indexes to identify prime candidate ARTEP evaluation implementation options (based on AT 75 data), and the design of a program for testing the prime candidate options in the field during the latter half of TY 76 and at AT 76. The work accomplished during this phase, the prime candidate options, and the recommended test program were the major subjects of the Second Interim Report, were detailed in Annexes A and B to the Draft Final Report, and are fully documented in Volumes II and III of this report.

(3) The third phase involved close coordination with FORSCOM in planning the field implementation of the recommended test program, coordinated assistance from FORSCOM and the three CONUSA to collect cost and effectiveness data for the test program evaluations, and the analysis of all collected data to verify or revise the C-E estimates associated with the prime candidate options tested. The phase also involved the collection of cost and effectiveness data for selected evaluations (not included in the test program) using ARTEP not used in RC unit evaluations during AT 75, the analysis of these collected data, and the identification of prime candidate options for the pertinent ARTEP. For all data collection the materials developed and used in Phases 1 and 2 were adapted and additional and/or revised materials were developed as necessary, all in coordination with FORSCOM. The phase and the study ended with the identification of a recommended set of cost-effective options (based on AT 76 data) for implementing RC unit evaluations using ARTEP, and the preparation and submission of the Draft Final Report and this Final Report of all work accomplished in the phase, all previous project activities (i.e., significant portions from the two Interim Reports and the Draft Final Report), and final findings and recommendations.

3. Cost-Effective Implementation Options.

a. General. This section defines the candidate ARTEP evaluation implementation options finally considered in the study, discusses data collected and used, presents estimates of option cost and indexes of option effectiveness, and through a C-E analysis identifies prime candidate ARTEP evaluation implementation options.

b. Candidate Implementation Options.

(1) In the First Interim Report seventy-two basic and a to-be-determined multiple of twenty-four composite candidate ARTEP evaluation implementation options were described in terms of five option variables - evaluation schedule, organizational level tested, aggressor source, test configuration, and controller/evaluator source. The first four variables, respectively, included three, two, two, and two alternatives. The fifth included three and a to-be-determined number of selected mixes (ratios of Active Army to RC personnel in a mixed controller/evaluator group). The evaluation schedule variable included three alternative frequencies - annual, biennial, and triennial; the source of aggressor variable allowed for all Active Army or all RC personnel; the organizational level tested variable considered battalion or company size units; the test configuration variable delineated the evaluated unit pure from the evaluated unit combined (e.g., task force); and the controller/evaluator source variable allowed for all Active Army, all Reserve Component (all Maneuver Training Command or all other RC), or selected mixes of Active Army and RC personnel. Considering three general mix ratios (predominantly Active Army, predominantly RC, and essentially equal in Active Army and RC personnel) the initial number of candidate options was one hundred and forty-four (3x2x2x2x6=144).

(2) At the 10 June 1975 SAG meeting it was agreed to apply the following as a screening process to the options proposed in the First Interim Report.

(a) "Eliminate combined arms testing as an alternative. FORSCOM emphasis will be on testing pure units without cross attachments required for combined arms operation."[5] (Since the test configuration variable included only two alternatives, the elimination of combined arms testing as one effectively eliminated test configuration as a variable.)

(b) "Eliminate aggressor source as an alternative. RC Units tested at Active Army installations normally will be provided Active Army aggressors. However, RC units tested at other sites will have RC aggressors. FORSCOM cannot support the costs involved in providing Active Army units as aggressors for all ARTEP testing."[5]

(c) "Expand frequency of testing alternatives to 2, 3, and 4 year intervals. Delete from consideration the one year alternative since even Active Army units are not required to undergo annual testing."[5]

(3) On the basis of the foregoing SAG guidance and the above consideration of three mixes to be included as alternatives in the controller/evaluator source variable, a set of thirty-six candidate ARTEP evaluation implementation options was developed. The options are listed in Table 1.

c. Data. It was infeasible to design a program of RC unit ARTEP evaluations especially to provide data for the study. For one thing, the time from the start of the study to the start of AT 75 evaluations was too short; for another, specific program requirements such as simultaneous evaluation of an RC unit by two or more separate evaluator/controller groups would not only be too costly (money and personnel, even ad hoc) but could introduce interference adverse to the purpose of the evaluation. Thus, for AT 75 and AT 76 data collection was planned and effected within the scope of FORSCOM scheduled RC unit ARTEP evaluations.

(1) AT 75. All AT 75 data were collected relative to evaluations of units involved in the RC portion of the joint FORSCOM/TRADOC ARTEP validation program. The RC portion involved four different ARTEP and ten affiliated units - four Mechanized Infantry, three Tank, and two 155mm (SP)

---

[5]Disposition Form, DAMO-ODU, dated 13 June 1975, subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (10 June 1975); Inclosure: Minutes of the Meeting.

Table 1

Candidate ARTEP Evaluation Implementation Options

Number	Description		
	Evaluator Source	Level Tested	Frequency
1	Active Army	Battalion	Biennial
2	Active Army	Battalion	Triennial
3	Active Army	Battalion	Quadrennial
4	Active Army	Company	Biennial
5	Active Army	Company	Triennial
6	Active Army	Company	Quadrennial
7	Reserve Component	Battalion	Biennial
8	Reserve Component	Battalion	Triennial
9	Reserve Component	Battalion	Quadrennial
10	Reserve Component	Company	Biennial
11	Reserve Component	Company	Triennial
12	Reserve Component	Company	Quadrennial
13	Maneuver Training Command	Battalion	Biennial
14	Maneuver Training Command	Battalion	Triennial
15	Maneuver Training Command	Battalion	Quadrennial
16	Maneuver Training Command	Company	Biennial
17	Maneuver Training Command	Company	Triennial
18	Maneuver Training Command	Company	Quadrennial
19	Mix (Active Army > RC)	Battalion	Biennial
20	Mix (Active Army > RC)	Battalion	Triennial
21	Mix (Active Army > RC)	Battalion	Quadrennial
22	Mix (Active Army > RC)	Company	Biennial
23	Mix (Active Army > RC)	Company	Triennial
24	Mix (Active Army > RC)	Company	Quadrennial
25	Mix (RC > Active Army)	Battalion	Biennial
26	Mix (RC > Active Army)	Battalion	Triennial
27	Mix (RC > Active Army)	Battalion	Quadrennial
28	Mix (RC > Active Army)	Company	Biennial
29	Mix (RC > Active Army)	Company	Triennial
30	Mix (RC > Active Army)	Company	Quadrennial
31	Mix (Active Army ≅ RC)	Battalion	Biennial
32	Mix (Active Army ≅ RC)	Battalion	Triennial
33	Mix (Active Army ≅ RC)	Battalion	Quadrennial
34	Mix (Active Army ≅ RC)	Company	Biennial
35	Mix (Active Army ≅ RC)	Company	Triennial
36	Mix (Active Army ≅ RC)	Company	Quadrennial

Field Artillery battalions, and one Engineer company. Litton-Mellonics study team members were on site at all but one evaluation (a Field Artillery battalion). Table 2 lists the ten evaluations, and outlines the context in which they were conducted. For each the data include dates of evaluation, identity of evaluated unit, name and location of evaluation site, identity of controller/evaluator group, identity of aggressor, ARTEP evaluation level, and evaluated unit configuration. Seven evaluations were conducted at Active Army installations; five of the seven where the controller/evaluator personnel were stationed. The remaining three were conducted at Army National Guard (ARNG) installations. In all the evaluations all evaluators were Active Army personnel. Seven evaluations employed elements of Active Army units as aggressor forces, and three employed ARNG elements. All evaluations but one (a Field Artillery battalion) were conducted at level 3. Two Tank and two Mechanized Infantry battalions were evaluated in task force configuration; all other battalions were evaluated pure. The platoons of the Engineer company were attached to companies of the Mechanized Infantry battalion undergoing evaluation at the same time. Because the Engineer company was the only company in the AT 75 RC portion of the validation program and because it was evaluated in support of an infantry battalion (so that the infantry exercise scenario dominated the play, and to a large extent precluded and overrode some of the engineer ARTEP evaluation requirements), data pertinent to the Engineer company were not used. Although the variations in the conduct of the battalion evaluations for each type ARTEP rendered each evaluation somewhat distinct, the differences were not considered inimical

Table 2

Reserve Component Evaluations, AT 75, FORSCOM/TRADOC ARTEP Validation Program

Dates	Unit	Site	Evaluator Source	Aggressor Source	Level	Configuration
23-26 March 1975	1/123 AR (KY-ARNG)	Ft Hood, TX	2/67 AR Ft Hood, TX	2nd Sqdrn 1st Cav 2 Co's	L-3	Task Force
9-12 June 1975	1/168 FA (NE-ARNG)	Cp Guernsey, WY	1/19 FA Ft Carson, CO	1/19 FA	L-3	Pure
16-18 June 1975	3/117 IN (M) (TN-ARNG)	Ft Hood, TX	2/50 IN (M) Ft Hood, TX	C Co, 2/67 IN (M)	L-3	Task Force
28-31 July 1975	1/195 AR (NE-ARNG)	Ft Carson, CO	1/70 AR Ft Carson, CO	Trp E, 167 Cav 67 Bde (NE-ARNG)	L-3	Task Force
11-14 July 1975	2/134 IN (M) (NE-ARNG)	Ft Carson, CO	1/12 IN (M) Ft Carson, CO	2 Co's, Co - 170 AR Co - 112 AR	L-3	Task Force
23-26 June 1975	2/146 FA (WA-ARNG)	Ft Lewis, WA	1/11 FA Ft Lewis, WA	1/11 FA	L-1	Pure

(continued)

Table 2 (continued)

Dates	Unit	Site	Evaluator Source	Aggressor Source	Level	Configuration
3, 7-9 July 1975	1/303 AR (WA-ARNG)	Yakima Firing Center, WA	2/77 AR Ft Lewis, WA	2/77 AR	L-3	Pure
23-25 June 1975	1/161 IN (M) (WA ARNG)	Yakima Firing Center, WA	2/2 IN Ft Lewis, WA	2/2 IN	L-3	Pure
18-20 Aug 1975	1/134 IN (M) (NE-ARNG)	Cp Ripley, MN	1/11 IN (M) Ft Carson, CO	A Co, 1/134 IN (M) (NE-ARNG)	L-3	Pure
18-20 Aug 1975	867 EN Co (NE-ARNG)	Cp Ripley, MN	4th EN Co Ft Carson, CO	A Co, 1/134 IN (M) (NE-ARNG)	L-3	*

*Platoons attached to companys of 1/134 IN (M).

to pooling data for analysis by type ARTEP evaluation. Detailed discussions of these data are presented in Annexes A and B to this report.

(2) AT 76. The consideration in c above notwithstanding, a recommended RC unit ARTEP evaluation program for AT 76 was developed as a requirement of the study in Phase 2. In accordance with an agreement reached at the 10 June 1975 SAG meeting the recommended program was submitted to the COR and FORSCOM in an Informal Report of Preliminary Results on 17 November 1975 as well as in the Second Interim Report, dated 15 March 1976. The program involved selected options to be implemented variously in thirty-eight battalion size RC unit evaluations to provide AT 76 data comparable to the AT 75 data. In February 1976 FORSCOM published a "Tentative Schedule for Formal ARTEP Evaluations, TY 75-76." The schedule designated one hundred and seven (107) company size RC units to be evaluated variously by Maneuver Training Command (MTC), Active Army, or RC personnel. No mixed evaluator groups were designated nor indicated. Only company size units were included in the schedule.

(a) Eighty-one (81) evaluations distributed across eight (8) different ARTEP were selected from the FORSCOM schedule for a program of AT 76 cost and effectiveness data collection. The program is shown in Table 3. Two evaluations with each type evaluator/controller group were included where possible. Four of the eight ARTEP - Infantry, Maintenance, 105 mm (Towed) Field Artillery battalion, and Military Police company - were not included in the AT 75 FORSCOM/TRADOC ARTEP validation program.

Table 3

Data Collection Program, AT 76 RC Unit ARTEP Evaluations

ARTEP 19-77, MP Company

Evaluators	Unit	CONUSA	Location	Date
† 80th MTC	213th MP Co	1	Ft Bragg, NC	5-7 May
† 80th MTC	211th MP Co	1	Ft Pickett, VA	12-26 June
† 78th MTC	307th MP Co	1	Ft Pickett, VA	12-26 June

ARTEP 29-17 (Maintenance)

† 76th MTC	D, 726	1	Ft Drum, NY	29-30 July
† 85th MTC	D, 747	5	Cp Ripley, MN	21-24 June
# 49th Div (RC)	HQ, C, 949	5	Ft Hood, TX	10-12 June
# 49th Div (RC)	D, 949	5	Ft Hood, TX	10-16 June
† 28th Div (RC)	B, 728	1	Ft Pickett, VA	12-15 July

ARTEP 5-145, 5-25, Engineer

† 458 Engr Bn	Co A, 458 Engr	1	Ft Indiantown Gap, PA	3-6 May
# 49th Div (RC)	HQ Co, 111 Engr	5	Ft Hood, TX	14-16 June
† 2nd MTC	890 Engr Co	1	Cp Shelby, MN	5-19 June
* 76th MTC	B/242 Engr	1	Cp Edwards, MA	24 July-7 Aug
v 27th Engrs (AA)	A, B, C, D, 122d Engrs	1	Ft Bragg, NC	19-22 May
* 91st MTC	A, 820 Engr Bn	6	Cp Roberts, CA	19-22 July
* 1st MTC	169th Engr Co	6	Ft Chaffee, AR	16-19 Aug
x 9th Div (AA)	A, 321 Engr Bn	6	Yakima Firing Ctr, WA	19-21 July
† 28th Div (RC)	HQ, A, E, 103rd Engr Bn	1	Ft A. P. Hill, VA	14-16 July

(continued)

Table 3 (continued)

ARTEP 7-15, Infantry

	Evaluators	Unit	CONUSA	Location	Date
†	76th MTC	C, 1/101	1	Cp Edwards, MA	7-9 June
†	85th MTC	B, 2/	5	Cp Ripley, MN	21-24 June
v	28th Div (RC)	A, 2/109	1	Ft Pickett, VA	19-21 July
†	101st Div (AA)	ABC, CS, 2/153	5	Ft Chaffee, AR	27-29 July
v	101st Div (AA)	ABC, CS, 3/153	5	Ft Chaffee, AR	27-29 July
*	1st MTC	A, 1/137 IN	6	Ft Chaffee, AR	25-26 Aug
*	1st MTC	A, 2/137 IN	6	Ft Chaffee, AR	25-26 Aug
†	76th MTC	C, 1/169 IN	1	Ft Drum, NY	29-30 July
v	28th Div (RC)	B, 3/109	1	Ft Pickett, VA	21-22 July
v	28th Div (RC)	C, 1/109	1	Ft Pickett, VA	15-16 July

ARTEP 17-45, Infantry (M)

†	2nd MTC	A, B, C. 4/117	1	Cp Shelby, MN	5-19 June
†	218th Bde (RC)	B, 1/118	1	Ft Stewart, GA	6-19 June
†	218th Bde (RC)	B, 4/118	1	Ft Stewart, GA	6-19 June
v	1st CAV Div (AA)	ABC, CS, 2/120	1	Ft Hood, TX	19-21 July
†	1st IN (M) Div (AA)	C, CSC, 2/136	5	Cp Ripley, MN	21-24 June
§	9th IN Div (AA)	HHC, A, B, C, CSC 3/161 IN (M)	6	Yakima Firing Ctr, WA	22-26 Aug

ARTEP 17-35, Armor

v	1st CAV Div (AA)	ABC, CS, 2/252	1	Ft Hood, TX	19-21 July
†	78th MTC	A, 3/102	1	Ft Drum, NY	7-10 June
§	1st Div (AA)	A, 1/632	5	Ft McCoy, WI	10-12 June

(continued)

Table 3 (continued)

ARTEP 6-365, 6-155, Field Artillery

	Evaluators	Unit	CONUSA	Location	Date
†	78th MTC	A, B, 5/112	1	Ft Drum, NY	24-27 May
#	4th Div (AA)	A, C, 1/147 FA	6	Cp Ripley, MN	7-9 June
#	11th Corps (RC)	A, B, C, 1/49th	6	Cp Guernsey, WY	14-15 June
†	28th Div (RC)	1/229 FA (105)	1	Ft A. P. Hill, VA	20-22 July
#	1st Div (AA)	B, 1/120 FA	5	Ft McCoy, WI	10-12 June
§	2/34 FA (AA)	A, C, 1/201 FA	1	Ft Knox, KY	8-21 Aug
#	49th Div (RC)	C, 4/133 FA	5	Ft Hood, TX	21-23 June
#	9th Div (AA)	A, B, 2/222 FA	6	Dugway, PG, UT	14-15 June
§	4th Div (AA)	C, 1/168 FA	6	Ft Carson, CO	28-29 June
#	4th Div (AA)	A, 1/127 FA	6	Ft Carson, CO	26-28 July

† Evaluations visited, data collected, and interviews completed by 15 September 76.
# Evaluations from which data received by mail by 15 September 76.
§ Evaluations from which data due by mail not recieved as of 4 October 76.
x Scheduled evaluation cancelled.
* Data received after 15 Setpember 76, too late to use.
v Evaluations visited, data collected, insufficient time available to ARTEP participants for interviews.

(b) Table 3 shows that Litton-Mellonics study team members planned to visit and interview personnel at fifty-two (52) of the eighty-one (81) RC unit evaluations. The table also shows that although all scheduled visits were made, interviews at only thirty-three (33) were accomplished. Completed survey/questionnaire data forms from the thirty-three evaluations and forms received by mail from thirty-three (33) other evaluations not scheduled for visits, along with interview data obtained during the visits, and the survey of General Officers constitute all the AT 76 effectiveness data included in the study. Cost data collected and available as of the 15 September 1976 cut-off date were complete for the equivalent of forty (40) battalion evaluations.

d. Cost Estimates.

(1) The elements of cost for RC unit ARTEP evaluations for this study were identified with the assistance of FORSCOM, USACATB, III Corps, and other cognizant headquarters and agencies. All the identified cost elements were classified operational. No investment costs were identified for either the AT 75 or the AT 76 evaluations.

(2) Six elements of operational cost were identified:

- Personnel required for evaluations,
- Travel,
- Per Diem,
- Petroleum, Oil, and Lubricants (POL),
- Maintenance (repair parts), and
- Ammunition.

The data, as applicable, were reported for the following:

- Planning evaluation headquarters responsible for the writing of the exercise scenario and the conduct of the evaluation,
- Evaluator/Controller group,
- Support personnel such as drivers, radio operators, and range personnel,
- Aggressor personnel,
- Evaluated unit, and
- Attached and supporting units.

Personnel data was reported by number of personnel by category (Officers, Warrant Officer, Enlisted Man) and man-days by rank. Travel and per diem costs were applicable to personnel (who were not attending AT in fulfillment of their personal obligation) who travelled to an evaluation site different from home station. POL consumption was reported in terms of gallons by type. Maintenance cost was reported simply as the cost of the repair parts used during the evaluation and as a result of the post evaluation technical inspection. Ammunition used only during the evaluation was reported by type and quantity.

