US Army Corps
of Engineers
Construction Engineering
Research Laboratory

USA-CERL TECHNICAL REPORT P-86/15, VOL. I
September 1986

Operation and Maintenance of Training Ranges Equipped With the Remoted Target System, Volume I: Development of a Model Statement of Work for Infantry Rifle Marksmanship Ranges

by
Patrick J. Tanner
Robert B. Blackmon
Frank G. Sullivan
David C. Morck
Robert L. Johnson

The Army is designing and constructing high-technology training ranges that must be operated and maintained. These ranges, which are equipped with the Remoted Target System (RETS), will require additional personnel at the training site to handle the increased operations and maintenance (O&M) workload. In the future, the Department of the Army Modernization Office for Training Ranges (DAMO-TR) may eliminate all civilian personnel positions that support these ranges. Funding would be retained to support the ranges, but there would be no new personnel authorizations. As a result, all O&M work would have to be assigned to a commercial contractor.

This volume describes a model Statement of Work (SOW) for various Infantry Rifle Marksmanship Ranges. It could be used as a guide for preparing commercial activity contracts for these ranges should the support positions be canceled. Volume II is a similar report describing a model SOW for two Multipurpose Range Complexes. Volume III is a staffing guide that can be used either in-house or by the Government contracting office to estimate calculated workload for a contractor.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704 0188
Exp Date Jun 30 1986

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b RESTRICTIVE MARKINGS
2a SECURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION/AVAILABILITY OF REPORT Distribution limited to U.S. Government agencies only; Proprietary Information; September 1986. Other requests (Cont'd)
2b DECLASSIFICATION/DOWNGRADING SCHEDULE	
4 PERFORMING ORGANIZATION REPORT NUMBER(S) CERL TR P-86/15, VOL. I	5 MONITORING ORGANIZATION REPORT NUMBER(S)
6a NAME OF PERFORMING ORGANIZATION U.S. Army Construction Engr Research Laboratory 6b OFFICE SYMBOL (If applicable) CERL	7a NAME OF MONITORING ORGANIZATION
6c ADDRESS (City, State, and ZIP Code) P.O. Box 4005 Champaign, IL 61820	7b ADDRESS (City, State, and ZIP Code)
8a NAME OF FUNDING/SPONSORING ORGANIZATION Directorate of Army Ammunition, Ranges and Targets 8b OFFICE SYMBOL (If applicable) DAART	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER FAD No. 153-85 (May 1985)
8c ADDRESS (City, State, and ZIP Code) Fort Eustis, VA 23604	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO / PROJECT NO / TASK NO / WORK UNIT ACCESSION NO

11 TITLE (Include Security Classification)
Operation and Maintenance of Training Ranges Equipped with the Remoted Target System Volume I: Development of a Model Statement of Work for (Cont'd)

12 PERSONAL AUTHOR(S) Tanner, Patrick J.; Blackmon, Robert B.; Sullivan, Frank J.; Morck, David C.; Johnson, Robert L.

13a TYPE OF REPORT	13b TIME COVERED	14 DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
Final	FROM _____ TO _____	1986, September	77

16 SUPPLEMENTARY NOTATION
Copies may be obtained from Defense Technical Information Center, ATTN: DTIC-DDRB, Cameron Station, Alexandria, VA 22304-6145

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	RETS	Training
05	01		Remoted Target System	Commercial activity
			Statement of Work	Operation & Maintenance

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

The Army is designing and constructing high-technology training ranges that must be operated and maintained. These ranges, which are equipped with the Remoted Target System (RETS), will require additional personnel at the training site to handle the increased operations and maintenance (O&M) workload. In the future, the Department of the Army Modernization Office for Training Ranges (DAMO-TR) may eliminate all civilian personnel positions that support these ranges. Funding would be retained to support the ranges, but there would be no new personnel authorizations. As a result, all O&M work would have to be assigned to a commercial contractor.

(Cont'd)

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT ☐ DTIC USERS	21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
22a NAME OF RESPONSIBLE INDIVIDUAL D. P. Mann	22b TELEPHONE (Include Area Code) (217) 373-7223 / 22c OFFICE SYMBOL CERL-IMT

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE

UNCLASSIFIED

Block 3 (Cont'd):

for this document must be referred to DAART, ATTN: ATIC-RTR.

Block 11 (Cont'd):

Infantry Rifle Marksmanship Ranges

Block 19 (Cont'd):

This volume describes a model Statement of Work (SOW) for various Infantry Rifle Marksmanship Ranges. It could be used as a guide for preparing commercial activity contracts for these ranges should the support positions be canceled. Volume II is a similar report describing a model SOW for two Multipurpose Range Complexes. Volume III is a staffing guide that can be used either in-house or by the Government contracting office to estimate calculated workload for a contractor.

FOREWORD

This work was done for the Directorate of Army Ammunition, Ranges and Targets (DAART), U.S. Army Training Support Center (USATSC), under Funding Authority Document No. 153-85 (May 1985).

The work was conducted by the Facility Systems Division (FS), U.S. Army Construction Engineering Research Laboratory (USA-CERL). E. A. Lotz is Chief, FS.

COL Norman C. Hintz is Commander and Director of USA-CERL, and Dr. L. R. Shaffer is Technical Director.

CONTENTS

OPERATION AND MAINTENANCE OF TRAINING RANGES EQUIPPED WITH THE REMOTED TARGET SYSTEM, VOLUME I: DEVELOPMENT OF A MODEL STATEMENT OF WORK FOR INFANTRY RIFLE MARKSMANSHIP RANGES

1 INTRODUCTION

1.1 Background

The Army is designing and building nine new high-technology training ranges equipped with the Remoted Target System (RETS). These ranges will require additional personnel due to the increased workload, which will directly affect the range office. Later, however, the Department of the Army Modernization Office for Training Ranges (DAMO-TR) may eliminate all civilian personnel positions programmed to support these ranges. Funding would be retained, with no new personnel authorizations. Consequently, operations and maintenance (O&M) would have to be through commercial contract, creating the need for a standard Statement of Work.

1.2 Objective

The objective of this work is to provide guidance for operating and maintaining RETS-equipped ranges. Guidance is to cover both options for achieving O&M: in-house and contracted work.

The objective of this volume is to develop a model Statement of Work (SOW) to be used as a guide in developing commercial contracts for O&M of various Infantry Rifle Marksmanship Ranges. Volume II is a model SOW for two Multipurpose Range Complexes and Volume III is a staffing guide for in-house use and for estimating calculated workload for contractors.

1.3 Approach

O&M tasks were divided into three categories: Maintenance of Real Property, Maintenance of the RETS equipment, and Operation of Range. Each category was further divided into three work levels relating to the predictability of a task.

1.4 Scope

This SOW is limited to Infantry Rifle Marksmanship Ranges that have the standard RETS equipment configuration given in U.S. Army Corps of Engineers, Huntsville Division, Manual (HNDM) 1110-1-5.[1] The Sniper Field Fire Range is based on examples from Army Training Circular (TC) 23-14.[2] The SOW can apply to ranges that vary from the standard configuration if Technical Exhibit No. 6 is modified accordingly.

---

[1] Huntsville Division Manual (HNDM) 1110-1-5, *Design Information for Infantry Rifle Marksmanship Ranges*, (U.S. Army Corps of Engineers, Huntsville Division, February 1984).

[2] Training Circular (TC) 23-14, *Sniper Training and Employment* (Headquarters, Department of the Army [HQDA], October 1969).

2 KEY ELEMENTS OF THE STATEMENT OF WORK

The key elements included in the SOW apply to each task category (Maintenance of Real Property, Maintenance of the RETS Equipment, and Operation of the Range).

2.1 Bidding Methods

The contract implements two types of bidding methods: lump-sum and unit-price. Tasks having predictable frequency and duration were placed under lump sum. Those with a less predictable frequency and duration were placed under unit price.

2.2 Work Levels

Work tasks were categorized into three levels: Work Level I, Work Level II, and Work Level III. The levels were set up to allow for smooth operation with adequate Government control over the contract workload.

Work Level I tasks were placed under the lump-sum portion of the contract. These tasks require the least amount of direct control by the Government. Before work begins, the Contractor must submit a schedule plan for all Work Level I tasks. Upon approval, the Contracting Officer will issue a Standing Operating Order (SOO) work request. Level I work consists of operations, operator maintenance, preventive maintenance (PM), and other routine maintenance activities.

Level II work includes tasks in the unit price portion of the contract. The necessary level of Government control is achieved by requiring prior authorization for any Work Level II tasks. This authorization is in the form of a Service Order (SO) or an Individual Job Order (IJO).

Work Level III consists of tasks which are beyond the scope of Work Level II, e.g., new construction or major improvements. The Government may allow other contractors to bid on Work Level III tasks. Work Level III, like Work Level II, requires prior authorization.

2.3 Task Priorities

Two work priority categories were established: emergency and routine. Emergency priority allows for the immediate assembly of all resources needed to begin work in an emergency situation. Only a verbal authorization is required to begin work in an emergency. However, the proper written authorization must follow. The Contractor can, if necessary, divert any or all resources from other areas to alleviate the emergency.

2.4 Performance Criteria

Performance criteria were established for maintenance of real property and RETS equipment. For real property maintenance, repairs of facilities/components must meet the specifications given in the range as-built drawings. For RETS equipment maintenance, the performance criterion requires range equipment to be 100 percent

operational prior to each daily training session. However, during range operation, the criterion requires that faulty RETS equipment components be replaced only if the equipment operational rate falls below 95 percent. Work to achieve the initial required operational readiness of the RETS equipment (100 percent) is bid on a lump-sum basis, whereas replacement work done during range operation is bid on a unit-price basis.