(3) To derive estimates of ARTEP evaluation implementation options costs a concept of estimated cost based on ARTEP document (ECD) was developed. (See Annex A to this report.) The concept involved the computation of an evaluation option cost relative only to a given evaluator source and a given

organizational level tested based on the averages of the acutal AT 75 or AT 76 evaluation costs of POL and maintenance and on estimates for personnel and ammunition in accordance with numbers and quantities, respectively, recommended in the applicable ARTEP, with travel and per diem computed for the recommended personnel to travel to the specific AT 75 or AT 76 evaluation sites. To obtain the ECD for each of the thirty-six (36) options the one time evaluation costs based on given evaluator sources and given organizational levels tested were adjusted by the frequency factor in respective options. Thus, for example, the ECD of a quadrennial option with given evaluator source and given organizational level tested is one-half the ECD of the biennial option with the same givens. In fact, the ECD are average annual costs as a function of the frequency of evaluation. ECD5 for all thirty-six options for Mechanized Infantry, Tank, and Field Artillery (155mm) battalions based on AT 75 data are shown in Table 4. Option costs (ECD6) for evaluations with the eight ARTEP used for RC unit evaluations during AT 76 are shown in Table 5.

(4) In considering only ARTEP evaluation implementation option costs, an inspection of Tables 4 and 5 discloses that option 12 - quadrennial evaluation at company level with all RC evaluators - is the best (lowest cost) option for evaluating all eight type RC units; and option 30 - quadrennial evaluation at company level with a mixed evaluator group, predominantly RC personnel - is the second best option for evaluating Tank, Field Artillery (155mm), and Military Police units, while option 9 - quadrennial evaluation at battalion level with all RC evaluators - is the second best option for evaluating Mechanized Infantry, Field Artillery (105mm), Infantry, and Engineer units. Option 11 presents lowest cost for maintenance units. Thus, if evaluation implementation option effectiveness were nugatory these options would be recommended for employment in an RC unit ARTEP evaluation program.

Table 4

Option Evaluation Costs
for AT 75 Mechanized Infantry, Tank, Field
Artillery, and AT 76 Military Police Evaluations

Option Number	Eval Source	Level	Freq	Costs & Rank							
				IN (M)	Rk	Tank	Rk	FA	Rk	MP	Rk
1	Act Army	Bn	Bi	49,832	36	31,288	36	35,300	36	*	*
2	Act Army	Bn	Tri	33,221	26	20,859	28	23,533	27	*	*
3	Act Army	Bn	Quad	24,916	16	15,644	21	17,650	16	*	*
4	Act Army	Co	Bi	46,836	33	22,423	31	29,560	32	3,768	17
5	Act Army	Co	Tri	31,224	23	14,948	17	19,707	21	2,512	12
6	Act Army	Co	Quad	23,418	13	11,211	9	14,780	10	1,884	7
7	Res Comp	Bn	Bi	29,440	19	18,209	23	23,409	26	*	*
8	Res Comp	Bn	Tri	19,627	6	12,139	11	15,606	11	*	*
9	Res Comp	Bn	Quad	14,720	2	9,104	3	11,705	3	*	*
10	Res Comp	Co	Bi	28,782	18	14,129	13	17,670	17	2,374	10
11	Res Comp	Co	Tri	19,188	5	9,419	4	11,780	4	1,583	3
12	Res Comp	Co	Quad	14,391	1	7,064	1	8,835	1	1,187	1
13	MTC	Bn	Bi	47,661	35	30,760	35	34,284	35	*	*
14	MTC	Bn	Tri	31,774	25	20,506	26	22,856	25	*	*
15	MTC	Bn	Quad	23,830	15	15,380	20	17,142	14	*	*
16	MTC	Co	Bi	44,802	32	23,067	32	28,544	31	3,816	18
17	MTC	Co	Tri	29,868	22	15,378	19	19,039	20	2,544	13
18	MTC	Co	Quad	22,401	11	11,533	10	14,272	9	1,908	8
19	Mix AA+	Bn	Bi	47,315	34	29,927	34	33,867	34	*	*
20	Mix AA+	Bn	Tri	31,543	24	19,951	25	22,578	24	*	*
21	Mix AA+	Bn	Quad	23,657	14	14,964	18	16,934	13	*	*
22	Mix AA+	Co	Bi	44,605	30	21,628	30	28,128	30	3,587	16
23	Mix AA+	Co	Tri	29,737	20	14,419	16	18,752	19	2,391	11
24	Mix AA+	Co	Quad	22,303	9	10,814	8	14,064	8	1,794	5
25	Mix RC+	Bn	Bi	34,539	28	21,480	29	26,381	28	*	*
26	Mix RC+	Bn	Tri	23,026	12	14,320	15	17,587	15	*	*
27	Mix RC+	Bn	Quad	17,269	4	10,740	6	13,191	5	*	*
28	Mix RC+	Co	Bi	33,297	27	16,203	22	20,642	22	2,723	14
29	Mix RC+	Co	Tri	22,198	8	10,802	7	13,761	7	1,815	6
30	Mix RC+	Co	Quad	16,648	3	8,101	2	10,321	2	1,361	2
31	Mix ≅	Bn	Bi	44,754	31	28,515	33	32,434	33	*	*
32	Mix ≅	Bn	Tri	29,836	21	19,010	24	21,622	23	*	*
33	Mix ≅	Bn	Quad	22,377	10	14,257	14	16,217	12	*	*
34	Mix ≅	Co	Bi	42,332	29	20,781	27	26,694	29	3,430	15
35	Mix ≅	Co	Tri	28,221	17	13,854	12	17,796	18	2,287	9
36	Mix ≅	Co	Quad	21,116	7	10,391	5	13,347	6	1,715	4

* MP ARTEP are written for company size units

Table 5

Option Evaluation Costs for AT 76 Field Artillery (155mm), Field Artillery (105mm), Maintenance and Military Police Evaluations

Option Number	Eval Source	Level	Freq	Costs & Rank							
				FA 155	Rk	FA 105	Rk	MAINT	Rk	MP	Rk
1	Act Army	Bn	Bi	34,491	35	28,970	36	*	*	*	*
2	Act Army	Bn	Tri	22,994	25	19,313	27	*	*	*	*
3	Act Army	Bn	Quad	17,246	14	14,485	16	*	*	*	*
4	Act Army	Co	Bi	28,752	31	26,313	33	1,954	17	3,768	17
5	Act Army	Co	Tri	19,168	20	17,542	22	1,303	13	2,512	12
6	Act Army	Co	Quad	14,376	9	13,156	12	977	9	1,884	7
7	Res Comp	Bn	Bi	24,506	27	18,088	23	*	*	*	*
8	Res Comp	Bn	Tri	16,337	12	12,058	7	*	*	*	*
9	Res Comp	Bn	Quad	12,253	3	9,044	2	*	*	*	*
10	Res Comp	Co	Bi	18,767	19	15,431	17	180	3	2,374	10
11	Res Comp	Co	Tri	12,511	4	10,287	4	120	2	1,583	3
12	Res Comp	Co	Quad	9,383	1	7,715	1	90	1	1,187	1
13	MTC	Bn	Bi	35,092	36	28,480	35	*	*	*	*
14	MTC	Bn	Tri	23,394	26	18,987	26	*	*	*	*
15	MTC	Bn	Quad	17,546	15	14,240	15	*	*	*	*
16	MTC	Co	Bi	29,352	32	25,823	31	2,029	18	3,816	18
17	MTC	Co	Tri	19,568	21	17,215	20	1,352	14	2,544	13
18	MTC	Co	Quad	14,676	10	12,912	10	1,014	10	1,908	8
19	Mix AA+	Bn	Bi	33,809	34	27,549	34	*	*	*	*
20	Mix AA+	Bn	Tri	22,539	24	18,366	25	*	*	*	*
21	Mix AA+	Bn	Quad	16,905	13	13,774	13	*	*	*	*
22	Mix AA+	Co	Bi	28,070	30	24,892	30	1,742	16	3,587	16
23	Mix AA+	Co	Tri	18,713	18	16,594	19	1,161	12	2,391	11
24	Mix AA+	Co	Quad	14,035	7	12,446	9	871	8	1,794	5
25	Mix RC+	Bn	Bi	27,167	29	20,809	28	*	*	*	*
26	Mix RC+	Bn	Tri	18,111	17	13,872	14	*	*	*	*
27	Mix RC+	Bn	Quad	13,583	6	10,404	5	*	*	*	*
28	Mix RC+	Co	Bi	21,427	22	18,152	24	624	6	2,723	14
29	Mix RC+	Co	Tri	14,285	8	12,101	8	416	5	1,815	6
30	Mix RC+	Co	Quad	10,714	2	9,076	3	312	4	1,361	2
31	Mix ≅	Bn	Bi	32,473	33	26,127	32	*	*	*	*
32	Mix ≅	Bn	Tri	21,649	23	17,418	21	*	*	*	*
33	Mix ≅	Bn	Quad	16,237	11	13,064	11	*	*	*	*
34	Mix ≅	Co	Bi	26,734	28	23,470	29	1,530	15	3,430	15
35	Mix ≅	Co	Tri	17,822	16	15,647	18	1,020	11	2,287	9
36	Mix ≅	Co	Quad	13,367	5	11,735	6	765	7	1,715	4

* MAINT and MP ARTEP are written for company size units

Table 5 (continued)

Option Evaluation Costs for AT 76 Mechanized Infantry, Infantry, Tank and Engineer Evaluations

Option Number	Eval Source	Level	Freq	Costs & Rank							
				IN(M)	Rk	IN	Rk	Tank	Rk	ENGR	Rk
1	Act Army	Bn	Bi	37,574	35	35,503	36	82,779	36	71,006	35
2	Act Army	Bn	Tri	25,049	27	23,669	28	55,186	30	47,337	23
3	Act Army	Bn	Quad	18,787	15	17,752	18	41,389	24	35,503	11
4	Act Army	Co	Bi	34,674	32	31,829	33	33,816	18	67,583	31
5	Act Army	Co	Tri	23,116	22	21,219	24	22,544	12	45,235	19
6	Act Army	Co	Quad	17,337	12	15,915	13	16,908	7	33,927	7
7	Res Comp	Bn	Bi	20,803	13	17,026	16	69,108	31	60,068	25½
8	Res Comp	Bn	Tri	13,869	6	11,351	6	46,072	25	40,045	13½
9	Res Comp	Bn	Quad	10,402	2	8,513	2	34,554	19	30,034	1½
10	Res Comp	Co	Bi	19,966	17	16,485	14	23,238	13	60,068	25½
11	Res Comp	Co	Tri	13,311	5	10.990	5	15,492	3	40,045	13½
12	Res Comp	Co	Quad	9,983	1	8,242	1	11,619	1	30,034	1½
13	MTC	Bn	Bi	38,579	36	34,606	35	82,687	35	71,079	36
14	MTC	Bn	Tri	25,719	28	23,070	27	55,125	29	47,386	24
15	MTC	Bn	Quad	19,289	16	17,303	17	41,344	23	35,540	12
16	MTC	Co	Bi	35,589	33	31,042	32	33,716	17	67,910	32
17	MTC	Co	Tri	23,726	24	20,694	23	22,477	11	45,273	20
18	MTC	Co	Quad	17,794	13	15,521	12	16,858	6	33,955	8
19	Mix AA+	Bn	Bi	35,603	34	33,082	34	81,149	34	69,648	34
20	Mix AA+	Bn	Tri	23,735	25	22,054	26	54,099	28	46,432	22
21	Mix AA+	Bn	Quad	17,802	14	16,541	15	40,574	22	34,824	10
22	Mix AA+	Co	Bi	32,950	30	29,813	30	32,481	16	66,888	30
23	Mix AA+	Co	Tri	21,967	20	19,875	20	21,654	10	44,592	18
24	Mix AA+	Co	Quad	16,475	9	14,906	10	16,241	5	33,444	6
25	Mix RC+	Bn	Bi	24,996	26	21,646	25	72,526	32	62,803	28
26	Mix RC+	Bn	Tri	16,664	10	14,430	9	48,350	26	41,868	16
27	Mix RC+	Bn	Quad	12,498	4	10,823	4	36,263	20	31,401	4
28	Mix RC+	Co	Bi	23,643	23	20,321	21	25,882	14	62,015	27
29	Mix RC+	Co	Tri	15,762	8	13,547	7	17,255	8	41,343	15
30	Mix RC+	Co	Quad	11,822	3	10,161	3	12,941	2	31,008	3
31	Mix ≅	Bn	Bi	33,633	31	30,660	31	79,338	33	68,290	33
32	Mix ≅	Bn	Tri	22,422	21	20,440	22	52,892	27	45,527	21
33	Mix ≅	Bn	Quad	16,816	11	15,330	11	39,669	21	34,145	9
34	Mix ≅	Co	Bi	31,226	29	27,797	29	31,147	15	65,921	29
35	Mix ≅	Co	Tri	20,817	19	18,531	19	20,764	9	43,947	17
36	Mix ≅	Co	Quad	15,613	7	13,898	8	15,573	4	32,961	5

(5) The data in Tables 4 and 5 were used in conjunction with ARTEP evaluation implementation option indexes to select prime candidate (cost-effective) options, discussed later in this section.

e. Effectiveness.

(1) Definition. Effectiveness was considered to be a function of the extent to which ARTEP evaluation meets its stated objectives and fulfills the implicit functions of an evaluative system, namely, to provide valid and useful feedback information.

(2) ARTEP Objectives. The objectives presented following are common to all type ARTEP:

- "To evaluate the ability of a (type) battalion to serve as a nucleus of a combined arms task force performing specified missions under simulated combat conditions." For this objective effectiveness determination was concerned with the accuracy and completeness of the information rendered through conduct of the evaluation.

- "To evaluate the efficiency and the effectiveness of past training of all echelons of the battalion from crew/squad through battalion/task force." Effectiveness with regard to this objective rested upon the extent to which the evaluation yielded information which reflected changes in unit (or sub-unit/element) performance through a test-train-retest cycle. (Because the units evaluated during AT 75 will not be evaluated during AT 76, and because records of previous evaluations cannot be matched to ARTEP information the aim of this objective cannot be quantitatively assessed.)

- "To provide a guide for training objectives by specifying minimum standards of performance for combat-critical missions and tasks." This objective relates to training only and therefore was not a concern for effectiveness of evaluation.

(3) Data Requirements. Accuracy, timeliness, and usefulness were selected as three essential characteristics of evaluation feedback, and therefore the bases of data necessary for the development of an index of option effectiveness.

(4) Data Collection. At the outset it was determined that all data needed for the conduct of effectiveness analysis would be obtained from on-going activities during 1975 and 1976, to include observation of ARTEP validation and RC unit evaluation exercises, the use of survey/questionnaires, interviews with personnel experienced and involved with ARTEP, and reviews and analysis of ARTEP results and evaluator comments.

(a) Not all these data collection efforts were planned for AT 75, nor were all feasible during that period. Most interview and some survey/questionnaire activities were obviated because all evaluations were conducted by Active Army personnel, and because neither the ARTEP document nor associated command guidance required formal feedback reports to the evaluated unit. The latter point is presented in the joint TRADOC/FORSCOM ARTEP validation team report as follows: "There appears to be a need for the ARTEP to better define the feedback cycle, rather than leaving it up to the individual evaluation groups to decide how to accomplish."[1] Comparative analysis of ARTEP evaluation results (deficiencies noted by the RC unit ARTEP evaluation evaluator/controller group) and the critique of training readiness (1-R report) rendered by a three-man Active Army evaluator team present throughout AT but normally not involved in the RC unit ARTEP evaluation per se

[1] Reference Number 21 in Annex E.

was precluded because the three-man team was an integral part of the ARTEP evaluation controller/evaluator group, with the result that principal evaluators served the purposes of two otherwise separate evaluations. In these circumstances it was unlikely that 1-R report information and ARTEP evaluation information would reflect meaningful differences. For AT 75, therefore, observations of evaluation exercises and survey/questionnaires provided all the useable data.

(b) Survey and interview activities were the major part of the planned data collection for AT 76 RC unit ARTEP evaluations. To provide the representative expert military judgement necessary for assessing ARTEP evaluation effectiveness RC and MTC evaluator/controller personnel as well as Active Army evaluator and RC unit personnel were included. Also included were branch school personnel involved in the development of the ARTEP. The interviews of these personnel provided rationale in support of the data obtained from the survey/questionnaire forms. An important part of the data collection effort for AT 76, not used during AT 75, was a separate survey of General Officers of TRADOC, FORSCOM, the CONUSA, corps, divisions, separate brigades, and the ARR. Slighty more than forty such commanders were included in the survey. Summaries of the interviews and the General Officers survey are in Appendix 3 to Annex B.

(c) The AT 75 and AT 76 survey/questionnaire sets each consisted of four pages. These included instructions, two rating data matrixes, a list of the thirty-six (36) ARTEP evaluation implementation options, and a respondent biographical data section. (See Enclosures B-1-1 and B-1-2, Appendix 1 to Annex B.) Approximately two hundred (200) and eight hundred (800) survey/questionnaire sets were distributed during AT 75 and AT 76, respectively, to personnel of all RC units and all evaluator/controller groups that participated in RC unit ARTEP evaluations listed in Table 3; branch schools staff personnel who were involved in developing ARTEP; cognizant DA, FORSCOM, TRADOC, USACATB personnel; and members of the SAG.

1 In the first matrix respondents used a five (5) point scale to rate the three option variables - evaluator source, evaluation schedule (frequency), and organizational level tested - separately in terms of the degree to which respondents felt each contributed to an ideal evaluation system as defined by the three essential characteristics of evaluation feedback: timeliness, accuracy, and usefulness (acceptability to the user).

2 In the second matrix respondents used the same five (5) point scale similarly to rate the alternative elements of each variable (e.g., MTC for evaluator/controller source, triennial for frequency, or company for organizational level tested) separately in terms of their perceived abilities to provide the three essential characteristics of evaluation feedback.

3 On the third page of the survey/questionnaire forms respondents simply ranked, from best down, their choices of ten options overall deemed most feasible and potentially effective.

4 The biographical data section was completed by each respondent -- with assurance of personal anonymity in all materials submitted to the Army under the study contract.

(5) Option Effectiveness Indexes.

(a) Cost-effectiveness analysis generally concerns systems (e.g., weapons, communications) for which the effectiveness of system output or performance can be assessed in terms that permit comparison against plan or design specifications. Since neither the ARTEP evaluation system nor any of the candidate implementation options function in this sense and specific evaluation feedback requirements, if any, are indefinite, option effectiveness indexes were designed to facilitate relative comparisons between options.

(b) The option effectiveness indexes by type ARTEP were derived as averages (arithmetic mean) of individual respondent option scores calculated from the survey/questionnaire rating data (matrixes) by means of a formula developed as a part of the study. The choice data (rankings on page 3 of the questionnaire) were used to test the consistence of each respondent group (controller/evaluator, branch school staff, and evaluated RC unit personnel) in completing the questionnaire forms.

Additionally, the interview data analysis included in Appendix 3 to Annex B of this report provides the rationale underlying the option effectiveness indexes data base. Table 6 lists the option effectiveness indexes for all options for AT 75 Mechanized Infantry, Tank, and Field Artillery (155mm) battalion evaluations. Table 7 lists the similar information for the eight type ARTEP evaluations conducted during AT 76.

(c) In considering only ARTEP evaluation implementation option effectiveness, an inspection of Table 6 discloses that options 1, 22, 4, and 16, respectively, are the best (highest relative effectiveness) options for evaluating Mechanized Infantry, Tank, Field Artillery (155mm) and Military Police units; and in Table 7 option 4 is the best option for evaluating Field Artillery (155mm), Tank, Infantry, and Engineer units while options 34, 26, and 35 are the best for evaluating Mechanized Infantry, Field Artillery (105mm), and Maintenance units. Thus, if evaluation implementation option costs were inconsequential these options would be recommended for employment in an RC unit ARTEP evaluation program.

f. Prime Candidate Options.

(1) The prime candidate options are a subset of the candidate implementation options selected for further consideration in developing assessment systems for use in periodic Reserve Component evaluations with the ARTEP.

(2) Since neither a maximum acceptable option cost nor a minimum acceptable option effectiveness index was ascertainable (to provide criteria for effecting an initial reduction in the number of options), the full list of thirty-six candidate implementation options remained for cost-effectiveness review. The review was based on a comparison of options according to the following principles:

Table 6

Option Effectiveness Indexes
for AT 75 Mechanized Infantry, Tank, Field
Artillery, and AT 76 Military Police Evaluations

Option Number	Eval Source	Level	Freq	Indexes & Rank							
				IN(M)	Rk	Tank	Rk	FA	Rk	MP	Rk
1	Act Army	Bn	Bi	138.6	1	151.9	3	134.2	2	*	
2	Act Army	Bn	Tri	121.8	10	134.8	9	123.7	10	*	
3	Act Army	Bn	Quad	109.7	18	125.3	19	114.2	22	*	
4	Act Army	Co	Bi	137.4	2	157.8	2	140.6	1	153.3	3
5	Act Army	Co	Tri	120.6	12	140.7	6	130.1	5	152.6	6½
6	Act Army	Co	Quad	108.5	20	131.1	14	120.6	15½	128.7	14
7	Res Comp	Bn	Bi	119.1	13	126.0	18	114.7	21	*	
8	Res Comp	Bn	Tri	102.3	27	108.9	31	104.2	32	*	
9	Res Comp	Bn	Quad	90.2	35	99.4	36	94.7	36	*	
10	Res Comp	Co	Bi	117.9	14	131.8	13	121.1	14	147.6	11
11	Res Comp	Co	Tri	101.1	28	114.7	27	110.6	26	146.8	12
12	Res Comp	Co	Quad	89.0	36	105.2	33	101.1	34	122.9	18
13	Man Tng Cmd	Bn	Bi	123.5	7	128.6	15	122.7	12	*	
14	Man Tng Cmd	Bn	Tri	106.7	21	111.5	29	112.2	25	*	
15	Man Tng Cmd	Bn	Quad	94.6	31	102.0	35	102.7	33	*	
16	Man Tng Cmd	Co	Bi	122.3	9	134.4	10	129.1	6	164.1	1
17	Man Tng Cmd	Co	Tri	105.5	23	117.3	25	118.6	17	163.4	2
18	Man Tng Cmd	Co	Quad	93.4	33	104.7	34	109.1	28	139.5	13
19	Mix AA+	Bn	Bi	133.0	3	145.0	4	127.3	7	*	
20	Mix AA+	Bn	Tri	116.2	15	127.9	17	116.8	18	*	
21	Mix AA+	Bn	Quad	104.1	25	118.4	23	107.3	29	*	
22	Mix AA+	Co	Bi	131.8	4	158.0	1	133.7	3	152.7	5
23	Mix AA+	Co	Tri	115.0	16	133.8	11	123.2	11	151.9	8½
24	Mix AA+	Co	Quad	102.9	26	124.2	20	113.7	23	128.1	15½
25	Mix RC+	Bn	Bi	122.5	8	132.2	12	120.6	15½	*	
26	Mix RC+	Bn	Tri	105.7	22	115.1	26	110.1	27	*	
27	Mix RC+	Bn	Quad	93.6	32	105.6	32	100.6	35	*	
28	Mix RC+	Co	Bi	121.3	11	138.0	8	127.0	8	152.9	4
29	Mix RC+	Co	Tri	104.5	24	120.9	22	116.5	19	152.0	8½
30	Mix RC+	Co	Quad	92.4	34	111.4	30	107.0	30	128.1	15½
31	Mix Equal	Bn	Bi	126.8	5	139.0	7	126.5	9	*	
32	Mix Equal	Bn	Tri	110.0	17	121.9	21	116.0	20	*	
33	Mix Equal	Bn	Quad	97.9	29	112.4	28	106.5	31	*	
34	Mix Equal	Co	Bi	125.6	6	144.8	5	132.9	4	152.6	6½
35	Mix Equal	Co	Tri	108.8	19	127.8	16	122.4	13	151.9	10
36	Mix Equal	Co	Quad	96.7	30	118.2	24	112.9	24	128.0	17

* MP ARTEP are written for company size units

Table 7

Option Effectiveness Indexes and Ranks
for AT 76 Field Artillery (155), Field Artillery (105),
Maintenance and Military Police Evaluations

Option Number	Eval Source	Level	Freq	Indexes & Rank							
				FA 155	Rk	FA 105	Rk	MAINT	Rk	MP	Rk
1	Act Army	Bn	Bi	133.7	6	102.3	33	*	*	*	*
2	Act Army	Bn	Tri	129.3	12	112.5	20	*	*	*	*
3	Act Army	Bn	Quad	113.5	29	107.2	28½	*	*	*	*
4	Act Army	Co	Bi	144.2	1	96.9	36	130.2	18	153.3	3
5	Act Army	Co	Tri	139.7	2	107.2	28½	137.1	9	152.6	6½
6	Act Army	Co	Quad	124.0	18	102.0	34	131.7	17	128.7	14
7	Res Comp	Bn	Bi	123.2	19	113.0	15½	*	*	*	*
8	Res Comp	Bn	Tri	118.7	24	123.4	2	*	*	*	*
9	Res Comp	Bn	Quad	103.0	35	118.0	9½	*	*	*	*
10	Res Comp	Co	Bi	133.5	7	107.8	25	134.0	15	147.6	11
11	Res Comp	Co	Tri	129.1	13	118.0	9½	140.7	5	146.8	12
12	Res Comp	Co	Quad	113.3	30	112.7	18½	135.3	12	122.9	18
13	Man Tng Cmd	Bn	Bi	119.9	23	106.7	30	*	*	*	*
14	Man Tng Cmd	Bn	Tri	115.4	27	116.9	11	*	*	*	*
15	Man Tng Cmd	Bn	Quad	99.7	36	111.6	21½	*	*	*	*
16	Man Tng Cmd	Co	Bi	130.2	10½	101.2	35	134.3	14	164.1	1
17	Man Tng Cmd	Co	Tri	125.6	16	111.6	21½	141.1	4	163.4	2
18	Man Tng Cmd	Co	Quad	109.9	31	106.2	31	135.7	11	139.5	13
19	Mix AA+	Bn	Bi	126.8	15	108.0	24	*	*	*	*
20	Mix AA+	Bn	Tri	122.3	21	118.3	6	*	*	*	*
21	Mix AA+	Bn	Quad	106.6	33	113.0	15½	*	*	*	*
22	Mix AA+	Co	Bi	137.2	4	102.6	32	132.8	16	152.7	5
23	Mix AA+	Co	Tri	132.7	9	112.9	17	139.6	7	151.9	8½
24	Mix AA+	Co	Quad	116.9	26	107.6	27	134.3	13	128.1	15½
25	Mix RC+	Bn	Bi	124.4	17	114.0	12	*	*	*	*
26	Mix RC+	Bn	Tri	120.0	22	124.4	1	*	*	*	*
27	Mix RC+	Bn	Quad	104.2	34	119.0	4½	*	*	*	*
28	Mix RC+	Co	Bi	134.7	5	108.8	23	136.4	10	152.9	4
29	Mix RC+	Co	Tri	130.2	10½	119.0	4½	143.3	2	152.0	8½
30	Mix RC+	Co	Quad	114.5	28	113.7	13	137.9	8	128.1	15½
31	Mix Equal	Bn	Bi	127.3	14	113.1	14	*	*	*	*
32	Mix Equal	Bn	Tri	122.8	20	123.3	3	*	*	*	*
33	Mix Equal	Bn	Quad	107.1	32	118.1	7½	*	*	*	*
34	Mix Equal	Co	Bi	137.6	3	107.7	26	140.0	6	152.6	6½
35	Mix Equal	Co	Tri	133.1	8	118.1	7½	146.9	1	151.9	10
36	Mix Equal	Co	Quad	117.3	25	112.7	18½	141.6	3	128.0	17

*MAINT and MP ARTEP are written for company size units

Table 7 (continued)

Option Effectiveness Indexes and Ranks for
AT 76 Mechanized Infantry, Infantry, Tank and Engineer
Evaluations

Option Number	Eval Source	Level	Freq	Indexes and Rank							
				IN(M)	Rk	IN	Rk	TANK	Rk	ENGR	Rk
1	Act Army	Bn	Bi	125.5	15	128.4	12	137.8	10	131.7	3½
2	Act Army	Bn	Tri	123.9	17	121.4	19	134.0	13	129.8	6½
3	Act Army	Bn	Quad	108.5	32	106.8	31	111.6	30	122.1	17½
4	Act Army	Co	Bi	133.7	3	143.3	1	153.2	1	139.9	1
5	Act Army	Co	Tri	132.1	5	136.3	6	149.3	2	138.0	2
6	Act Army	Co	Quad	116.7	26	121.7	18	127.1	20	130.3	5
7	Res Comp	Bn	Bi	120.3	21	120.2	20	121.5	25	116.7	27
8	Res Comp	Bn	Tri	118.7	23½	113.2	30	117.6	28	114.8	31
9	Res Comp	Bn	Quad	103.3	35	98.6	36	95.3	36	107.1	36
10	Res Comp	Co	Bi	128.5	9	135.1	7	136.4	11	124.9	13
11	Res Comp	Co	Tri	126.9	12	128.1	13	133.0	14	123.0	16
12	Res Comp	Co	Quad	111.5	29	113.5	29	110.8	31	115.3	30
13	Man Tng Cmd	Bn	Bi	119.9	22	124.0	15	132.2	16	120.2	20
14	Man Tng Cmd	Bn	Tri	118.3	25	117.0	24	128.6	19	118.3	24
15	Man Tng Cmd	Bn	Quad	102.9	36	102.4	33	106.3	33	110.6	33
16	Man Tng Cmd	Co	Bi	128.1	10	138.8	3	147.9	4	128.4	8
17	Man Tng Cmd	Co	Tri	126.5	13	131.9	9	143.9	7	126.5	10
18	Man Tng Cmd	Co	Quad	111.1	30	117.3	23	121.8	24	118.8	22
19	Mix AA+	Bn	Bi	125.1	16	125.3	14	132.7	15	123.5	15
20	Mix AA+	Bn	Tri	123.5	18½	118.2	22	128.8	18	121.6	19
21	Mix AA+	Bn	Quad	108.1	33	103.7	32	106.6	32	113.9	32
22	Mix AA+	Co	Bi	133.3	4	140.1	2	148.2	3	131.7	3½
23	Mix AA+	Co	Tri	131.7	6½	133.2	8	144.3	6	129.8	6½
24	Mix AA+	Co	Quad	116.3	27	118.6	21	122.0	23	122.1	17½
25	Mix RC+	Bn	Bi	123.5	18½	121.9	17	123.3	22	117.4	26
26	Mix RC+	Bn	Tri	121.9	20	114.9	28	119.4	26	115.5	29
27	Mix RC+	Bn	Quad	106.5	34	100.2	35	97.2	35	107.8	35
28	Mix RC+	Co	Bi	131.7	6½	136.7	5	138.7	9	125.6	12
29	Mix RC+	Co	Tri	130.1	8	129.7	11	134.8	12	123.7	14
30	Mix RC+	Co	Quad	114.7	28	115.2	27	112.6	29	116.0	28
31	Mix Equal	Bn	Bi	127.5	11	122.9	16	129.7	17	119.9	21
32	Mix Equal	Bn	Tri	125.9	14	115.9	26	125.9	21	118.0	25
33	Mix Equal	Bn	Quad	110.5	31	101.4	34	103.6	34	110.3	34
34	Mix Equal	Co	Bi	135.7	1	137.8	4	145.2	5	128.1	9
35	Mix Equal	Co	Tri	134.1	2	130.9	10	141.2	8	126.2	11
36	Mix Equal	Co	Quad	118.7	23½	116.2	25	119.0	27	118.5	23

- An option with given cost and given effectiveness index was dropped from the list of options if the list contained another option with the same or lower cost and a greater effectiveness index;

- An option with given cost and given effectiveness index was dropped from the list of options if the list contained another option with same or a greater effectiveness index and a lower cost.

Tables 8 and 9 were constructed to facilitate the review. The left most column, Index Rank, lists the numbers 1 through 36 in their natural order. It is used in conjunction with all other columns in the table. The columns headed Option Number, for the respective type ARTEP as indicated, list the number of the option associated with the rank number in the left most column (from Tables 6 and 7). Thus, for each type ARTEP the options are listed in order from the one with largest effectiveness index to the one with the smallest. The columns headed ECD Rank, for the respective type ARTEP as indicated, list the rank order numbers based on cost (from Tables 4 and 5) for the options listed immediately to the left. Arrayed in this way the information is such that in an ECD column for any number, say A, that is greater than a number, say B, appearing anywhere before it in the column the option associated with A has a lower effectiveness index and greater cost than the option associated with B, so that in accordance with the comparison principles the option associated with A is dropped from the list. For example, in Table 8 in the ECD column for Field Artillery the number 34 (seventh from the top) is greater than the number 30 (third from the top), which signifies

Table 8

Selection of Prime Candidate Options for Mechanized Infantry, Tank, Field Artillery, and Military Police ARTEP Evaluations

Index Rank	IN (M) Option Number	IN (M) ECD5 Rank	Tank Option Number	Tank ECD5 Rank	FA Option Number	FA ECD5 Rank	MP Option Number	MP ECD6 Rank
1	1	36	22	30	4	32	16	18
2	4	33	4*	31	1*	36	17	13
3	19*	34	1*	36	22	30	4*	17
4	22	30	19*	34	34	29	28*	14
5	31*	31	34	27	5	21	22*	16
6	34	29	5	17	16*	31	5	12
7	13*	35	31*	33	19*	34	34*	15
8	25	28	28*	22	28*	22	29	6
9	16*	32	2*	28	31*	33	23*	11
10	2	26	16*	32	2*	27	35*	9
11	28*	27	23	16	23	19	10*	10
12	5	23	25*	29	13*	35	11	3
13	7	19	10	13	35	18	18*	8
14	10	18	6	9	10	17	6*	7
15	20*	24	13*	35	6	10	30	2
16	23*	20	20*	25	25*	28	24*	5
17	32*	21	35*	12	17*	20	36*	4
18	3	16	7*	23	20*	24	12	1

(continued)

Table 8 (continued)

Index Rank	IN (M) Option Number	IN (M) ECD5 Rank	Tank Option Number	Tank ECD5 Rank	FA Option Number	FA ECD5 Rank	MP Option Number	MP ECD6 Rank
19	35*	17	3*	21	29	7	-	-
20	6	13	24	8	32*	23	-	-
21	14*	25	32*	24	7*	26	-	-
22	26	12	29	7	3*	16	-	-
23	17*	22	21*	18	24*	8	-	-
24	29	8	36	5	36	6	-	-
25	21*	14	17*	19	14*	25	-	-
26	24*	9	26*	15	11	4	-	-
27	8	6	11	4	26*	15	-	-
28	11	5	33*	14	18*	9	-	-
29	33*	10	14*	26	21*	13	-	-
30	36*	7	30	2	30	2	-	-
31	15*	15	8*	11	33*	12	-	-
32	27	4	27*	6	8*	11	-	-
33	18*	11	12	1	15*	14	-	-
34	30	3	18*	10	12	1	-	-
35	9	2	15*	20	27*	5	-	-
36	12	1	9*	3	9*	3	-	-

* Options with associated cost greater than other options earlier in the list with equal or greater effectiveness indexes.