2.5 Preventive Maintenance Schedules

The PM schedules for the RETS equipment are based on a reduced PM schedule developed using actual maintenance data from the Malone 18 Defense Test Range at Fort Benning, GA. Range mechanics there indicated that the amount of PM recommended in the Preventive Maintenance Checks and Services (PMCS) was excessive. Therefore, to minimize costs, the reduced PM schedule was used.

2.6 Records and Reports

The Contractor is required to keep records and submit periodic reports of all tasks performed. The records and reports will be used to verify contract performance and reevaluate estimated workload requirements for future contracts.

2.7 Contractor Representative

The Contractor must provide a representative to act as an interface with the Government during the life of the contract. The representative must be at the range at the beginning and end of each day so that anything needing special attention can be reported.

2.8 Installation-Unique Items

At certain points within the SOW, specific information pertaining to range operation, configuration, and type can only be outlined, e.g., Government-furnished property, details of conservation, and environmental programs. The specification writer's interpretations will complete the SOW to make it applicable to each particular range.

2.8.1 Closure Contingencies

If the range is closed for any reason during a regularly scheduled work day, the Government has two options: reschedule the work for the next day or on another mutually agreed upon day or, when mutually agreed upon, forego the work and reduce payment to the Contractor accordingly.

2.8.2 Scheduling of Operations

Operations will be scheduled within the following parameters as specified in the SOW: all nonemergency work will be completed between 7:00 a.m. and 9 p.m. Monday through Sunday, excluding legal public holidays. Some exceptions are allowed (see the model SOW in Attachment 1).

2.8.3 Security/Key Control

A key control system must be established by the Contractor and included in the Contractor Quality Control Plan. The plan must comply with AR 190-13 and AR 190-15 as they pertain to key and lock control.[3] The Contractor is responsible for expenses incurred as the result of a lost key.

2.8.4 Conservation Program

A Conservation Program, as specified, should be drafted for the installation. This program is to be submitted with the bid proposal. The program, which will include personnel training, is intended to optimize operations and minimize costs.

2.8.5 Warranties

The Contractor is responsible for exercising the manufacturer's commercial warranties on all newly installed equipment and must follow all installation and operation recommendations set forth therein to ensure compliance. If the warranty stipulates a PM program which is not consistent with the contract recommendations, the installation will specify which schedule is to be followed. The Contractor will be responsible only for repairs and expenses resulting from noncompliance to the specified guidelines.

2.8.6 Environmental Program

The Contractor must comply with all Federal, State, and local laws, regulations, and standards regarding environmental pollution. All environmental protection matters shall be coordinated through the Contracting Officer with the Post Environmental Engineer. The Contracting Officer may inspect facilities on a short-notice basis to insure compliance. Any fines imposed by State regulatory authorities or the U.S. Environmental Protection Agency (USEPA) will be paid by the Government, but if it is determined that the fine resulted from negligence by the Contractor or employees, the fine will be deducted from any payments due the Contractor. All manpower required in a clean-up operation is to be supplied by the Contractor.

2.8.7 Technical Exhibits

Eleven Technical Exhibits are included in the SOW (see samples in Attachment 1). The exhibits include information that applies to Infantry Rifle Marksmanship Ranges of any type or configuration. However, Exhibit No. 6 includes calculated workloads which apply specifically to ranges with the HNDM 1110-1-5 standard configurations.

2.9 Government-Furnished Property

The Government will furnish certain property and materials intended to sustain range operations. The Contractor is responsible for all maintenance and repair during the life of the contract.

---

[3]Army Regulation (AR) 190-13, *The Army Physical Security Program* (HQDA, June 1985); AR 190-15, *Physical Security of the Alternate Joint Communications Center* (AJCC), (HQDA, November 1983).

The Government will supply facilities as described in Technical Exhibit No. 7 (as well as an additional Range Control Station); equipment as described in Technical Exhibit No. 2; utilities including heat, air-conditioning, water, electricity, sewer, etc.; and Class C telephone service (noncommercial).

The Contractor is required to maintain the Government-supplied inventories at their precontract levels. The Contractor must keep all documentation and catalogs pertaining to equipment and materials up-to-date and orderly.

2.10 Contractor-Furnished Property

The Contractor must furnish and maintain all plant, facilities, vehicles, equipment, tools, supplies, and materials necessary to accomplish all required services except as described in Section C.3 of the model SOW.

The Contractor must furnish all administrative supplies and equipment except for Government-furnished forms.

A properly maintained motor pool will be supplied by the Contractor as well. The number and variety of vehicles should be appropriate for the services required. The Contractor will also supply any fuels necessary for operating the motor pool.

The Contractor must not use Government-furnished property to perform maintenance or repairs on Contractor-furnished property unless so authorized by the Contracting Officer.

3 SUMMARY AND RECOMMENDATIONS

Attachment 1 contains the model SOW. Although the model applies to any of the seven Infantry Rifle Marksmanship Ranges equipped with the standard RETS configuration, it can become site-specific with little effort on the part of the contract specification writer. For Rifle Marksmanship Ranges that vary from the standard configuration--either in RETS equipment or real property--only Technical Exhibit No. 6 (Calculated Workload) need be modified.