Table 9

Selection of Prime Candidate Options for Field Artillery (155), Field Artillery (105), Maintenance and Military Police AT 76 Evaluations, Mechanized Infantry, Infantry, Tank, and Engineer AT 76 Evaluations

Index Rank	FA (155) Op No.	FA (155) ECD6 Rank	FA (105) Op No.	FA (105) ECD6 Rank	MAINT Op No.	MAINT ECD6 Rank	MP Op No.	MP ECD6 Rank	IN (M) Op No.	IN (M) ECD6 Rank	IN Op No.	IN ECD6 Rank	TANK Op No.	TANK ECD6 Rank	ENGR Op No.	ENGR ECD6 Rank
1	4	31	26	14	35	11	16	18	34	29	4	33	4	18	4	31
2	5	20	8	7	29	5	17	13	35	19	22	30	5	12	5	19
3	34*	28	32*	21	36*	7	4*	17	4*	32	16*	32	22*	16	1*	35
4	22*	30	27	5	17*	14	28*	14	22*	30	34	29	16*	17	22*	30
5	28*	22	29*	8	11	2	22*	16	5*	22	28	21	34*	15	6	7
6	1*	35	20*	25	34*	15	5	12	23*	20	5*	24	23	10	2*	23
7	10	19	33*	11	23*	12	34*	15	28*	23	10	14	17*	11	23*	18
8	35	16	35*	18	30*	4	29	6	29	8	23*	20	35	9	16*	32
9	23*	18	9	2	5*	13	23*	11	10*	17	17*	23	28*	14	34*	29
10	16*	32	11*	4	28*	6	35*	9	16*	33	35*	19	1*	36	17*	20
11	29	8	14*	26	18*	10	10*	10	31*	31	29	7	10*	13	35*	17
12	2*	25	25*	28	12	1	11	3	11	5	1*	36	29	8	28*	27

(continued)

Table 9 (continued)

Index Rank	FA (155) Op No.	FA (155) ECD6 Rank	FA (105) Op No.	FA (105) ECD6 Rank	MAINT Op No.	MAINT ECD6 Rank	MP Op No.	MP ECD6 Rank	IN (M) Op No.	IN (M) ECD6 Rank	IN Op No.	IN ECD6 Rank	TANK Op No.	TANK ECD6 Rank	ENGR Op No.	ENGR ECD6 Rank
13	11	4	30*	3	16*	18	18*	8	17*	24	11	5	2*	30	10*	25½
14	31*	33	31*	32	24*	8	6*	7	32*	21	19*	34	11	3	29*	15
15	19*	34	7*	23	10*	3	30	2	1*	35	13*	35	19*	34	19*	34
16	17*	21	21*	13	22*	16	24*	5	19*	34	31*	31	13*	35	11*	13½
17	25*	29	23*	19	6*	9	36*	4	2*	27	25*	25	31*	33	3*	11
18	6*	9	12	1	4*	17	12	1	20*	25	6*	13	20*	28	24	6
19	7*	27	36*	6	-	-	-	-	25*	26	2*	28	14*	29	20*	22
20	32*	23	2*	27	-	-	-	-	26*	10	7*	16	6*	7	13*	36
21	20*	24	15*	15	-	-	-	-	7*	18	24*	10	32*	27	31*	33
22	26*	17	17*	20	-	-	-	-	13*	36	20*	26	25*	32	18*	8
23	13*	36	28*	24	-	-	-	-	8*	6	18*	12	24*	5	36	5
24	8*	12	19*	34	-	-	-	-	36*	7	14*	27	18*	6	14*	24

(continued)

Table 9 (continued)

Index Rank	FA (155) Op No.	FA (155) ECD6 Rank	FA (105) Op No.	FA (105) ECD6 Rank	MAINT Op No.	MAINT ECD6 Rank	MP Op No.	MP ECD6 Rank	IN (M) Op No.	IN (M) ECD6 Rank	IN Op No.	IN ECD6 Rank	TANK Op No.	TANK ECD6 Rank	ENGR Op No.	ENGR ECD6 Rank
25	36*	5	10*	17	-	-	-	-	14*	28	16*	8	7*	31	32*	21
26	24*	7	34*	29	-	-	-	-	6*	12	32*	22	26*	26	25*	28
27	14*	26	24*	9	-	-	-	-	24*	9	30	3	36*	4	7*	25½
28	30	2	3*	16	-	-	-	-	30	3	26*	9	8*	25	30	3
29	3*	14	5*	22	-	-	-	-	12	1	12	1	30	2	26*	16
30	12	1	13*	35	-	-	-	-	18*	13	8*	6	3*	24	12	1½
31	18*	10	18*	10	-	-	-	-	33*	11	3*	18	12	1	8*	13½
32	33*	11	22*	30	-	-	-	-	3*	15	21*	15	21*	22	21*	10
33	21*	13	1*	36	-	-	-	-	21*	14	15*	17	15*	23	15*	12
34	27*	6	6*	12	-	-	-	-	27*	4	33*	11	33*	21	33*	9
35	9*	3	16*	31	-	-	-	-	9*	8	27*	4	27*	20	27*	4
36	15*	15	4*	33	-	-	-	-	15*	16	9*	2	9*	19	9*	1½

* Options with associated cost greater than other options earlier in the list with equal or greater effectiveness Indexes.

that option 22 has a greater effectiveness index and a lower cost than option 19, so that option 22 is more cost-effective than option 19, and therefore option 19 is dropped from further consideration in the study relative to Field Artillery unit evaluations with ARTEP. The most efficient way to use Tables 8 and 9 in the cost-effectiveness review was to start at the top of each ECD column, proceed down the column number by number, and mark with an asterisk (*) each option for which the associated ECD Rank number was greater than any ECD Rank number appearing before it in the column. All the options marked with an asterisk were dropped from further consideration in the study for the indicated type ARTEP evaluations. Alternatively, for each type ARTEP as shown the unmarked options constitute a subset of prime candidate options.

4. ARTEP Assessment Systems.

a. General. The most important part of the study concerned the development of assessment systems (frequency of testing, manner of application) to be recommended for use in periodic Reserve Component evaluations with ARTEP, to include the identification of units (by type, deployment objectives, mission to be tested) with which the assessment systems should be used. As guidance relative to deployment objectives considerations the SAG suggested the use of "D+60 NATO contingency deployment as the deployment objectives descrimination for RC units."[6] The considerations of type units and missions to be tested relate directly to the type ARTEP, and of course, the alternatives for frequency

---

[6]Disposition Form, DAMO-ODU, dated 13 June 1975, subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (10 June 1975); Inclosure: Minutes of the Meeting.

of testing and manner of application are manifest in the ARTEP evaluation implementation options. In addition to the classification of units by type ARTEP, a classification as Roundout, Affiliated, or non-Affiliated was considered. Finally, to provide a basis for estimating a total cost of the recommended assessment systems, on 2 July 1976 the COR provided a list of NATO contingency deployment RC units.

b. Foundation. Eleven assessment systems, one for each type ARTEP used in the AT 75 and AT 76 evaluations in this report, were developed. Each system consists of six parts corresponding to all possible combinations of the two deployment objective categories earlier than D+61 or after D+60) and the three categories of units - Roundout, Affiliated, and non-Affiliated. The systems are described in terms of ARTEP evaluation implementation options selected from among the prime candidate options in accordance with a set of definitions, assumptions, and rules.

(1) Definition. RC units scheduled to deploy earlier than D+61 are given higher priority for ARTEP evaluation than those scheduled to deploy after D+60.

(2) Assumption. Evaluation for roundout units takes precedence over evaluation for affiliated units, and evaluation for affiliated units takes precedence over evaluation for non-affiliated units.

(3) Rules.

(a) All RC units scheduled to deploy earlier than D+61 will be evaluated using the most effective options relative to the frequency variable alternatives.

(b) Combat arms RC units scheduled to deploy after D+60 will be evaluated using the second most effective options relative to the frequency variable alternatives.

(c) Non-combat arms RC units scheduled to deploy after D+60 will be evaluated using the third most effective options relative to the frequency variable.

(d) Roundout units scheduled to deploy earlier than D+61 will be evaluated using the most effective options relative to the controller/evaluator source variable alternatives.

(e) Affiliated units scheduled to deploy earlier than D+61 will be evaluated using the most effective options (preferred) or the second most effective options (acceptable) relative to the controller/evaluator source variable alternatives.

(f) Non-Affiliated units scheduled to deploy earlier than D+61 will be evaluated using the second most effective options (preferred) or the third most effective options (acceptable) relative to the controller/evaluator source variable alternatives.

(g) Roundout units scheduled to deploy after D+60 will be evaluated using the most effective options (preferred) or the second most effective options (acceptable) relative to the evaluator/controller source variable alternatives.

(h) Affiliated units scheduled to deploy after D+60 will be evaluated using the second most effective options (preferred) or the third most effective options (acceptable) relative to the evaluator/controller source variable alternatives.

(i) Non-Affiliated units scheduled to deploy after D+60 will be evaluated using the third most effective options (preferred) or the fourth most effective options (acceptable) relative to the evaluator/controller source variable alternatives.

(4) Development of Assessment Systems.

(a) Tables 10 and 11 list the prime candidate options and their descriptions respectively for the type units evaluated during AT 75 and AT 76. The information was extracted from Tables 8 and 9 to provide more convenient working tables for use in developing the assessment systems. For the same reason the information shown in Table 8 was extracted from Table B-15 in Annex B and Tables B-1-14 through B-1-16 in Appendix 1 to Annex B. The information in Table 9 was extracted from similarly entitled tables in Appendix 2 to Annex B.

1 A study of Table 10 reveals that all the prime candidate options for Tank, Field Artillery (155mm), and Military Police are company level

Table 10

Prime Candidate Options by Type ARTEP, AT 75

Option Description			Option Number			
Eval Source	Level	Freq	Mechanized Infantry	Tank	Field Artillery	Military Police
Act Army	Bn	Bi	1	-	-	-
Act Army	Bn	Tri	2	-	-	-
Act Army	Bn	Quad	3	-	-	-
Act Army	Co	Bi	4	-	4	-
Act Army	Co	Tri	5	5	5	5
Act Army	Co	Quad	6	6	6	-
Res Comp	Bn	Bi	7	-	-	-
Res Comp	Bn	Tri	8	-	-	-
Res Comp	Bn	Quad	9	-	-	-
Res Comp	Co	Bi	10	10	10	-
Res Comp	Co	Tri	11	11	11	11
Res Comp	Co	Quad	12	12	12	12
Man Tng Cmd	Co	Bi	-	-	-	16
Man Tng Cmd	Co	Tri	-	-	-	17
Mix AA+	Co	Bi	22	22	22	-
Mix AA+	Co	Tri	-	23	23	-
Mix AA+	Co	Quad	-	24	-	-
Mix RC+	Bn	Bi	25	-	-	-
Mix RC+	Bn	Tri	26	-	-	-
Mix RC+	Bn	Quad	27	-	-	-
Mix RC+	Co	Tri	29	29	29	29
Mix RC+	Co	Quad	30	30	30	30
Mix [illegible]	Co	Bi	34	34	34	-
Mix [illegible]	Co	Tri	-	-	35	-
Mix [illegible]	Co	Quad	-	36	36	-

Table 11

Prime Candidate Options by Type ARTEP, AT 76

Option Description			Option Number			
Eval Source	Level	Freq	FA(155)	FA(105)	MAINT	MP
Act Army	Co	Bi	4	-	-	-
Act Army	Co	Tri	5	-	-	5
Res Comp	Bn	Tri	-	8	-	-
Res Comp	Bn	Quad	-	9	-	-
Res Comp	Co	Bi	10	-	-	-
Res Comp	Co	Tri	11	-	11	11
Res Comp	Co	Quad	12	12	12	12
MTC	Co	Bi	-	-	-	16
MTC	Co	Tri	-	-	-	17
Mix RC+	Bn	Tri	-	26	-	-
Mix RC+	Bn	Quad	-	27	-	-
Mix RC+	Co	Tri	29	-	29	-
Mix RC+	Co	Quad	30	-	-	30
Mix Equal	Co	Tri	-	-	35	-

Table 11 (continued)

Prime Candidate Options by Type ARTEP, AT 76

Option Description			Option Number			
Eval Source	Level	Freq	IN(M)	IN	TANK	ENGR
Act Army	Co	Bi	-	4	4	4
Act Army	Co	Tri	-	-	5	5
Act Army	Co	Quad	-	-	-	6
Res Comp	Co	Bi	-	10	-	-
Res Comp	Co	Tri	11	11	11	-
Res Comp	Co	Quad	12	12	12	12
Mix AA+	Co	Bi	-	22	-	-
Mix AA+	Co	Tri	-	-	23	-
Mix AA+	Co	Quad	-	-	-	24
Mix RC+	Co	Bi	-	28	-	-
Mix RC+	Co	Tri	29	29	29	-
Mix RC+	Co	Quad	30	-	-	-
Mix Equal	Co	Bi	34	34	-	-
Mix Equal	Co	Tri	35	-	35	-
Mix Equal	Co	Quad	-	-	-	36

options, and that only the Mechanized Infantry list includes both battalion and company level options. In Table 11 only the Field Artillery (105mm) list includes both battalion and company level options.

2 A study of Tables 12 and 13 reveals that relative to the frequency variable biennial evaluations are most effective for all the combat arms type ARTEP except Field Artillery (105mm), and that triennial and quadrennial evaluations follow in effectiveness in that order. Further study of the tables discloses that Active Army evaluators provide the most effective evaluations for all the combat arms type units except Field Artillery (105mm), that the MTC rank first for the Military Police, and the mix (RC > AA) ranks first for the maintenance units. This evaluator source portion of the tables is used in conjunction with the rules (d) through (i) to assist in selecting the evaluation implementation options to constitute the assessment systems.

(b) To develop the four assessment systems it was convenient to use six cell matrixes, where the columns are headed roundout, affilitated, and non-affiliated and the row stubs are earlier than D+61 and after D+60. The matrix for Field Artillery (155mm) and the matrixes for all the other type units in this report are shown in Tables 14 and 15. Development of the assessment systems is explained in the following example for Field Artillery (Table 14).

1 The first cell in the matrix concerns roundout units scheduled to deploy earlier than D+61. In accordance with rule 3(a) and the frequency variable information in Table 12 only biennial evaluation options were considered. In Table 10 it was found that options 4, 10, 22, and 34 were the only prime candidate biennial options. Then in accordance with rule 3(d) and the evaluator source data in Table 12 option 4 was selected and placed in the first cell.

Table 12

Effectiveness Indexes Components Each Option
Variable Alternative, for AT 75 Mechanized Infantry, Tank,
Field Artillery, and AT 76 Military Police Evaluation

Variable (Alternative)	Components			
	Mechanized Infantry	Tank	Field Artillery	Military Police
Evaluator Source				
Active Army	53.9	56.8	53.4	51.7
RC	38.8	30.8	33.9	46.0
MTC	34.4	33.4	41.9	62.5
Mix (AA > RC)	48.3	49.8	46.5	51.1
Mix (RC > AA)	37.8	37.0	39.8	51.2
Mix (AA ≅ RC)	42.1	43.8	45.7	51.0
Frequency				
Biennial	46.1	54.5	43.6	50.2
Triennial	29.3	35.8	33.1	49.4
Quadrennial	17.2	27.8	23.6	25.5
Level				
Battalion	38.6	40.7	37.2	*
Company	37.4	46.6	43.6	51.4

* MP ARTEP written for company size units.

Table 13

Effectiveness Indexes, Components, Each Option
Variable Alternative. for AT 76 Field Artillery (155mm) Field
Artillery (105mm), Maintenance and Military Police Evaluations

Variable (Alternative)	Components			
	FA 155	FA 105	Maintenance	Military Police
Evaluator Source				
Active Army	48.8	30.3	42.0	51.7
RC	38.3	41.1	45.7	46.0
MTC	34.9	34.5	46.0	62.5
MIX (AA > RC)	41.9	36.0	44.6	51.1
MIX (RC > AA)	39.5	42.1	48.2	51.2
MIX (AA ≅ RC)	42.3	41.1	51.8	51.0
Frequency				
Biennial	44.9	29.6	38.6	50.2
Triennial	40.4	39.9	45.4	49.4
Quadrennial	24.7	34.6	40.1	25.5
Level				
Battalion	40.0	42.4	-	-
Company	50.4	37.0	49.6	51.4

Table 13 (continued)

Effectiveness Indexes, Components, Each Option
Variable Alternative, for AT 76 Mechanized Infantry,
Infantry, Tank and Engineer Evaluations

Variable (Alternative)	Components			
	Mechanized Infantry	Infantry	Tank	Engineer
Evaluator Source				
Active Army	45.7	46.4	56.6	52.5
RC	40.5	38.2	40.3	37.5
MTC	40.1	42.0	51.3	41.0
MIX (AA > RC)	45.3	43.3	51.6	44.3
MIX (RC > AA)	43.7	39.8	42.1	38.2
MIX (AA ≅ RC)	47.7	40.9	48.6	40.7
Frequency				
Biennial	42.7	45.9	47.2	38.7
Triennial	41.1	38.9	43.3	36.8
Quadrennial	25.7	24.3	21.1	29.1
Level				
Battalion	37.1	36.1	34.0	40.5
Company	45.3	51.0	49.4	48.7

Table 14

Assessment Systems Recommended* ARTEP
Evaluation Implementation Options, AT 75

Deployment Schedule	Field Artillery		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	4	4/22	22/34
After D+60	5/23	23/35	35/29

Deployment Schedule	Tank		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	22	22/34	34/10
After D+60	5/23	23/29	29/11

Deployment Schedule	Military Police		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	16	16	16
After D+60	30/12	12	12

Deployment Schedule	Mechanized Infantry		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	4 (1)**	4/22 (1/7)	22/34 (7/25)
After D+60	5/11 (2/8)	11/29 (8/26)	29 (26)

*Preferred and acceptable options are separated by the slash mark (/) in order, respectively.

**Numbers in parentheses constitute an assessment system of battalion level evaluations.

Table 15

Assessment Systems

Recommended ARTEP Evaluation Implementation Options
for Periodic Evaluation of Reserve Component Units, based on
AT 76 Data

Deployment Schedule	Field Artillery (155mm)		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	4	4/10*	10
After D+60	5/35	35/29	29/11

Deployment Schedule	Field Artillery (105mm)		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	26	26/8	8
After D+60	27/9	9/12	12

Deployment Schedule	Maintenance		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	35	35/29	29/11
After D+60	12	12	12

Deployment Schedule	Military Police		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	16	16	16
After D+60	30/12	12	12

* Preferred and acceptable options are separated by the slash mark (/) in order, respectively.

Table 15 (continued)

Assessment Systems

Recommended ARTEP Evaluation Implementation Options
for Periodic Evaluation of Reserve Component Units, based on
AT 76 Data

Deployment Schedule	Mechanized Infantry		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	34	34	34
After D+60	35/29	29/11	11

Deployment Schedule	Infantry		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	4	4/22	22/34
After D+60	29/11	11	11

Deployment Schedule	Tank		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	4	4	4
After D+60	5/23	23/35	35/29

Deployment Schedule	Engineer		
	Roundout	Affiliated	Non-Affiliated
Earlier than D+61	4	4	4
After D+60	5	5	5

* Preferred and acceptable options are separated by the slash mark (/) in order, respectively.

2 The second cell in the matrix concerns affiliated units scheduled to deploy earlier than D+61. With the procedure outlined immediately above the same four biennial evaluations came under consideration. In accordance with rule 3(e) option 4 was readily selected as the preferred option, and with further reference to the evaluator data in Table 12 the mixed evaluator (predominantly Active Army) alternative ranked second to the Active Army alternative so that option 22 was identified as the acceptable option. The two option numbers 4/22 were placed in the cell.

3 The third cell in the matrix concerns non-affiliated units scheduled to deploy earlier than D+61. Proceeding as outlined above the same four options again came under consideration. In accordance with rule 3(f) and reference to the evaluator data in Table 12 options 22/34 were selected as preferred and acceptable options, respectively.

4 For the left most cell in the second row of the matrix the use of rule 3(b) in conjunction with Table 12 determined that triennial evaluations were in order. Thus, from Table 10 options 5, 11, 23, and 35 came under consideration, and with the use of rule 3(g) and reference to Table 12 options 5/23 were selected as the preferred and acceptable options, respectively.

5 The use of rule 3(b) in conjunction with Table 12 followed by the use of rule 3(h) in conjunction with Table 12 provided the information necessary to select options 23/35 for the center cell in the lower row of the Field Artillery (155mm) matrix.

6 Finally the application of rule 3(b) with reference to Table 12 followed by the application of rule 3(i) with reference to Table 12 led to the selection of options 35/29 for the last cell in the matrix.

7 The selection of ARTEP evaluation implementation options as shown in the matrix constitutes a recommended assessment system for RC Field Artillery (155mm) units based on AT 75 data.

(5) Assessment systems for the seven other type RC units were developed similarly as the Field Artillery (155mm) system, using corresponding tables in Appendix 3 to Annex B. The selection of options that constitute the assessment systems are shown in respective matrixes in Tables 14 and 15.