If DAMOS-TR eliminates the in-house O&M staff, it is recommended that this model SOW be used as a basis for developing contract specifications at standard RETS ranges as well as those ranges that vary slightly from the standard.

BIBLIOGRAPHY

Army Regulation (AR) 190-13, *The Army Physical Security Program* (Headquarters, Department of the Army [HQDA], June 1985).

AR 190-15, *Physical Security of the Alternate Joint Communications Center (AJCC)*, (HQDA, November 1983).

Brown, Jack, and Associates, Inc., Elmhurst, IL, "HVAC Maintenance and Repair Contract" (DACW88-83-R-011).

Directorate of Training and Doctrine, U.S. Army Armor School, Fort Knox, KY, *Independent Evaluation Report on the Armor Remoted Target System (ARETS)* (March 1984).

Directorate of Training and Doctrine, U.S. Army Armor School, Fort Knox, KY, *Operational Test II of Armor Remoted Target System (ARETS)* (7 March 1984).

Directorate of Training and Doctrine, U.S. Army Infantry School, Fort Benning, GA, *Independent Evaluation Report on the Infantry Remoted Target System (IRETS)* (January 1984).

Glazing Manual (Flat Glass Marketing Association, *Current edition*).

Glazing Sealing Systems Manual (Flat Glass Marketing Association, *Current edition*).

Huntsville Division Manual (HNDM) 1110-1-5, *Design Information for Infantry Rifle Marksmanship Ranges* (U.S. Army Corps of Engineers, Huntsville, February 1984).

Technical Bulletin (TB) 420-20, *Pipefitting, Plumbing Handbook* (HQDA, August 1983).

TB 420-23, *Roads, Grounds, Pest Control, Refuse Collection Formulas* (HQDA, October 1972).

Technical Manual (TM) 9-6920-442-12&P, *Operator and Organizational Maintenance Manual With Repair Parts and Special Tools List for Target Holding Mechanism, Tank Gunnery* (Draft) (HQDA, 3 February 1983).

TM 9-6920-442-34&P, *Direct and General Support Maintenance Manual With Repair Parts and Special Tools List for Stationary Tank Automatic Target System* (HQDA, 1 May 1982).

Training Circular (TC) 23-14, *Sniper Training and Employment* (HQDA, October 1969).

Whittington, H., and Associates, Athens, TX, "Maintenance and Repair Requirements for Exterior and Interior Finishes and Materials " (DACA88-83-Q-0638, 6 July 1984).

Nay, J. L., et al., *Housing Maintenance Contract Guide*, Technical Report P-107/ADA084539 (USA-CERL, May 1980).

Neathammer, R. D. *Life-Cycle Cost Database: Volume II*, Appendices E, F, and G--Sample Data Development, Technical Report P-139/ADA126645 (USA-CERL, January 1983).

ATTACHMENT 1:

MODEL STATEMENT OF WORK FOR DEFENSE TEST RANGE (DTR), MODIFIED DEFENSE TEST RANGE (MDTR), AUTOMATED RECORD FIRE RANGE (ARF), MODIFIED RECORD FIRE RANGE (MRF), AUTOMATED FIELD FIRE RANGE (AFF), MODIFIED FIELD FIRE RANGE (MFF), AND SNIPER FIELD FIRE RANGE (SFF)

STATEMENT OF WORK—TABLE OF CONTENTS

BID SCHEDULE

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	The Contractor shall furnish the necessary management, supervision, administration, data, personnel, supplies, material, and equipment (not otherwise furnished as government property) to perform operations and maintenance of the IRETS/ ARETS range(s), pursuant to the terms and conditions set forth herein and in Exhibits and Attachments hereto				
	BASE PERIOD_October 1, 198X through September 30, 198X				
001	Provide work control IAW C.5.5.	12	MO	$____	$____
	GROUNDS MAINTENANCE				
	Perform maintenance on protective berms surrounding target emplacements IAW the following sections:				
002	C.5.6.2.1	1	LS	$____	$____
003	C.5.6.2.2	1	100 ft of berm	$____	$____
004	C.5.6.2.3	1	ton of material in place	$____	$____
	Perform maintenance and repair of foxholes IAW the following sections:				
005	C.5.6.3.1.1	1	per board foot	$____	$____
006	C.5.6.3.1..2	1	square foot	$____	$____
007	Perform repair on range fencing IAW C.5.6.4.1	1	per 100 lineal feet of fence	$____	$____
008	Paint range fencing IAW C.5.6.4.2	1	per 100 lineal feet of fence	$____	$____

BID SCHEDULE (cont'd)