(6) Since the list of prime candidate options for the Mechanized Infantry includes battalion level options as well as company level options a dual assessment system was developed. As shown in the Mechanized Infantry matrix in Table 14 the dual system is simply an all company level option system and an all battalion level option system (shown by the option numbers enclosed in parentheses), so that commanders may choose to start with one system and switch to the other at a time to be determined on the basis of training and evaluation progress.

(7) Because of changed ammunition requirements in the revised ARTEP documents used for AT 76 evaluations that AT 76 cost estimates are more current than those based on AT 75 experience. For this reason the assement systems for the combat arms type ARTEP as shown in Table 15 may be preferable to the corresponding systems in Table 14.

c. Cost of the Recommended Assessment Systems.

(1) Two cost estimates were developed for the overall RC unit assessment program described in Tables 14 and 15. The estimates were based on a twelve year period for the number of RC units in the NATO contingency deployment list provided by the COR, with an assumption of no changes in numbers of units or assessment system throughout the period. The twelve year period conveniently includes six evaluations for units evaluated biennially, four for those evaluated triennially, and three for those evaluated quadrennially. Option cost estimates were those shown in Table 5. Also, for comparisons a minimum and a maximum cost estimate were developed from data in Tables 5 and 7.

(2) The four cost estimates are shown in Table 16. The first was calculated for an overall system consisting of all lowest cost options; the second for an overall system consisting of all maximum effectiveness options; the third for an overall system consisting of all preferred options in Table 15; and the fourth for an overall system consisting of preferred options and all permissible acceptable options in Table 15.

(3) Table 16 shows a clear and significant dollar difference between an assessment system of minimum cost options and one of maximum effectiveness options. The latter costs almost three times the former. The table shows only a five percent cost difference between the system of all preferred options and the system of preferred and acceptable options.

5. Ancillary Investigations.

a. Introduction. At the 10 June 1975 SAG meeting to review the First Interim Report one discussion concerned the importance of differentiating between requirements for officer evaluators versus enlisted evaluators/data collectors in constituting evaluator groups for RC unit evaluations using ARTEP. Another discussion concerned the recognition that the choice of

Table 16

Estimated Costs of Select Assessment Systems for
Eight Type ARTEP Over A Twelve Year Period

	Minimum Cost Options	Maximum Effectiveness Options	Cost-Effective: All Preferred Options	Cost-Effective: Preferred and All Permissible Acceptable Options
Field Artillery (155)	$ 3,940,860	$ 12,075,840	$ 6,941,340	$ 5,821,440
Field Artillery (105)	1,296,120	2,330,496	1,344,336	1,312,068
Maintenance	7,560	85,680	7,560	7,560
Military Police	484,296	1,556,928	705,132	705,132
Infantry (Mechanized)	5,031,432	15,737,904	8,169,672	7,842,468
Infantry	4,252,872	16,423,764	6,421,044	6,421,044
Tank	5,716,548	16,637,472	11,073,768	9,715,020
Engineer	15,587,652	35,915,580	26,158,725	26,158.725
	$ 36,317,340	$100,763,664	$ 60,821,577	$ 57,983,457

implementation options for ARTEP could be affected by the facilities available. On the basis of these discussions it was agreed that the study effort would include a survey of major training sites and an analysis of ARTEP evaluator tasks and position assignments. The two investigations are presented separately and completely in Annexes C and D to this report. Paragraphs b and c following are precis of this work.

b. Analysis of ARTEP Evaluator Tasks and Position Assignments.

(1) Purpose. To review recommended evaluator officer assignments to determine the feasibility of using qualified noncommissioned officers (NCO) in lieu of officers in selected positions.

(2) Methodology. Analysis was made of the individual judgments required to accomplish assessment of performance of ARTEP mission tasks. Standards listed in the training and evaluation outlines for Infantry (ARTEP 7-45), Tank (ARTEP 17-35), and Field Artillery (ARTEP 6-365) battalion ARTEP were used in this analysis. Evaluator requirements for assessing performance of various tasks during tactical operations at ARTEP evaluation levels 1, 2, and 3 were identified for each suggested evaluator position. The requirements were then compared with the major duties and tasks of appropriate senior NCO military occupational specialty (MOS) descriptions contained in AR 611-201, 3 February 1975.

(3) Results. A significant number of officer evaluator positions were identified as candidates for NCO substitution at evaluation levels

1, 2, and 3 for both Infantry and Tank battalion ARTEP evaluations, and one officer position was so identified for the 155mm (SP) Field Artillery battalion ARTEP evaluation.

(a) For the Infantry (M) battalion evaluation nine substitutions are recommended at level 1, and twelve are recommended at levels 2 and 3. The positions, the recommended substitutions, and the changes in evaluator group totals are shown in Tables C-1 and C-2 in Annex C.

(b) For the Tank battalion evaluation six substitutions are recommended at all levels. The positions, the recommended substitutions, and the changes in evaluator group totals are shown in Tables C-1 and C-3 in Annex C.

(c) For the Field Artillery battalion evaluation only the substitution of a senior communications NCO (tactical communications chief, MOS 31G40, E-7 or MOS 31G50, E-8) for the battery communications evaluator (CPT/LT) is recommended. No other artillery officer evaluators were selected for possible NCO substitution becuase they evaluate either positions with peer counterparts or positions for which there are no NCO equivalents.

c. Major Training Sites Suitable for ARTEP Evaluations.

(1) Purpose. The purpose of the survey was to determine which sites are suitable for ARTEP evaluations and to identify the type ARTEP which may be employed at each such site.

(2) Scope. The survey included most Active Army, Army National Guard, and United States Army Reserve major training sites in the United States. The type ARTEP applicable to Infantry (M), Tank, Field Artillery, and Engineer RC units were given priority in the survey. Data used were derived from available published materials and through telephone interviews with operations and training staff personnel at the sites.

(3) Approach. The approach involved a simple comparison of maneuver area requirements for each type ARTEP evaluation with the training areas available at the individual major training sites to identify those sites that have adequate areas. Additionally, where applicable the approach included similar comparisons of ARTEP requirements for firing range facilities and equipment with firing range facilities and equipment available at the individual sites.

(4) Results. In accordance with the outlined approach major training sites were separated into three categories. Table D-5 (annex D) lists seventeen (17) Annual Training Equipment Pool (ATEP) sites or Equipment Concentration Sites (ECS) with equipment, live fire facilities, and maneuver areas capable of supporting ARTEP as indicated. These ATEP sites also have requisite training acreage to support any other type ARTEP field exercise. Table D-6 (Annex D) lists thirty-seven (37) sites with training areas capable of supporting some ARTEP evaluations, especially light infantry battalion. The ECS in this table do not have sufficient equipment to support all ARTEP evaluations. In addition to providing for necessary equipment before the sites may be used

for ARTEP evaluations, the range facilities at each site must be reviewed. The third category of sites includes those judged unsuitable for ARTEP evaluations. (A list of these sites is available in Annex D to this report.) On the basis of a comparison of the major training site data, ARTEP evaluation requirements data, and the geographical distribution of priority early deployment units by type it was concluded that a sufficient number of adequate training sites exist in each of the CONUSA areas for ARTEP evaluations.

6. Findings

a. ARTEP Evaluation Cost.

(1) Base cost data were not available for Reserve Component Army Training Test evaluations.

(2) No investment cost was reported in training years 75 or 76.

(3) The Army expense system does not provide maintenance data for direct support or general support of specific units.

(4) Ammunition and personnel cost represent 73% to 93% of the ECD with Active Army evaluators.

(5) The cost estimates sensitized were relatively invariant to cost element deviations of ± 10%.

(6) First year EC were high because of additional support and emphasis. For example, FA (155mm) evaluations for AT 75 utilized 93%

more ammunition than recommended by the ARTEP while in AT 76 it was 9% below the ECD.

(7) The Engineer average consumption of ammunition is only 14% of the ECD; the ARTEP recommendations appear high.

(8) Option number twelve (12) (Reserve Component evaluators, Quadriennial, Company level) was the least expensive option for all type units during both AT 75 and AT 76. Options thirty (30) (mix predominantly Reserve Component evaluators, Quadriennial, Company level) and nine (9) (Reserve Component evaluators, Quadriennial, Battalion level) were the two next least expensive selections.

(9) ECD and AEC differed significatly. Annumition costs gave rise to the most consistently dramatic discrepancies. Personnel costs also contributed greatly to differences due to various combinations of evaluators used during AT 76 as compared with ECD which was based only on Active Army evaluators.

b. ARTEP Evaluation Effectiveness.

(1) Based on AT 75 data options 1 (Active Army evaluators, Biennial, Battalion level), 4 (Active Army evaluators, Biennial, Company level), and 22 (Evaluator mix predominantly Active Army personnel, Biennial, Company level) respectively are the most effective ARTEP evaluation implementation options for Mechanized Infantry, Field Artillery (155mm), and Tank RC units.

(2) Based on AT 76 data option 4 is the most effective for ARTEP evaluations of Field Artillery (155mm), Tank, Infantry, Engineer RC units; options 34 (Evaluator mix approximately equal Active Army and RC personnel, Biennial, Company level), 26 (Evaluator mix predominantly RC personnel, Triennial, Battalion level) 16 (MTC evaluators, Biennial, Company level), and 35 (Evaluator mix approximately equal Active Army and RC personnel, Triennial, Company level) respectively are the most effective ARTEP evaluation implementation options for Mechanized Infantry, Field Artillery (105mm), Military Police, and Maintenance RC units.

(3) In the model for calculating individual respondent option scores changes in the independent variables have less relative impact on larger values in the range of the dependent variable than the same changes in the independent variables have on the dependent variable at the low end of the range.

(4) For both AT 75 and AT 76 data respondent group option indexes and the same respondent group option choices correlated positively so that without loss of reliability either might be used.

(5) For both AT 75 and AT 76 there was strong agreement among the three sets of option effectiveness indexes for each type ARTEP derived from the rating data received from the three respondent groups - evaluator, RC unit, and branch school personnel.

(6) For AT 75 data, based on a comparison test of the frequency distribution of the option effectiveness indexes it is unlikely that the respondents' rating data were generated at random. Correlation analysis

showed a high level of consistence between option ranks determined form AT 76 data and those from AT 75 data. Therefore, because the two sets of data were collected and used in the same way to derive option effectiveness indexes it was accepted that the AT 76 data, similarly as the AT 75 data, were not random.

(7) A review of respondents biographical data showed that the RC and Active Army AT 75 and AT 76 survey/questionnaire respondents were experienced, branch qualified officers, well suited for ARTEP duty assignments.

(8) With ten percent variations in the values of the option effectiveness indexes components - evaluator source, evaluation schedule (frequency), organizational level tested, timeliness, accuracy and usefulness - the ranks of approximately ten percent of the thirty-six indexes were affected for all ARTEP used during AT 75 and AT 76. The highest rank options were virtually unaffected.

c. Analysis of ARTEP Evaluator Tasks and Position Assignments.

(1) The recommended addition of senior noncommissioned officers to assume some ARTEP evaluator team officer positions should not cause changes in effectiveness of evaluation.

(2) Positions selected for NCO substitution are those for which the needed skills fall well within the bounds of required expertise of an Infantry or Armored Senior Sergeant or the Artillery Tactical Communications Chief.

(3) Some difficulty could be experienced in those situations where senior NCO are evaluating officer led subunits. This may occur during Infantry and Tank crew/platoon evaluations. The OIC should be made aware of possible difficulties and be charged with briefings and critiques of any officer led unit.

(4) Consideration might be given to expanding the role of senior infantry and tank NCO during live fire exercises. It appears to be an unnecessary officer personnel strength burden to require commissioned evaluators as OIC and SO for each of the subunit live firing ranges.

d. A comparison of major training site data, ARTEP evaluation requirements data, and the geographical distribution of priority early deployment units by type reveals that a sufficient number of adequate training sites exist in each of the Army areas for ARTEP evaluations.

e. ARTEP Evaluation Personnel Interviews.

(1) Thirty-nine (39) percent of the total number of interviewees observed the evaluated units personnel attitudes toward the ARTEP exercise "somewhat positive," and forty-one (41) percent observed the attitudes to be "strongly positive."

(2) Eighty-nine (89) percent of all interviewees felt that ARTEP evaluation results in an accurate training/proficiency assessment (account of a unit's performance).

(3) Eighty-nine (89) percent of the two hundred and eighty (280) evaluators and RC unit personnel interviewed selected company level ARTEP evaluations as best for RC units. Thirty-two (32) percent reasoned that "You get closer evaluation and more useful feedback at company level" and thirty-eight (38) percent felt that "Company level missions permit evaluators to see and report more detail about subunit and team/crew performance."

(4) Forty-nine (49) percent of the interviewees preferred RC unit ARTEP evaluations every two years, and thirty-four (34) percent preferred evaluations every three years. Approximately six in ten of the first group stated that "Every AT would be too often. Every two years would permit maximum training accomplishment and still partially address the problem of personnel turbulence." One of every two in the second group stated that "At this point a maximum turnover of lower ranked personnel will have occurred and feedback from a formal evaluation would be more beneficial to the commander."

(5) Three of seven alternative sources of evaluators were selected by almost equal numbers of interviewees.

(a) Thirty-six (36) percent of the evaluators and sixteen (16) percent of the unit personnel (26 percent of the 280 total) indicated preference for MTC evaluators. One-half of this interviewee group felt that "MTC evaluators are experienced in preparing and administering field exercises," and one-third of the group felt that "Evaluating ARTEP is a MTC mission related project."

(b) Sixteen (16) percent of the evaluators and twenty-nine (29) percent of the unit personnel (24 percent of the 280 total) selected the equal mix of Active Army and Reserve or Guard personnel alternative as the best type evaluator group for ARTEP evaluation of RC units. Five in eight of this group of interviewees experessed the view that the equal mix team "Should provide the best evaluation. A mix of professionals and RC evaluators blends expert tactical knowledge and RC unit knowledge and understanding."

(c) Approximately twenty (20) percent of the unit personnel and the same ratio of evaluator interviewees selected the Active Army evaluator alternative. Slightly more than half of this interviewee group felt that "Active Army evaluators should be more proficient (knowledgeable) and should have less bias towards specific RC units."

f. Survey of Active Army General Officers.

(1) Source of Evaluators. Collective comments indicated a strong preference for evaluation of roundout and affiliated units by their sponsor units. In general, the rationale was that sponsor units will be better able to assist in the development of training programs and structure training assistance to address weaknesses and deficiencies noted at first hand. There was general agreement that nonaffiliated units should be evaluated by personnel from a headquarters two levels higher or by maneuver training command personnel agumented, where necessary, by Active Army personnel. The rationale was that evaluation of all nonaffiliated RC units is beyond the capability of a single source and that the majority should be evaluated by a headquarters two level higher with maneuver training command participation as next best choice.

(2) Frequency of Evaluation. A formal ARTEP evaluation every three years predominates in the comments for all RC units. The rationale was that resources do not permit more frequent evaluations and that units would require the intervening period for other required mission essential training and the conduct of informal ARTEP evaluations.

(3) Level of Evaluation. There was agreement that all RC units should be evaluated at company level with a few units possibly progressing to battalion level evaluation. The rationale was that company level evaluation is the most that should be expected of RC units in general, considering training time limitations, but that some roundout and affiliated units with sponsor assistance may possibly progress to battalion level evaluation.

g. Assessment Systems

(1) For the list of NATO Contingency Deployment RC units provided by the COR on 2 July 1976 an assessment system of all maximum effectiveness options regardless of cost is approximately 2.8 times a system of minimum cost option irrespective of effectiveness over a twelve year period.

(2) Over the twelve year period there is only a five (5) percent difference between the cost of a system of all cost-effective preferred options and a system of cost-effective preferred and acceptable options for the list of NATO Contingency Deployment RC units.

(3) The twelve year period cost of a system of all cost-effective preferred options is forty (40) percent less than the cost of a system of maximum effectiveness options and sixty-seven (67) percent larger than the cost of a system of minimum cost options.

ANNEX A

ARTEP EVALUATION COST

(Bound separately in Volume II)

ANNEX B

ARTEP EVALUATION EFFECTIVENESS

(Bound separately in Volume III)

ANNEX C

ARTEP EVALUATOR TASKS AND POSITION ASSIGNMENTS

Annex C

ANALYSIS OF ARTEP EVALUATOR TASKS AND POSITION ASSIGNMENTS

1. Introduction. At the 10 June 1975 Study Advisory Group (SAG) meeting for the Reserve Component Unit Evaluation Analysis (C-E) additional guidance provided to the study team included a requirement to consider, in determining the source of evaluators, the importance of differentiating between requirements for officer evaluators versus enlisted evaluators/data collectors. This annex presents the work done in response to this guidance. The presentation begins with a statement of the purpose, a description of the methodology, a summary of the results, and a discussion of the analysis leading to the results.

2. Purpose. To review recommended evaluator officer assignments to determine the feasibility of using qualified noncommissioned officers in lieu of officers in selected positions.

3. Methodology.

a. An analysis was made of the nature of individual judgments required to accomplish assessment of performance of ARTEP mission tasks. Standards listed in the training and evaluation outlines for Infantry (ARTEP 7-45), Tank (ARTEP 17-35) and Artillery (ARTEP 6-365) battalion ARTEP were used in this analysis. The senior and deputy senior evaluator positions were not included in the analyses because there are no NCO equivalents.

b. Evaluator requirements for assessing performance of various tasks during tactical operations at levels 1, 2 and 3 were identified for each evaluator position. The requirements were then compared with the major duties and tasks

of appropriate senior noncommissioned (NCO) officer military occupational specialty (MOS) descriptions contained in AR 611-201, 3 February 1975.

c. Consideration was given to the rank of the individual in charge of the unit or sub-unit undergoing evaluation. In those instances where senior NCO possessed the requisite qualifications to evaluate units headed by officers, at least one officer evaluator position was retained in order to allow an officer in charge (OIC) with NCO assistants to conduct the evaluation. If necessary, under these circumstances, the OIC could conduct the briefings and critiques.

d. Another officer personnel consideration was the requirement for commissioned officers to serve as OIC and safety officers (SO) during infantry and tank battalion sub-unit live firing exercises (Chapter 2, AR 385-63, 28 February 1973). In view of the wealth of experienced senior NCO assigned to ARTEP evaluator teams there may be justification to waiver the commissioned officer requirement in some cases.

4. Summary of Recommended NCO Substitutions.

a. Number. As a result of comparisons and considerations certain officer evaluator positions were selected as candidates for NCO substitution.

(1) The officer evaluator strength figures shown in Table C-1 reflect the impact of the recommended NCO substitutions upon Infantry and Tank battalion evaluator teams. Details of the recommended substitutions are shown in the tables on pages C-14 and C-15, respectively.

(2) The recommended Artillery battalion 155 mm (SP) evaluator substitutions consist of a senior communications NCO for the battery communications

Table C-1

Infantry Battalion (Mech)
(ARTEP 7-45)

Level 1		Level 2		Level 3	
ARTEP Suggested	Recommended Change	ARTEP Suggested	Recommended Change	ARTEP Suggested	Recommended Change
OFF 23	OFF 14 (-9)	OFF 27	OFF 15 (-12)	OFF 23	OFF 11 (-12)
NCO 16	NCO 25 (+9)	NCO 23	NCO 35 (+12)	NCO 23	NCO 35 (+12)

Tank Battalion
(ARTEP 17-35)

Level 1		Level 2		Level 3	
ARTEP Suggested	Recommended Change	ARTEP Suggested	Recommended Change	ARTEP Suggested	Recommended Change
OFF 21	OFF 15 (-6)	OFF 21	OFF 15 (-6)	OFF 13	OFF 7 (-6)
NCO 13	NCO 19 (+6)	NCO 13	NCO 19 (+6)	NCO 13	NCO 19 (+6)

CPT/LT evaluator (see table, page C-16). No other artillery officer evaluators were selected for NCO substitution since they either are evaluating positions with peer counterparts or positions for which there are no NCO equivalent.

b. Duties and skills of recommended NCO substitutes. MOS duties of senior NCO recommended as officer evaluator substitutes may be found in paragraph 5a. Unlike officers, NCO are required to undergo annual testing of their knowledge of these requisite duties and skills.

5. Discussion.

a. Officer Evaluator Positions Recommended for NCO Substitution.

(1) Assistant Infantry or Tank company/team evaluator, LT. This officer assists the MAJ/CPT company/team evaluator in observing and assessing unit performance of tasks assigned as part of the fundamental ARTEP tactical missions for units at Level 1, 2 and 3. He extends the senior company/team evaluator's data collecting capability through coverage of additional areas and activities. This officer must have served in a unit of the type undergoing evaluation. Recommended infantry NCO substitutions are for a Senior Sergeant, E-8, MOS 11G50 or E-7, MOS 11B40. The recommended tank NCO substitutions are for a Senior Sergeant, E-8, MOS 11E50, or E-7, MOS 11E40.

(a) Duties, Master Sergeant, E-8, MOS 11G50.

Serves as First Sergeant in a company or as Chief Instructor in a training facility, Chief Advisor to a Reserve Component unit, or Chief Advisor to foreign military unit.

Must be able to perform the duties of Light Weapons

Infantryman (11B), Infantry Indirect Fire Crewman (11C), Infantry Operations and Intelligence Specialist (11E), or Infantry Direct Fire Crewman (11H) at the "4" skill level. Serves as First Sergeant of a company. Interprets and supervises execution of company policy and standard operating procedures (SOP). Assists in planning, coordinating, and supervising all activities that support the company mission. Advises company commander on all matters concerning enlisted personnel, to include assignments, reassignments, transfers, promotions, granting of passes and leave, punishments, welfare, privileges, and awards. Directs and coordinates company administration. Forms unit for drill, ceremonies, and other military formations. Receives report of personnel present and absent, and reports number of unauthorized absences. Holds NCO call to disseminate instructions and information to subordinate enlisted supervisors. Coordinates operation of company food service and supply activities. Assists company commander in accomplishing unit training. Assists in inspection of organizational activities as prescribed by commander, observes discrepancies, and initiates appropriate corrective action.

Serves as Chief Instructor in a training facility, Chief Advisor to a Reserve Component unit, or Chief Advisor to a foreign military unit.

(b) Duties, Sergeant First Class, E-7, MOS 11B40.

Must be able to perform the duties of Infantryman (11B20). Commands infantry fire team, rifle or crew-served weapons squad, section, or platoon in combat. Supervises tactical deployment of weapons and personnel. Selects weapons emplacement sites. Evaluates terrain and assigns fields of fire, target types, and target areas. Controls and selects ammunition types for use against specific targets. Measures angles with military relation formula, field

glasses, or map. Establishes observation post. Observes, estimates range, requests, shifts, and adjusts unit and supporting indirect fire. Computes and reports firing data. Orders and directs fire and movement to destroy enemy personnel, weapons, and equipment. Commands patrols engaged in obtaining combat information. Supervises construction of hasty field fortifications, security of unit, preventive maintenance of weapons and equipment, and receipt, storage, and distribution of food, supplies, and ammunition. Instructs replacements. Enforces correct communication procedures.

(c) Duties, Master/First Sergeant, E-8, MOS 11E50.

Must be able to perform the duties of Armor Crewman (11E40). Serves as Operations Sergeant in operations section of battalion, group, combat command, division, and comparable headquarters. Prepares operations directives, reports, and records. Assists in planning tactical operations. Interprets tactical and technical data in combined arms operations. Computes combat data. Conducts oversea training of replacement personnel. Assists in supervising of staff armor operations activities.

Serves as First Sergeant of a company. Interprets and supervises execution of company policy and SOP. Assists in planning, coordinating, and supervising all activities that support the company mission. Advises company commander on all matters concerning enlisted personnel, to include assignments, reassignments, transfers, promotions, granting of passes and leave, punishments, welfare, privileges, and awards. Directs and coordinates company administration. Forms unit for drill, ceremonies, and other military formations. Receives report of personnel present and absent, and reports number of unauthorized absences. Holds NCO call to disseminate instructions and information to

subordinate enlisted supervisors. Coordinates operation of company food service and supply activities. Assists company commander in accomplishing unit training. Assists in inspection of organizational activities as prescribed by commander, observes discrepancies, and initiates appropriate corrective action.

(d) Duties, Sergeant First Class, E-7, MOS 11E40.

Must be able to perform the duties of Armor Crewman (11E20). Commands tank or tank section, security section, or tank platoon in armor, tank/infantry, and reconnaissance operations. Selects routes, assembly and bivouac areas, and firing positions. Identifies and selects targets. Operates ranging equipment. Advises on displacement and location of firing position. Identifies, directs avoidance of, or destroys tank traps and barriers. Requests and adjusts mortar, artillery, and naval fire support. Supervises tank fire, tank fire adjustment, indirect fire support, and air-ground operations. Conducts battle drill. Supervises employment of demolitions, laying, and removal of mines. Supervises crew maintenance of tanks, weapons, and equipment. Assists in preparation of operations directives, reports, and records. Conducts technical and tactical training. Trains replacement personnel.

(2) Redeye Team evaluator, LT. At least two redeye teams are evaluated, each consisting of two personnel, one sergeant, E-5, team chief and a gunner, E-4. The two teams are selected at random and must successfully meet these standards to achieve a satisfactory rating:

(a) Selection and occupation of position

1 Leader/gunner: satisfactory selection and occupation of position

2 Redeye section: 90% of leaders and gunners meet the above standards

(b) Engage hostile aircraft

1 Leader/gunner: satisfactory engagement completed for 2 of 3 targets

2 Redeye section: 90% of leaders and gunners meet the above standards

(c) Visually recognize forward area aircraft

1 Leader/gunner: successfully recognize 90% of the aircraft slides

2 Redeye section: 90% of the leaders and gunners meet the above standards.

It is recommended that Redeye section Sergeants, Staff Sergeant, E-6, be substituted for the LT, Redeye team evaluator for the infantry (MOS 11B40) and tank (MOS 11E40) battalions. The section sergeants are charged with assisting in the training and supervision of their five assigned redeye teams and should be well qualified to accomplish these ARTEP evaluations.

(3) Assistant platoon evaluator, infantry and tank platoons. These positions are recommended for substitution by sergeants first class, MOS 11B40 for infantry and MOS 11E40 for Armored. As outlined above in paragraphs (1)(b) and (1)(d), infantry and tank platoon sergeants possess the necessary tactical skills to readily conduct these evaluations.

(4) Battery communications evaluator, CPT/LT, SC. It is recommended that senior artillery communications sergeants be substituted for this position: tactical communications chief, MOS 31G40, E-7, or MOS 31G50, E-8. These

communications chiefs are qualified to supervise tactical communications of field artillery battalions.

(a) Duties, Tactical Communications Chief, SFC, MOS 31G40.

Supervises installation, operation, and organizational maintenance of communications systems in infantry, armor, artillery, or other units employing similar methods of communication. Must be able to perform the duties of field communications operations or maintenance MOS. Supervises the installation, operation, and organizational maintenance of wire systems, frequency modulated radio nets, air-ground radio sets, and radio teletypewriter sets. Participates in reconnaissance for selection of locations for communications facilities. Determines requirements, assigns duties, and coordinates activities of communications personnel in employment of wire, radio, messenger, visual, and sound communications. Insures compliance with directives and instructions regarding communications matters. Inspects unit communications equipment for serviceability and coordinates organizational maintenance of equipment. Conducts training programs for unit personnel in communications operations, procedures, and maintenance practices.

(b) Duties, Master Sergeant, MOS 31G50.

Must be able to perform the duties of Tactical Communications Chief (31G40). Supervises tactical communications operating activities of unit to which assigned. Coordinates operating activities of subordinate communications element in establishment of effective communications net.

b. Officer Evaluator Positions Not Selected for NCO Substitution. (Summaries describing officer duties are derived largely from appropriate ARTEP editions and U.S. Army Field Manuals)

(1) Senior evaluator, COL/LT; deputy senior evaluator, LTC/MAJ. These officers are critical to a successful ARTEP evaluation. They develop the overall evaluation plan to include the training and supervision of evaluator and support personnel. The senior evaluator is personally responsible for preparing the test and reporting unit performance. Both officers should have extensive branch background and duty experience with a similar unit. The senior evaluator must have commanded a like battalion. There are no senior NCO with requisite training and experience.

(2) Fire support coordination evaluator, CPT, FA. The fire support coordination evaluator is an artillery officer who advises the commander and staff on fire support, prepares the fires support plan and coordinates with other fire support agencies. He is also a nuclear weapons employment officer and when required, prepares a detailed target analyses. He coordinates all supporting fires delivered on surface targets to include naval and air. There is no senior NCO equivalent for this duty.

(3) Chief aggressor controller, MAJ. The chief aggressor position is used only with the Infantry (Mech) battalion ARTEP at Levels 1 and 2. The Artillery and Tank battalions usually assign these duties to their deputy senior evaluator or a senior aggressor officer. The aggressor controller is charged with developing a detailed tactical scenario for the aggressor force which includes desired actions, locations and a time table. He provides guidance to the aggressor force commander on uniform, equipment and aggressor force requirements for specific required actions. He also monitors training and

AD-A066 262 LITTON MELLONICS SYSTEMS DEVELOPMENT DIV SPRINGFIELD VA F/G 5/9
RESERVE COMPONENT UNIT EVALUATION ANALYSIS. VOLUME I.(U)
OCT 76 J BERCOS, J R CHIORINI, R C EAKINS DAAG39-75-C-0135

UNCLASSIFIED NL

2 OF 2
AD A066262

END
DATE FILMED
5-79
DDC

rehearsals of the aggressor force. The chief aggressor controller should be a field grade officer with extensive branch experience. There are no NCO equivalents for this duty.

(4) Special staff officers: HQ Co evaluator, MAJ/CPT; comm Plt evaluator, CPT/LT; Maint Plt evaluator, CPT; Medical Plt evaluator, CPT/LT; and Support Plt evaluator, CPT/LT. It was decided not to consider substitutions for those officer assignments to Battalion/Task force headquarters which include special staff functions and responsibilities. The decision not to consider these assignments was made on the basis that it is understood some senior NCO serving as communications, maintenance, medical and support platoon sergeants do acquire special staff experience through serving in the absence of the appropriate platoon leader. Yet the experience and knowledge of staff and special staff functions at the professional level necessary in an evaluator is not included in the NCO MOS duty requirements and the capability may not be found in many of the senior NCO requisitioned to fill special staff ARTEP battalion/task force headquarters positions. Officers requisitioned by MOS to fill the position will be either serving in the position or should have requisite experience from previous training and duty. The special staff evaluators are assigned only to the tank battalion evaluation team. The infantry assigns evaluation of these positions as an additional duty to members of the infantry evaluation team. The Artillery ARTEP utilizes communications evaluators and covers the remaining special staff functions as additional duty for Artillery evaluators.

(5) Infantry, tank company/team, MAJ/CPT; artillery battery evaluator, MAJ/CPT. Positions are filled by a Major or Captain with command experience as a

company or battery commander of a similar unit. In general, senior NCO do not usually acquire the needed company or battery level tactical experience to evaluate these organizations in an ARTEP environment. Some company and battery first sergeants are assigned tactical training and supervisory duties but most are utilized primarily in administrative roles and thus permit officer personnel to concentrate on the tactical training of the unit.

(6) Infantry platoon evaluator, MAJ/CPT; tank and mortar platoon evaluator, CPT/LT. Most of the officer evaluator positions not selected for NCO substitution are of a type for which there are no NCO equivalent. A few positions, such as infantry, tank and mortar platoon evaluators were not recommended for substitution even though there are qualified NCO available. The platoon sergeants of these platoons certainly have the training and experience to evaluate similar platoons in an ARTEP environment. Substitutions were not recommended at the platoon level although substitutions were made for the officer, assistant platoon evaluator (Infantry and Tank platoon). One reason for not substituting at platoon leader evaluator level is the requirement (AR 385-63, 28 February 1973) for officers in charge of firing or safety officers for live firing exercises (see table, page C-17). Another reason is the matter of traditionally having personnel evaluated by their peers or superiors. It is not considered good policy in any profession to have leaders evaluated by subordinates, junior in rank and presumably, knowledge and experience.

(7) Infantry chief crew/platoon evaluator, MAJ; tank crew evaluator, CPT/LT. These positions evaluate live fire exercises and may be readily filled by infantry or tank platoon sergeants or senior infantry and armored sergeants with platoon experience. The infantry major chief crew evaluator was not recommended for substitution for the same reasons as outlined in paragraph 6.

The Captain, assistant infantry chief crew evaluator, was recommended for NCO substitution. One of the two CPT/LT tank crew evaluators was recommended for replacement by a senior NCO for similar reasons. The remaining officer could serve as OIC for live firing.

6. Summary.

a. The recommended addition of senior noncommissioned officers to assume some ARTEP evaluator team officer positions should not cause change in effectiveness of evaluation.

b. Positions selected for NCO substitution are those for which the needed skills fall well within the bounds of required expertise of an Infantry or Armored Senior Sergeant or the Artillery Tactical Communications Chief.

c. Some difficulty could be experienced in those situations where senior NCO are evaluating officer led sub-units. This may occur during Infantry and Tank crew/platoon evaluations. The OIC should be made aware of possible difficulties and be charged with briefings and critiques of any officer led units.

d. Consideration might be given to expanding the role of senior infantry and tank NCO during live fire exercises. It appears to be an unnecessary officer personnel strength burden to require commissioned evaluators as OIC and SO for each of the sub-unit live firing ranges.

Table C-2

Recommended Changes in Infantry Battalion Evaluator Team Officer Personnel Positions (ARTEP 7-45)

EVALUATOR PERSONNEL	LEVEL 1	LEVEL 2	LEVEL 3
Battalion/Task Force HQ			
Senior Evaluator, COL/LTC	1	1	0
Deputy Senior Eval, LTC/MAJ	1	1	0
Fire Support Coordination Evaluator, CPT (Arty)	1	1	0
Chief Aggressor Controller, MAJ	1	1	0
Chief Crew/Plt Evaluator, MAJ	1	1	1
*Asst Crew/Plt Evaluator, CPT	1	1	1
NCO Crew/Plt Evaluator, E7	1	1	1
Company/Teams			
Co/Team Evaluator, MAJ/CPT	1 per(3 total)	1 per(3 total)	1 per(3 total)
*Asst Co/Team Evaluator, LT	1 per(3 total)	1 per(3 total)	1 per(3 total)
Asst Co/Team Evaluator, Senior NCO (E7/E6)	1 per(3 total)	1 per(3 total)	1 per(3 total)
Rifle Platoons			
Plt Evaluator, MAJ/CPT	1	2	2
*Asst Plt Evaluator, LT	1	2	2
Asst Plt Evaluator, 1 NCO	1	2	2
Rifle Squads			
*Squad Evaluator(s), LT	1	3	3
Asst Sqd Evaluators, Senior NCO (E7/E6)	3	9	9
Weapons and Surveillance Proficiency			
CPT	1	1	1
**LT	7	7	7
NCO (E7/E6/E5)	8	8	8
TOTAL	23 Officers 16 NCO	27 Officers 23 NCO	23 Officers 23 NCO

*Senior NCO Substitution

**Three of the seven lieutenants are recommended for substitution by senior Infantry NCO, SFC (E-7). The weapons and surveillance personnel evaluate the Scout Platoon, Ground Surveillance, Redeye Team, AT Squad, Heavy Mortar Platoon, and 81 mm Mortar Section.

Change	14 (-9) OFF	15 (-12) OFF	11 (-12) OFF
Totals	25 (+9) NCO	35 (+12) NCO	35 (+12) NCO

Table C-3

Recommended Changes in Tank Battalion Evaluator Team Officer Personnel Positions
(ARTEP 17-35)

EVALUATOR		LEVEL 1	LEVEL 2	LEVEL 3
Task Force HQ				
Senior Evaluator, COL/LTC		1	1	0
Deputy Senior Evaluator, LTC/MAJ		1	1	0
Fire Support Coordination Evaluator, CPT (Arty)		1	1	0
HQ & CBT SPT CO EVAL				
HQ Co Eval MAJ/CPT		1	1	0
comm Plt Eval CPT/LT		1	1	0
Maint Plt Eval CPT		1	1	0
Medical Plt Eval CPT/LT		1	1	0
Support Plt Eval CPT/LT		1	1	0
Teams				
Tm Evaluator, MAJ/CPT		1 per TM	1 per TM	1 per TM
*Asst Tm Evaluator, LT		1 per TM	1 per TM	1 per TM
Asst Tm Evaluator NCO (E7/E6)		1 per TM	1 per TM	1 per TM
Tank Platoons				
Plt Evaluator CPT/LT		1	1	1
*Asst Plt Eval LT		1	1	1
Tank Crew				
**Crew Evaluators CPT/LT		2	2	2
Asst Crew Evaluators NCO (E7/E6)		2	2	2
Scout Plt				
Plt Eval CPT/LT		1	1	1
Asst Plt Eval NCO (E7/E6)		2	2	2
Mort Plt				
Plt & FDC Evaluator CPT/LT		1	1	1
FO Eval NCO (E6)		3	3	3
Mort Posit Eval (E6)		1	1	1
Redeye Tms				
*Team Evaluator LT		1	1	1
Ground Surveillance				
Crew Evaluator NCO (E7/E6)		1	1	1
AVLB NCO (E7/E6)		1	1	1
TOTALS	Officer	21	21	13
	NCO	13	13	13
*Senior NCO Substitutions				
**Senior NCO Substitution for one crew evaluator				
Change	Officer	15 (-6)	15 (-6)	7 (-6)
Totals	NCO	19 (+6)	19 (+6)	19 (+6)

Table C-4

Recommended Changes in Artillery Battalion Evaluator Team Officer Personnel Positions
(ARTEP 6-365)

Battery Evaluation Evaluator Personnel	Branch/MOS	Grade
Chief (1)	FA	LTC/MAJ
Firing Battery (1) ea (3)	FA	CPT/LT
HQ & HQ Battery (1)	FA	CPT/LT
Service Battery (1)	FA	CPT/LT
Tactical Nuclear Operations (1)	FA	MAJ/CPT
*Communications (2)	SC	CPT/LT
Observation (3) (Minimum of 3,	31G	NCO
including aerial observation	FA	CPT/LT
Fire Direction (1)	FA	CPT/LT

Battalion Evaluation Evaluation Personnel	Branch/MOS	Grade
Chief (1)	FA	BG/COL/LTC
Controller (1)	FA	LTC/MAJ
Battery (5) (1 per battery)	FA	MAJ/CPT
Tactical Nuclear Operations (1)	FA	LTC/MAJ/CPT
Communication (2)	SC	CPT/LT
	31G	NCO
Fire Direction (4)	FA	CPT/LT
Fire Support Coordination (1) (2 per brigade or battalion size Maneuver Force)	FA	MAJ/CPT
Observation (1 per brigade or battalion size Maneuver Force)	FA	CPT/LT

*Senior NCO Substitution for CPT/LT, SC as Battery Communications Evaluator

Table C-5

Infantry and Tank Battalion Sub-Unit Live Firing

Tank Battalion (ARTEP 17-35)	Infantry Battalion (ARTEP 7-45)
Tank crew	Squad
Heavy mortar crew	Heavy mortar platoon
*Tank platoon/section	81 mm mortar
	AT/TOW crew

*Level 1 only

Sub-unit live firing for the infantry and tank battalion require the same number of ranges at ARTEP level 2 and 3. The tank battalion adds tank platoon/section firing at level 1.