009	C.5.6.5.3 and C.5.6.5.4	1	per mile of tank trail	$____	$____
010	C.5.6.5.3 and C.5.6.5.4	1	ton of material in place	$____	$____
	Perform maintenance and repair on the vehicle holding area IAW the following sections:				
011	C.5.6.5.3 and C.5.6.5.4	1	per square foot of holding area	$____	$____
012	C.5.6.5.3 and C.5.6.5.4	1	ton of material in place	$____	$____
	Perform seasonal grounds maintenance IAW the following sections:"				
013	C.5.6.6.1	1	season	$____	$____
014	C.5.6.6.2	1	season	$____	$____
015	C.5.6.6.3	1	season	$____	$____
	FACILITIES MAINTENANCE				
016	Perform preventive maintenance on all range facilities IAW C.5.7.2	1	LS	$____	$____
017	Perform seasonal maintenance on heating and cooling systems IAW C.5.7.3.1	1	LS	$____	$____
018	Perform maintenance and repair on facility heat pump systems IAW C.5.7.3.2	1	hour	$____	$____
019	Provide maintenance and repair of the plumbing system for facilities IAW C.5.7.4	1	hour	$____	$____
020	Provide maintenance and repair of the electrical system for the facilities IAW C.5.7.5	1	hour	$____	$____

BID SCHEDULE (cont'd)

021	Repair/replace esterior/interior wall IAW C.5.7.6.1.2	1	square foot	$____	$____
022	Repair/replace section(s) of facility roof IAW C.5.7.6.1.3	1	100 square foot	$____	$____
023	Repair concrete surfaces IAW C.5.7.6.2	1	square foot	$____	$____
024	repair/replace doors and windows of facilities IAW C.5.7.6.3 through C.5.7.6.5	1	hour	$____	$____
025	Paint facilities as requested IAW C.5.7.6.6	1	hour	$____	$____
026	Perform maintenance and repair on electrical distribution system IAW C.5.6.7	1	hour	$____	$____
	RANGE OPERATIONS				
027	Perform range operations IAW C.5.8	1	LS	$____	$____
	RETS EQUIPMENT MAINTENANCE AND REPAIR				
028	Provide preventive maintenance (PM) for RETS equipment IAW C.5.9.3. and C.5.9.3.1	1	LS	$____	$____
029	Perform replacement of RETS equipment found defective during PM IAW C.5.9.3.1.1	1	LS	$____	$____
030	Perform replacement and repair for RETS equipment in emergency situations IAW C.5.9.3.2, C.5.9.3.4, and C.5.9.3.5	1	hour	$____	$____
031	Perform replacement during start-up procedures IAW C.5.9.3.3	1	LS	$____	$____
032	Perform repair of components removed during start-up procedures IAW C.5.9.3.3.1, C.5.9.3.4, and C.5.9.3.5	1	hour	$____	$____
033	Replace targets IAW C.5.9.4	1	LS	$____	$____

PART I—SECTION C

DESCRIPTION/SPECIFICATIONS FOR SERVICES TO PROVIDE OPERATION, MAINTENANCE, AND REPAIR AT THE DEFENSE TEST RANGE, THE MODIFIED DEFENSE TEST RANGE, THE AUTOMATED RECORD FIRE RANGE, THE MODIFIED RECORD FIRE RANGE, THE AUTOMATED FIELD FIRE RANGE, THE MODIFIED FIELD FIRE RANGE, AND THE SNIPER FIELD FIRE RANGE

SECTION C-1

GENERAL

C.1.1 Scope of Work: Contractor shall furnish all supervision, labor, equipment, repair parts, and supplies including Government-reimbursed supplies, except as specified herein as Government-furnished, to operate, maintain, and repair the Defense Test Range (DTR), the Modified Defense Test Range (MDTR), the Automated Record Fire Range (ARF), the Modified Record Fire Range (MRF), the Automated Field Fire Range (AFF), the Modified Field Fire Range (MFF), and Sniper Field Fire Range (SFF) in strict accordance with the terms and conditions of this contract. The DTR, MDTR, ARF, MRF, AFF, MFF, and SFF will provide collective training facilities for light infantry division units. The ranges will accommodate the firing of rifle marksmanship qualification tables. Contractor performance shall be according to the standards contained in Section C-6 and meet the intent of the directives listed in Section C-6, except where mandatory compliance is indicated. Facilities and equipment covered by this Statement of Work are listed in Technical Exhibit No. 7 for facilities and Technical Exhibit No. 9 for equipment.

C.1.1.1 Operational Readiness: In order for the range to fulfill its training mission, it must have a minimum number of targets up and in a completely functional mode. This minimum number of targets which must be fully operational, as a percentage of all targets on the range, will be known as the "required operational readiness level" of the range. The required operational readiness level of the DTR, MDTR, ARF, MRF, AFF, MFF, and SFF is 95 percent.

C.1.2 Description of Facilities and Equipment: Contractor shall perform all functions associated with the operation of the DTR, MDTR, ARF, MRF, AFF, MFF, and SFF during all training periods; and maintenance and repair of facilities, grounds, and equipment associated with these ranges. A list of the equipment to be maintained and repaired and a full set of the as-built drawings of the range are included in Technical Exhibit Nos. 7 and 9, respectively.