ANNEX D

TRAINING SITES
SUITABLE FOR ARTEP EVALUATIONS

Annex D

MAJOR TRAINING SITES SUITABLE FOR ARTEP EVALUATIONS

1. Introduction. In the development of the ARTEP evaluation implementation options to be considered in the Reserve Component Unit Evaluation Analysis (Cost-Effectiveness) study it was recognized that the choice of options for a given ARTEP could be affected by the facilities available. Although initially this potential contingency was viewed as an annual training scheduling problem for the Continental United States Armies (CONUSA), at the 10 June 1975 meeting of the SAG it was agreed that the study effort, nonetheless, would include a survey of major training sites. Following are a statement of the purpose of the survey, a delineation of the scope, an outline of the approach used, and a discussion of the results.

2. Purpose. The purpose of the survey is to determine which sites are suitable for ARTEP evaluations and to identify the type ARTEP which may be employed at each such site.

3. Scope and Data.

a. The type ARTEP considered and the major training sites covered define the scope of the survey.

(1) Type ARTEP. The Reserve Component Unit Evaluation Analysis (Cost-Effectiveness) study is concerned with high priority Reserve Component (RC) units. For purposes of the study high priority is directly associated with early deployment. The use of early deployment as a criterion of selection results in a concentration of Armored, Infantry, Field Artillery, and Engineer RC units.

Such units are likely to receive priority in scheduling for ARTEP evaluations. Accordingly, the type ARTEP applicable to these units were given priority in the survey.

(2) Major training sites. The need for the survey inherently dictates that it be comprehensive. To this end, the survey covers most Active Army, Army National Guard (ARNG), and United States Army Reserve (USAR) major training sites.

b. Data used in the survey were derived from published materials and through telephone interviews.

(1) The ARNG sites surveyed are those listed in National Guard Bureau (NGB) pamphlet 210-21, " Installations, Training Site General Information Summary," 1 September 1974. Each listing includes a site description, location, training acreage, ranges, aviation facilities, utilities and restrictions. Telephone interviews with operations and training personnel at the sites, maps, and logistical information obtained from the Material Branch, Logistics Division, NGB provided other important data.

(2) United States Army Reserve site data were obtained from various Army Reserve Commands (ARCOM) and the logistics division, Office of the Chief, Army Reserve.

(3) The primary source of Active Army site data is the Engineer Strategic Studies Group (ESSG) Volume II, "Division Stationing Analysis", Office, Chief of Engineers, July 1968. Additional data were obtained through telephone interviews with operations and training staff personnel at the sites.

(4) Test Editions of the following ARTEP were used:

(a) ARTEP 17-35, Tank Battalion and Combined Arms Task Force

(b) ARTEP 7-45, Mechanized Infantry Battalion

(c) ARTEP 6-365, Field Artillery Battalion, 155 mm Self-Propelled, Armored/Mechanized Division

(d) ARTEP 7-15, Light Infantry (In/Abn/Ambl/Light) Ranger Supplement to ARTEP 7-15

4. Approach. The approach involved a simple comparison of maneuver area requirements for each type ARTEP evaluation with the training areas available at the individual major training sites to identify those sites that have adequate areas. Additionally, where applicable the approach included similar comparisons of ARTEP requirements for firing range facilities and equipment (such as track vehicles) with firing range facilities and equipment available at the individual sites. In this straightforward approach the comparisons led to an identification of major training sites suitable for given ARTEP evaluations.

5. Discussion.

a. ARTEP Maneuver Area Requirements. Maneuver area requirements for ARTEP evaluations were obtained and developed from a review of selected type ARTEP. Table D-1 lists the area requirements (linear dimensions and surface) for the major combat missions at each of three levels for Mechanized Infantry and Tank battalions. Table D-2 lists the same kind of information for Light Infantry, Airborne, Airmobile, and Ranger battalions. It is clear from the tables that

Table D-1

Tank and Infantry (Mech) Battalion Maneuver Area Requirements**
by Mission at Levels 1, 2, and 3

Mission	Level 1 Infantry (Mech) KM	Acres*	Tank KM	Acres*
Bn/TF Daylight Attack	10 x 1.5	3,700	10 x 5	12,500
Bn/TF Illuminated Night Attack	5 x 1.5	1,900	5 x 1.5	1,900
Bn/TF Area Defense	2 x 5	2,500	3 x 5	3,700
	-	-	6 x 6	8,900
Bn/TF Night Withdrawal	2 x 6	3,000	-	-
Bn/TF Delay	2 x 15	7,400	6 x 15	22,200
	2 x 25	12,300	6 x 25	37,000
Bn/TF Tactical Road March	24	-	24	-
Bn/TF Night Occupation Assembly Area	-	-	5 x 5	6,100
	Level 2			
Bn/TF Attack	1.5 x 5	1,900	4 x 5	4,900
	-	-	5 x 5	6,100
Bn/TF Defense	2 x 5	2,500	2 x 5	2,500
Bn/TF Night Withdrawal	2 x 6	3,000	6 x 6	8,900
Tactical Road March	24	-	24	-
Bn/TF Delay	-	-	6 x 15	22,200
	-	-	6 x 25	37,000
Night Occupation Assembly Area	-	-	5 x 5	6,100

(continued)

Table D-1 (continued)

Mission	Level 3 Infantry (Mech) KM	Infantry (Mech) Acres*	Tank KM	Tank Acres*
Co/TM Attack	.5 x .5	600	2.5 x 4	2,500
	-	-	2.5 x 5	3,100
Co/TM Defense	.75 x 1.1	200	1.5 x 1.1	400
	-	-	3 x 1.1	800
Co/TM Tactical Road March	24	-	24	-
Co/TM Delay	-	-	1.5 x 15	5,600
Occupation Assembly Area	-	-	3 x 3	2,200
Co/TM Night Withdrawal	.5 x 6	750	-	-

* Acreage figures are rounded to nearest hundred when over one thousand and nearest fifty when less.

**Source: Test Editions, ARTEP 7-45 and ARTEP 17-35.

1 Square Meter = 10.764 Sq. Ft.
1 acre = 43,560 Sq. Ft.
1 acre = 4,047 Sq. Meters

Table D-2

Light Infantry, Airborne, Airmobile, and Ranger Battalion
Maneuver Area Requirements by Mission at Levels 1, 2, and 3

Level 3

	KM	Acreage*
Co/TM Attack	.5 x 2	250
Co/TM Defense	.75 x 2	400
	1.5 x 2	750
Co/TM Withdrawal	.75 x 3	550

Level 2

Bn Daylight Attack	1.5 x 2	750
Bn Defense	2 x 5	2,500
	3 x 5	3,700
Withdrawal	2 x 3	1,500

Level 1

Bn Attack	1.5 x 2	750
Bn Defense	2 x 5	2,500
	3 x 5	3,700
Delay	2 x 15	7,400
	2 x 25	12,300

*Acreage figures are rounded to nearest hundred when over one thousand and nearest fifty when less. Movement to contact at levels 1, 2, and 3 consists of a linear move of 8-10 KM.

1 Square Meter = 10.764 Sq. Ft.
1 acre = 43,560 Sq. Ft.
1 acre = 4,047 Sq. Meters

Mechanized Infantry and Tank battalions require the largest maneuver areas, in general; and that the largest single maneuver area requirement is for the Tank battalion task force conducting a delay (levels 1 and 2), roughly from 22 to 37 thousand acres. For Mechanized Infantry the largest maneuver area requirement is for the battalion task force in the delay (level 1), roughly from 7 to 12 thousand acres. Light Infantry, Airborne, Airmobile, and Ranger battalions also have their largest maneuver area requirement, 7 to 12 thousand acres, associated with the delay (level 1). Maneuver area requirements for level 3 evaluations in all cases are lower than those for levels 1 and 2. Thus, within the above two ranges of area requirements, 35 thousand acres and 10 thousand acres have been selected as overall minimums for the respective type battalions (ARTEP). The 10 thousand acre minimum is also applicable to evaluations using the ARTEP listed in Table D-3. Since on the basis of FORSCOM guidance, most Reserve Component units using ARTEP will be evaluated at level 3 the two minimums readily provide adequate maneuver areas. One possible problem, however, must be mentioned. At sites with training areas very close to the minimums there might be some difficulty in meeting the 24KM road march requirement for Mechanized Infantry and Tank battalions. Here, the senior evaluator may permit a reduction in the overall march distance, or the march might be conducted over a more circuitous, but still tactically sound, route than normally desirable.

b. Equipment Considerations. A major consideration in selecting training facilities for Armored, Infantry (Mech) and Self-propelled Artillery battalions is the availability of tracked vehicles at the training sites since the equipment is not easily moved by road and the cost of shipping such equipment might preclude units from bringing their own to Annual Training. National Guard units and United

Table D-3

Army Training and Evaluation Program Test Editions Available Autumn 1975

ARTEP 1-167	Assault Support Helicopter Company
ARTEP 5-35	Engineer Combat Battalion Corps
ARTEP 5-115	Engineer Construction Battalion
ARTEP 5-145	Engineer Battalion, and Company Infantry Mechanized Division
ARTEP 6-155	Field Artillery Battalion, 105 mm Towed Divisional, Non-Divisional, and Sep Inf Bde
ARTEP 6-365	Field Artillery Battalion, 155 mm Self-Propelled, Armored/Mechanized Division
ARTEP 7-15	Light Inf Bn (Inf/Abn/Ambl/Light) Ranger Supplement to ARTEP 7-15
ARTEP 7-45	Mechanized Infantry Battalion
ARTEP 11-35	Signal Battalion, Armored Division Signal Battalion, Infantry Division Signal Battalion, Infantry Division (Mechanized)
ARTEP 17-35	Tank Battalion and Combined Arms Task Force
ARTEP 17-55	Armored Cavalry Squadron
ARTEP 19-97	Military Police Physical Security Company
ARTEP 29-17	Forward Support Company, Maint Bn, Infantry, Mech Inf and Armored Div
ARTEP 31-101	Special Forces Training and Evaluation Program
ARTEP 33-500	Psychological Operations Training and Evaluation Program
ARTEP 44-325	Air Defense Artillery Battalion, Chaparral Vulcan, Self-Propelled

States Army Reserve units preposition and maintain equipment at several major training sites in the three CONUSA areas.

(1) Annual Training Equipment Pool (ATEP). The Chief, National Guard Bureau directs the establishment of ATEP at various sites and designates the units that will contribute items of equipment. In this connection the NGB has prepared (September 1975) a draft National Guard Regulation No. 750-2 prescribing basic concepts and policies and assigning responsibilities for the handling of unit equipment now stored in ATEP and Weekend Training Equipment Pools (WETEP). The regulation changes the ATEP title to Mobilization and Training Equipment Site (MATES) and the WETEP to Unit Training Equipment Site (UTES). The main purpose of the ATEP is to support ARNG units in training, as well as to facilitate their potential rapid mobilization and early deployment. There are five ATEP sites in the First U.S. Army area with equipment to support Infantry (Mech), Engineer, and Artillery battalion ARTEP. Four of the sites can support the tank battalion ARTEP. The Fifth U.S. Army area contains three ATEP sites that can support Tank, Infantry (Mech), Engineer, and Artillery battalion ARTEP; one that can support Tank, Infantry, and Engineer ARTEP and one that can support only Field Artillery ARTEP. In the Sixth U.S. Army area four of seven ATEP sites have equipment to support the Tank ARTEP, four the equipment to support the Infantry (Mech) ARTEP, three to support Engineer units and six capable of supporting Artillery ARTEP. Locations of ATEP are shown in Figure D-1.

(2) Equipment Concentration Sites (ECS). These sites are the USAR equivalent to ARNG ATEP sites. They are normally located at annual training (AT) sites and contain unit equipment required for multiple unit training assemblies

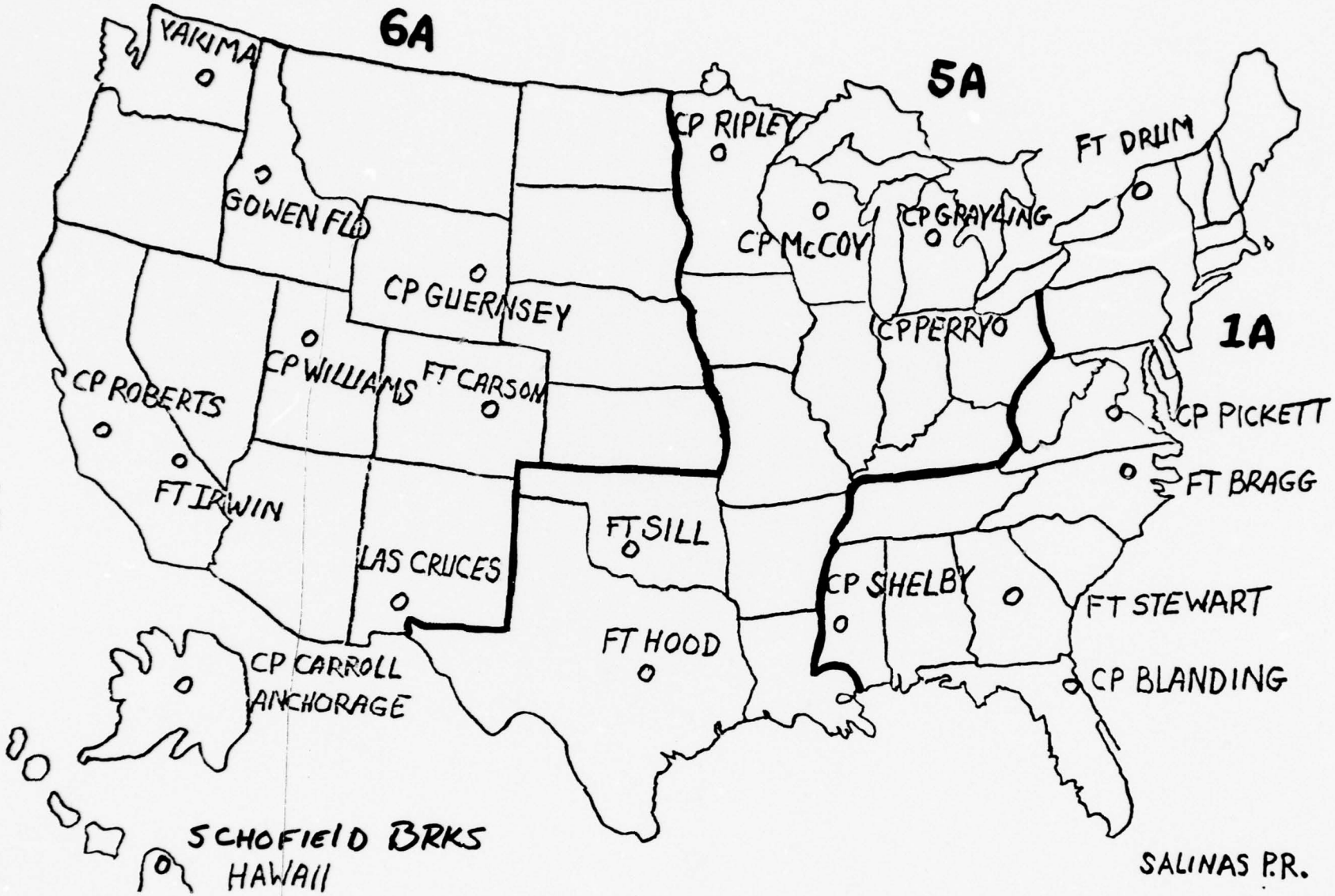

Figure D-1. U.S. ATEP Locations

(MUTA), AT, and mobilization. The amount of equipment placed in the ECS by units is determined by the appropriate Army Reserve Command/General Officer Command (ARCOM/GOCOM) commander with approval by commander, CONUSA. AT present (1 October 1975) there are seventeen ECS (see Table D-4). Six of the ECS sites are located in First U.S. Army area, eight are in Fifth U.S. Army area, and the remaining three are in the Sixth U.S. Army area. Seven of the ECS are co-located at installations with ARNG ATEP.

c. Special Considerations. A second major consideration in selecting training facilities for Armored, Artillery, and Infantry battalions is the availability of adequate facilities for the live fire portions of the evaluations. The obvious general requirement is that sites for the Tank battalion evaluation should have ranges to accommodate tank crew main gun proficiency firing, day and night; sites for Artillery battalion evaluations should have impact areas and permit choices of firing positions; sites for Infantry battalions should allow for mortar and antitank weapons firing.

d. Sites Suitable for ARTEP Evaluations. In accordance with the approach outlined in Section IV and in consideration of the requirements discussed above major training sites were identified and separated into three categories. Table D-5 (page D-13) lists 17 ATEP sites or ECS with equipment, live fire facilities, and maneuver areas capable of supporting the indicated ARTEP. These ATEP sites also have requisite training acreage to support any other type ARTEP exercise. Table D-6 (page D-15) lists 37 sites with training areas capable of supporting some ARTEP evaluations, especially light Infantry battalion. The ECS in this table do not have sufficient equipment to support all ARTEP evaluations.