C.1.3 Personnel:

C.1.3.1 Manning:

C.1.3.1.1 General: Contractor shall provide a Project Manager who shall be physically present onsite--except on legal public holidays--during the hours of 7 a.m. through 9 a.m. and 5 p.m. through 7 p.m. on each training day. The Project Manager shall conduct overall management coordination and shall be the central point of contact with the

Government for performance of all work under this contract. Another individual may be designated in writing to the Contracting Officer to act for the Project Manager when work is being performed at hours other than those listed above or during an absence of the Project Manager. The Contracting Officer shall be notified at the start of each training day of planned absences of the Project Manager. The Project Manager and the designated representitive shall have the full authority to contractually commit the Contractor for all matters pertaining to administration of this contract. The Project Manager and the designated representitve shall be able to understand, speak, read, and write the English language.

C.1.3.2 Other Personnel: Contractor shall provide all personnel needed to accomplish all contract work or service within the specified time limitations. This provision shall apply notwithstanding past historical records, estimates of personnel needed, or any minimum levels established elsewhere. All personnel shall be legal residents of the United States. The Contractor shall submit his organizational structure and a list of personnel required to perform this contract to the Contracting Officer as part of his bid proposal. The list shall be revised monthly to reflect all changes in personnel.

C.1.3.3 Qualifications/Certifications:

C.1.3.3.1 Contractor Quality Control Representative (QCR): Contractor shall provide a qualified individual solely responsible for quality control. The resume of the nominated individual shall be provided to the Government at least 30 days prior to the contract start date.

C.1.3.3.2 Contractor shall provide to the Contracting Officer evidence of certification/qualification prior to contract start and whenever a new Contractor employee performs work in a functional area requiring certification/ qualification.

C.1.4 Contingencies: If, in the event that the training situation changes which results in an increase of work directed by the Contracting Officer and an increase in cost of performance, such increase will be subject to the General Provision of the contract entitled "Changes."

C.1.5 Security Requirements: Contractor shall comply with all installation security requirements to include [installation regulations]. Contractor shall comply with DOD 5220.22-M, *Industrial Security Manual for Safeguarding Classified Information*, and DOD Regulation 5220.2R, *Industrial Security Regulation*, to obtain the required clearances.

C.1.5.1 Identification of Employees: Contractor shall provide each employee an indentification badge encased in clear plastic. The badge shall include, as a minimum, the person's name and the Contractor's firm name. Contractor shall ensure that all personnel wear the badge while they are on the installation.

C.1.5.2 Vehicle Registration: Contractor shall obtain, and shall require his personnel to obtain, vehicle passes/decals from the Provost Marshall prior to the commencement of contract work in accordance with [insert applicable installation supplement] AR 190-5. Vehicle passes/decals shall be displayed and returned by the employees to the Provost Marshall within one working day upon termination of employment or termination of this contract.

C.1.6 Quality Control:

C.1.6.1 Contractor Quality Control (CQC): Contractor shall establish and execute the approved Quality Control Program. Work shall not commence until the plan has been approved.

C.1.6.2 Draft Program: Contractor's Draft Quality Control Program shall be submitted as part of the bid proposal. The plan shall be constructed in such a way that each functional area plan may be extracted and used for that function only and not contain information extraneous to that function. The program shall include as a minimum the following:

C.1.6.2.1 Organizational structure and functional statements showing relationships between sections or functions which interrelate to operation and maintenance.

C.1.6.2.2 A quality control inspection system covering all General and Specific Tasks included in the contract scope of work. It shall specify tasks or areas to be inspected on either a scheduled or unscheduled basis and the way in which inspections are to be conducted.

C.1.6.2.3 The minimum acceptable qualifications of the Quality Control Representative and other personnel tasked to perform inspections and the extent of their authority. Their functional roles shall be depicted in an organizational chart or other approved form.

C.1.6.2.4 Method of documenting and enforcing quality control operations, including draft format of each record and report.

C.1.6.2.5 Key control as required by C.1.10.

C.1.6.2.6 Special equipment/clothing required for safety.

C.1.6.2.7 Detailed specifics as to how the Contractor will ensure that his/her personnel take required safety precautions when working with electricity, power tools, etc., and when entering or working in confined spaces.

C.1.6.3 Quality Control Files: Contractor shall maintain a file of all reports on inspections or tests conducted by the QCR and records of all corrective actions taken. This file shall be subject to review by and at the discretion of the Contracting Officer during the contract term. The file shall be the property of the Government and shall be turned over to the Contracting Officer upon completion or termination of the contract.

C.1.6.4 Quality Control Reports: Contractor shall submit a weekly Quality Control Report to the Contracting Officer by 10 a.m. each Monday.

C.1.6.5 Acceptability: All work and services performed shall be inspected and accepted in accordance with the clause entitled "Inspection of Services" (DAR 7-1902.4) contained in the General Provisions (Section I) of the contract. For purposes of acceptance, the CQC program shall be considered a service and shall be subject to inspection. The Contractor shall notify the Contracting Officer in writing of any proposed change to the Contractor's Quality Control Program. No change shall be implemented prior to review by the Contracting Officer.