Table D-4

USAR Equipment Concentration Sites

First U.S. Army

*Fort Drum, NY
*Camp Pickett, VA
Indiantown Gap, PA
*Fort Bragg, NC
Fort Jackson, SC
*Camp Shelby, MS

Fifth U.S. Army

Fort Knox, KY
*Fort Hood, TX
*Fort McCoy, WI
Fort Sam Houston, TX
Fort Leonard Wood, MO
Fort Chaffee, AK
Fort Polk, LA
*Fort Sill, OK

Sixth U.S. Army

Fort Lewis, WA
Camp Parks, CA
Fort Riley, KS

*Site also has an ATEP.

Table D-5

ATEP Sites Suitable for ARTEP Evaluations

First U. S. Army

ATEP	Training Acreage	Type ARTEP
*Fort Drum, NY	90,000	Tank INF (Mech) FA 8 IN (SP) FA 155 (SP) Engineer
*Camp Pickett, VA	35,000	Tank INF (Mech) FA 155 (SP) Engineer
*Fort Bragg, NC	125,000	INF (Mech) FA 155 (SP) FA 8 IN (SP) Engineer
*Camp Shelby, MS	100,000	Tank INF (Mech) FA 155 (SP) Engineer
Fort Stewart, GA	278,000	Tank INF (Mech) FA 8 IN (SP) FA 155 (SP) Engineer

Fifth U. S. Army

Camp Ripley, MN	54,000	Tank INF (Mech) Engineer
*Fort McCoy, WI	43,000	Tank INF (Mech) FA 155 (SP) Engineer
Camp Grayling, MI	123,000	Tank INF (Mech) FA 155 (SP) Engineer

*USAR Equipment Concentration Site co-located with ATEP.

(continued)

Table D-5 (continued)

ATEP	Training Acreage	Type ARTEP
*Fort Hood, TX	140,000	Tank INF (Mech) FA 155 (SP) FA 8 IN (SP) Engineer
*Fort Sill, OK	86,000	FA 155 (SP) FA 8 IN (SP)
	Sixth U. S. Army	
Yakima Range, WA	263,000	Tank INF (Mech) FA 155 (SP) Engineer
Gowen Field, ID	173,000	Tank FA 155 (SP)
Camp Guernsey, WY	26,000	FA 155 (SP) FA 8 IN (SP)
Camp Williams, UT	21,000	FA 155 (SP)
*Fort Carson, CO	105,000	Tank INF (Mech) FA 155 (SP) FA 8 IN (SP) Engineer
Camp Roberts, CA	39,000	INF (Mech) Engineer
Fort Irwin, CA	470,000	Tank INF (Mech) FA 155 (SP) FA 8 IN (SP)

*USAR Equipment Concentration Site co-located with ATEP.

Table D-6

Sites with More Than 10,000 Training Acres*

SITE	STATE	ACREAGE TOTAL/TRAINING
Atterbury	IND	33,500/33,500
Badlands Bombing Range	SD	42,240/42,240
Beauregard	LA	13,290/12,500
Blanding	FLA	72,397/51,500
Custer	SD	71,680/71,680
Gunpowder Rifle Range	MD	240,023/240,023
Natchez Trace	TN	24,000/18,000
Robinson	ARK	32,900/30,000
Roswell	NM	12,334/12,000
Shadehill	SD	25,600/25,600
Swift	TX	11,777/11,777
Gruber	OK	66,000/26,000
McCoy	WI	60,000/44,000
Dona Ana Range (Fort Bliss)	NM	1,054,156/65,290
Farmington	NM	10,240/10,240
Belle Fourche Reservoir	SD	17,920/17,920
Dugway	UT	841,000/50,000
Wind Cave National Park	SD	30,000/30,000
Yuma Proving Grounds	AR	903,000/901,000
Hunter Liggett Reservation	CA	168,000/168,000
Imperial Valley Unit Training	CA	38,000/38,000
**Indiantown Gap	PA	18,500/11,300

* Sites with more than 35 thousand training acres are suitable for Tank battalion ARTEP evaluation.

**ECS

(continued)

Table D-6 (continued)

SITE	STATE	ACREAGE TOTAL/TRAINING
Benning	GA	182,296/140,000
Campbell	KY	105,415/65,091
**Chaffee	ARK	71,979/70,760
**Jackson	SC	52,598/45,000
**Lewis	WA	86,000/58,000
**Polk	LA	199,032/190,000
**Riley	KS	101,000/76,000
**Knox	KY	110,351/59,101
**Wood	MO	70,963/34,850
Dix	NJ	31,992/26,185
McClellan	AL	45,513/26,785
Ord	CA	28,500/28,500
Rucker	AL	58,939/50,000
Huachucha	ARI	73,344/68,825
Gordon	GA	55,502/43,607

**ECS

In addition to providing for necessary equipment before the sites may be used for ARTEP evaluations, the range facilities available at each site must be reviewed. Table D-7 (page D-19) lists a large number of sites with less than 10 thousand acres and thus judged unsuitable for ARTEP evaluations.

e. Site Utilization. According to a site utilization report compiled from First, Fifth and Sixth Army circulars published 15 February 1975 more than three hundred thousand personnel attended AT at ATEP sites last year. Fort Drum, New York, led all training sites in the country with a site total of 82,162. Table D-8 (page D-26) shows the RC troop attendance at ATEP sites for AT 1974.

f. Priority Units. There are more than one hundred battalion size priority early deployment units that will probably be scheduled for ARTEP evaluations as early as resources permit. The geographical distribution is such that Fifth U.S. Army contains nearly forty percent of the units and except for a few Hawaii based units, First and Sixth U.S. Army each have approximately thirty percent. Hawaii has a priority early deployment unit which is also an affiliated unit. ARTEP scheduling for the unit in Hawaii could be accommodated at the sponsor unit station in Hawaii or at Pohokuloa training area, Hawaii, which contains 55,000 training acres and has range facilities for all Infantry division weapons. There are no early deployment units assigned to Alaska.

6. Summary.

A comparison of major training site data, ARTEP evaluation requirements data, and the geographical distribution of priority early deployment units by type reveals that a sufficient number of adequate training sites exist in each of the

Army areas for ARTEP evaluations. The ATEP and ECS sites listed at Table D-5 (page D-13) with their type ARTEP support capabilities should accommodate Infantry (Mech), Tank, Artillery and Engineer battalions as required. The Active Army and RC sites listed in Table D-6 (page D-15) (sites with more than 10,000 training acres) may be utilized when scheduling allows.

Table D-7

Sites* With Less Than 10,000 Acres

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
S	Pittsfield State Forest	40/40	MS
F & S	Townsend Station Forest	2713/1300	MS
F to S	Rehoboth	11/11	MS
S	Camp Curtis Guild	512/300	MS
S	Douglas State Forest	400/400	MS
S	Knightvill Dam	400/300	MS
S	Northampton	60/55	MS
S	Dever State School	1300/1300	MS
P	Adams	10/10	MS
F	Georgetown	1000/900	MS
F	*Camp Edwards*	12000/8000	MS
S	Camp Hartell	59/59	CN
S	Camp Meskill	88/30	CN
S	Nassahegan	1226/1226	CN
S	Nehantic	3655/3655	CN
S	Nepaug	1094/1094	CN
S	Stone's Ranch	2000/2000	CN
S	Thomaston Dam	794/794	CN
F to ANG	Bradlee Field	11.5/NMC	CN
S	Brainard Airport	88/NMC	CN
F	Bangor Int. Airport	2010/14	ME
F to S	Auburn TRNG Site	162/150	ME

*These sites are largely under Federal (F) or State (S) control. A few are privately (P) owned. All may be utilized for IDT and AT. Size is expressed in acres, Total/Training. Training acreage is unknown when blank. NMC means no maneuver capability.

(continued)

Table D-7 (continued)

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
F to S	Caswell TRNG Site	859/625	ME
S	Frye Mt. TRNG Site	5000/475	ME
S	Hollis TRNG Site	540/325	ME
F to S	Naval Air Station	52/30	ME
S	Plymouth TRNG Site	100/85	ME
S	Camp Keys	51/9.2	ME
P	Gardiner TRNG Site	114/100	ME
P	Island Falls TRNG Site	8/8	ME
F	Moosehorn Refuge	500/75	ME
P	Woodstock	75/65	ME
S	Camp Labonte	10/NMC	NH
P	Geneseco Target Range	25/25	NY
S	Gilderland Target Range	230/125	NY
S	Hudson TRNG Area	20/20	NY
F & S	Ticonderoga Target Range	7.7/3	NY
F to S	Malone Target Range	43/43	NY
S	Newark TRNG Site	130/90	NY
F to S	Ocean Target Range	127/127	NY
S	Rome	30/30	NY
S	Camp Smith	2000/1500	NY
S	South Dayton	485/485	NY
S	Camp Vannum	33.8/33.8	RI
F & S	Camp Johnson	729/729	VT
S	Sea Girt	167/100	NJ
S	Camp Dawson	1018/435	WVA

(continued)

Table D-7 (continued)

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
S	Bethany Beach	98/30	DEL
F to S	New Castle Rifle Range	224/75	DEL
S	NC National Guard TRNG Area	4234/4724	NC
S	State Military Reservation	751/500	VA
S	Byrd Field TRNG Area	100/	VA
S	Pickens Bend	75/75	SC
F to S	Clarkes Hill	200/200	SC
S	Lexington	20/20	SC
S	Winnsboro	20/20	SC
S	Camp Lincoln	268/268	IL
S	Marseilles NG TRNG Area	3000/3000	IL
S	Camp Logan Weapons Range	246/NMC	IL
S	Danvill Weapons Range	28/NMC	IL
F to S	Riverside	43/NMC	IL
F	US Army Training Area	4000/4000	IL
F to S	Jefferson City	112/NMC	MO
F	Weldon Springs	1655/1350	MO
F & S	Camp Clark	1282/900	MO
F to S	Camp Crowder	3200/3200	MO
S	Raytown	48.3/48.3	MO
S	Wappapello Lake	3240/5200	MO
S	Ashtabula Rifle Range	22/NMC	OH
S	Brown Rifle Range	32/NMC	OH
F to S	Camp Sherman Rifle Range	468/	OH
S	Zanesville Rifle Range	14/NMC	OH
Federally Leased & City of Akron	La Due Reservoir	5000/1000	OH

(continued)

Table D-7 (continued)

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
S	Camp Perry Military Reservation	630/400	OH
F to S	Ravenna Arsenal	920/920	OH
F to S	Catoosa Rifle Range	1726/1726	IN
S	Ashland Range	54/	KY
S	W. KY WETSITE	3060/3000	KY
S	Ravenna Range	88/NMC	KY
S	Cedars of Lebanon	1500/1500	TN
S	Loudon TRNG Area	670/670	TN
S	Laurel Hill TRNG Site	600/600	TN
F to S	Tullahoma J.W/Airstrip	2500/2500	TN
F to S	Milan Arsenal	2190/2190	TN
S	Bristol Rifle Range	NMC	TN
F to S	John Seiver	120/NMC	TN
F to S	Smyrna	NMC	TN
F	Oak Ridge Reservation	1576/1000	TN
F to S	Camp Villere	1710/1710	LA
S	Windy Hill TRNG Area	600/500	LA
P	Weaver Plantation	1000/600	LA
S	Nichell Barracks	2405/2400	KS
F to S	Hastings	3211/3200	NB
F to S	Mead	1185/1185	NB
S	Camp Dodge	2200/1200	IO
	Alamogordo	640/	NM
	Fort Wingate	727/	NM
S	Springer	80/	NM
S	Las Vegas	277/	NM

(continued)

Table D-7 (continued)

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
S	Taos	90/90	NM
F	Kirtland AFB	2100/NMC	NM
F	Santa Fe	6400/NMC	NM
F	Farmington	10240/10240	NM
F	Garrison WETSITE	707/707	ND
F	Williston WETSITE	300/300	ND
S	Camp Gilbert C. Grafton	2200/1500	ND
S	Angastora Reservoir	8960/8960	SD
S	Battle Mt. Sanitarium Reservation	3200/3200	SD
S	Bear Butte	1200/1200	SD
S	McNenney Fish Hatchery	2560/2560	SD
S	Swan Lake	1000/1000	SD
F	Deadman Mountain	2560/2560	SD
P	Kabiegman TRNG Area	600/600	SD
F	Missouri River	2000/2000	SD
F	Roubaiz	640/640	SD
S	Racine Small Drums Range	80/80	WI
S	Grassy Lake	320/260	WI
County	Marathan County Range	500/40	WI
S	Mud Lake Wild Life Area	460/200	WI
S	Camp Williams	2000/2000	WI
S	Custer Reserve Forces TRNG Site	7138/7138	MI
F to S	Camp McCain	3006/3006	MI
F	W. H. Harrison	2912/2200	MT
F	Camp Ashland	937/937	NE
F	Kearney Rifle Range	1143/NMC	NE

(continued)

Table D-7 (continued)

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
State Univ NE	Sidney	1920/	NE
F to S	Stead TRNG Facility	387/387	NE
S	Perry Rifle Range	240/NMC	OK
S	Lake Murray Station Park	300/300	OK
F to S	Addicks TRNG Area	809/809	TX
F to S	Anaville AFB	273/273	TX
S	Camp Barkley	1049/1049	TX
S	Camp Bowie	5410/5410	TX
S	Camp Mabry	374/374	TX
S	Eagle Mountain TRNG Area	1270/1270	TX
S	Camp Maxey	9989/9989	TX
S	Silvertown TRNG Area	3000/3000	TX
P	Redbird DZ	198/198	TX
F	Buckley Air NG	3535/3000	CO
S	Camp George West	640/640	CO
F	Florence Military Reservation	5692/5692	AR
F	Navajo Depot	28000/960	AR
F	Saguaro Lake TRNG Site	5760/5760	AR
S	Papago	480/320	AR
S	Camp Sanluis Obispo	4600/2500	CA
F to S	Camp Parks	1000/1000	CA
F to S	Chinese Camp	5000/5000	CA
S	Delaveaga Park	130/	CA
S	Healy Ranch	200/200	CA
S	Santa Fe Flood Control	730/730	CA
S	Fresno Air Terminal	5/NMC	CA

(continued)

Table D-7 (continued)

CONTROL F, S or P	SITE	ACREAGE TOTAL/TRAINING	STATE
F	Headdsburg WETS	125/	CA
P	Rocky Hill WETS	500/	CA
S	Camp Adair		OR
S	Camp Rilea	1865/975	OR
S	Camp Withycombe	234/192	OR
S	Camp Murray	229/210	WA

Table D-8

Reserve Component Personnel Attendance AT 1974

First U.S. Army

+FT Drum, NY	82,162
FT Stewart, GA	19,336
+Camp Pickett, VA	15,677
+FT Bragg, NC	22,672
+Camp Shelby, MS	33,832
Total	173,679

Fifth U.S. Army

+*FT Sill, OK	
+FT McCoy, WI	45,566
FT Hood, TX	3,842
Camp Ripley, MN	19,766
Camp Grayling, MI	25,549
Total	94,723

Sixth U.S. Army

Camp Roberts, CA	10,163
FT Irwin, CA	10,658
Gowen Fld, ID	7,189
Camp Guernsey, WY	4,748
Camp Williams, UT	3,524
+FT Carson, CO	5,572
Yakima, WA	3,722
Total	40,004

*Newly created ATEP (1975) located at Fort Carson, CO (Sixth Army) and Fort Sill, OK, Fifth Army. ATEP located at Camp Blanding, FLA, Dona Ana Range, NM (Fort Bliss) and Camp Perry, Ohio are not listed. These ATEP are equipped to support ADA AW units not included in ARTEP.

+USAR Equipment Concentration Sites co-located with ATEP.

ANNEX E

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Scarvia B. Anderson, Samuel Ball, Richard T. Murphy, et al., Encyclopedia of Educational Evaluation, Josey-Bass Publishers, San Francisco, 1975.

2. DA, ARTEP 7-45 Test Edition, Mechanized Infantry Battalion and Combined Arms Task Force, July, 1974.

3. DA, ARTEP 7-45, Mechanized Infantry Battalion and Combined Arms Task Force, September, 1975.

4. DA, ARTEP 17-35 Test Edition, Armor Battalion and Combined Arms Task Force, July, 1974.

5. DA, ARTEP 17-35, Tank Battalion and Combined Arms Task Force, August, 1975.

6. DA, ARTEP 17-35, Tank Battalions and Combined Arms Task Force (change 1), September, 1975

7. DA, ARTEP 19-77 Test Edition, Military Police Company, March, 1975

8. DA, ARTEP 29-17 Test Edition, Foreward Support Company, Maintenance Battalion, July 1975.

9. DA, ARTEP 5-145, Engineer Battalion, Mechanized and Armored Divisions, August 1974.

10. DA, ARTEP 6-155 Test Edition, Field Artillery Battalion, 105mm Howitzer, Towed, July 1975

11. DA, ARTEP 6-365 Test Edition, Field Artillery Battalion, 155mm Self Propelled, April,1975

12. DA, ARTEP 6-365, 6-37 Test Edition, Field Artillery Battalion, 155mm Self-Propelled, June 1975

13. DA, ARTEP 6-365, Field Artillery, 155 SP, Direct Support Units, September 1975.

14. DA, ARTEP 7-15 Test Edition, Light Infantry Battalions, April, 1975.

15. DA, DF, Subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (27 March, 1975) dated 11 April 1975.

16. DA. DF, Subject: Study Advisory Group (SAG) Reserve Component Unit Evaluation Analysis (10 June,1975) Dated 13 June 1975.

17. DA, DF, Subject: Study Advisory Group (SAG). Reserve Component Unit Evaluation Analysis (29 March 1976) Dated 12 April 1976.

18. Laszlo David and Lucien Duckstein, "Multi-Criterion Comparison of Long-Range Water Resources: A Case in the Hungarian Great Plain."

19. Gene H. Fisher, Cost Considerations in Systems Analysis, American Elsevier Publishing, Inc., New York, 1971.

20. A.C. Hamblin, Evaluation and Control of Training, McGraw - Hill, London, 1974.

21. John F. Hayes, et al., "ARTEP Validation Report," U.S. Army Research Institute for the Behavioral and Social Sciences, Arlington, Va., April, 1975

22. Headquarters, U.S Army Forces Command, "Reserve Component Affiliation Program, " Fort McPherson, Ga., November, 1975

23. Irving Heymont, et al., "Guide for Reviewers of Studies Containing Cost - Effectiveness Analysis," Research Analysis Corporation, McLean, Va., September 1966.

24. Harley H. Hinrichs and Graeme M. Taylor, Program Budgeting and Benefit - Cost Analysis, Goodyear Publishing, Co., Inc.. Pacific Palisades, Ca., 1969

25. Sir Maurice Kendall, Rank Correlation Methods, Charles Griffin & Co. Ltd., London, 1970.

26. Karl Seiler, III, Introduction to Systems Cost - Effectiveness, Wiley-Interscience, New York, 1969

27. W. Bruce Taylor, "Dominance Analysis: Some Army Studies", Research Analysis Corporation, McLean, Va., November 1967.