C.1.6.6 Performance Evaluation Meetings: The Contractor shall meet with the Contracting Officer weekly, during the first month. Meetings shall be held thereafter as determined necessary by the Contracting Officer. Written minutes of these meetings shall be prepared by the Contracting Officer and shall be signed by the Contracting Officer and the Contractor or their designated representatives.

C.1.7 Installation Closure: When an unforeseen installation closure occurs on a regularly scheduled day of work, the Government shall have the following options:

C.1.7.1 Reschedule the work to the following day unless that day is a Saturday, Sunday, or legal holiday and routine work is not scheduled for Saturday, Sunday, or holiday.

C.1.7.2 Reschedule the work on any day which is mutually satisfactory.

C.1.7.3 When mutually agreed, forego the work and adjust the payment due the Contractor accordingly.

C.1.8 Hours of Operation: Operations shall be accomplished as specified. Routine inspection, maintenance, and repair work shall be done during normal duty hours for the range from 7 a.m. to 9 p.m., Monday through Sunday (determined for each individual installation), excluding legal public holidays. Where operators of Government facilities or equipment are required at other than the above normal duty hours, the Contractor shall adjust work schedules and provide adequate staffing. Payment for the additional services will be made under the "Changes" provision of the contract.

C.1.9 Legal Public Holidays: Except as otherwise specified, routine work shall not be scheduled on holidays or holidays observed in lieu thereof. When a service is required less than three times per week and the schedule for that work falls on a holiday, the work shall be done on the day following or preceding the holiday. Legal public holidays are:

New Year's Day - 1st day of January
Martin Luther King's Birthday - 3rd Monday in January
Washington's Birthday - 3rd Monday of February
Memorial Day - last Monday of May
Independence Day - 4th day of July
Labor Day - 1st Monday of September
Columbus Day - 2nd Monday of October
Veterans Day - 11th day of November
Thanksgiving Day - 4th Thursday of November
Christmas Day - 25th day of December

C.1.10 Key Control: The Government will furnish the number and types of keys required for accomplishment of the work. Contractor shall establish a control system to ensure that keys are not lost, misplaced, or used by unauthorized persons. Government keys shall not be duplicated by the Contractor without Contracting Officer's advanced approval. Procedures developed to control Government keys shall be included in the Contractor Quality Control Plan. Contractor shall comply with AR 190-13 and AR 190-15 applicable to key and lock control. Contractor shall:

C.1.10.1 Reimburse the Government for replacement of locks or re-keying required as a result of Contractor losing any key. In the event a master key is lost or found to have been duplicated, all locks and keys for that system shall be replaced and the total cost charged against the Contractor.

C.1.10.2 Report any occurrence of lost key(s) within 1 hour upon discovery of the loss to the Contracting Officer.

C.1.10.3 Limit access to secure areas under Contractor's control to authorized employees and others specially authorized in writing by the Contracting Officer. The Contracting Officer and his/her designated representative(s) shall have access to any Contractor-controlled point providing entry to any Government-owned property.

C.1.11 Energy and Utilities Conservation Program:

C.1.11.1 Contractor shall comply with the [installation] Energy Conservation Program and participate in energy conservation activities, including:

C.1.11.1.1 Training personnel to conserve energy by turning off unneeded equipment. Controls for heating, ventilation and air-conditioning systems shall not be adjusted by unauthorized personnel.

C.1.11.1.2 During the summer season, the controls shall be set to hold the dry bulb temperature not lower than 78 degrees F during working hours.

C.1.11.1.3 During the winter season, the controls shall be set to maintain a dry bulb temperature not higher than 65 degrees F during working hours and shall be set to maintain a dry bulb temperature of not more than 55 degrees F during nonworking hours.

C.1.11.2 Contractor shall instruct his/her personnel in utilities conservation practices and shall require them to operate under conditions which preclude waste of Government-furnished utilities. Contractor's instructions and programs shall include the following:

C.1.11.2.1 Use of lights only in areas where work is actually being performed.

C.1.11.2.2 Water faucets, valves, and equipment shall be turned off after use.

C.1.11.3 Contractor Energy Conservation Plan: Contractor shall develop an Energy Conservation Plan to support Government conservation programs. Contractor shall submit a draft of the plan with the bid proposal and a detailed and complete final plan to the Contracting Officer within 30 days after contract award.

C.1.12 Warranties:

C.1.12.1 Contractor shall be responsible for exercising all existing manufacturers' commercial warranties on Government equipment. Contractor shall report any difficulty in exercising manufacturers' warranties to the Contracting Officer and request assistance as necessary. Existing warranties will be provided to the Contractor by the Government.

C.1.12.2 Contractor shall provide to the Contracting Officer the original warranties on new equipment installed. These warranties shall be made out to the Government.

C.1.12.3 Equipment installed by the Contractor that fails within a warranty period due to poor workmanship or to not following the manufacturer's installation or operation instructions shall be replaced or repaired at the Contractor's expense. This determination will be made by the Contracting Officer.

[Note to Specifications Writer: At this time, there are no warranties for RETS equipment. The preventive maintenance (PM) schedules provided shall be followed as they apply to RETS equipment. However, warranties on other equipment may require specific PM schedules. The installation may need to choose between a manufacturer-required PM schedule and the contract-provided PM schedule. The chosen schedule must be specified in this section. If a breakdown occurs and a warranty is not honored due to noncompliance with the manufacturer-required maintenance, the Contractor is not liable if a less comprehensive PM schedule had been specified. However, if a breakdown occurs due to noncompliance with the specified guidelines, then the Contractor is liable.]

C.1.13 Environmental Program:

C.1.13.1 Regulations/Laws: Contractor shall comply with all Federal, State, and local laws, regulations, and standards regarding environmental pollution specified in Section C.6 and including [installation name] Spill Control and Countermeasure (SPCC) Plan and the Installation Spill Contingency (ISC) Plan prepared on [date]. All environmental protection matters shall be coordinated through the Contracting Officer with the Post Environmental Engineer. The Post Environmental Engineer is located in Building [number] and telephone extension [number].

C.1.13.2 Citations: Citations against Government facilities operated by the Contractor for noncompliance with environmental standards are a matter for resolution between Contracting Officer and the issuing office of the EPA or State of [insert state] Regulatory Authorities. Payment of fines or penalty charges associated with citations issued by Federal, State, or local officials shall be paid by the Government. If the citations are issued due to faulty operation or maintenance practices, the Contracting Officer shall deduct the fines or penalty charges from any monies due the Contractor.

C.1.13.3 Contractor shall provide all necessary manpower, equipment and material to implement all spill response, containment, cleanup, and reporting requirements specified by Federal, State, and local laws, regulations, standards, and plans.

C.1.14 Safety Requirements and Reports: All work shall be conducted in a safe way and shall comply with Occupational Safety and Health Administration (OSHA) requirements and Engineer Manual (EM) 385-1-1. If the Contractor fails or refuses to promptly comply with safety requirements, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop order shall be made the subject of claim for extension of time or for any exceeded costs or damages to the Contractor.

C.1.14.1 Damage Reports: In all instances for which Government property and/or equipment are damaged by Contractor's employees, a full report of the fact and extent of such damage shall be submitted to the Contracting Officer within 24 hours of occurrence.

C.1.14.2 Accident Reporting: Contractor shall comply with OSHA and other regulatory agency requirements (cite installation regulations/policy) for recordkeeping and reporting of all accidents resulting in death, trauma, occupational disease, or environmental insult. Contractor shall provide a verbal report to the Contracting Officer within 4 hours of occurrence and a written follow-up report within 3 working days of occurrence whenever an accident involving personal injury occurs.

[Note to Specification Writer: A pre-bid conference is recommended to allow bidders to view the range and its facilities.]

SECTION C-2

DEFINITIONS

C.2 Definintions: The following terms and abbreviations are defined for use with this document.

C.2.1 Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

C.2.2 Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

C.2.3 Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

C.2.4 Debug Scenario: The act of correcting deficiencies in an already recorded scenario to insure its conformance to range-user requirements.

C.2.5 Develop Scenario: The act of determining range-user requirements for the exposure sequence of targets.

C.2.6 EPS: Engineering Performance Standards.

C.2.7 Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

C.2.8 Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a way that allows the proper functioning of the equipment or system.

C.2.9 Record Scenario: The act of programming the RCS with a previously developed scenario.

C.2.10 Remoted Target System (RETS) Equipment: Any of the pieces of targetry listed in Technical Exhibit No. 2.

C.2.11 Repair. The application of maintenance service (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

C.2.12 Replace. The act of substituting a serviceable like-type part, subassembly, or module (component or system) for an unserviceable counterpart.

C.2.13 Response: As used in relation to service calls, means the Contractor's workforce is at the worksite ready to begin required work within a specified time period following receipt or notification of service call.

C.2.14 Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), preserve, drain, paint, or replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

C.2.15 Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

C.2.16 Test Scenario: The act of executing an already recorded scenario to verify its intended use.

SECTION C-3

GOVERNMENT-FURNISHED PROPERTY

C.3.1 Facilities: The Government will furnish the facilities described in Technical Exhibit No. 7. The Contractor shall assume responsibility and accountability of such facilities, and shall take adequate precautions to prevent fire hazards, odors, chemical spills, and vermin. At the completion of the contract, all facilities shall be returned to the Government in the same condition as received, except for normal wear and tear. The Contractor shall be held responsible for the cost of any repairs caused by negligence or abuse on his/her part, or on the part of any employees, including subcontractor employees.

C.3.1.1 Additional Range Control Station: The Government will provide the Contractor an additional Range Control Station within the control tower for programming and debugging new scenarios and as a backup RCS.

C.3.2 Equipment: The Government will furnish the Contractor the equipment as described in Technical Exhibit No. 2 for use in performing this contract. All equipment will be fully operational before release to the Contractor.

C.3.2.1 Contractor shall be responsible for all service, maintenance, and repair, to include parts and labor, for the furnished equipment. [Maintenance and repair procedures shall be provided if available.] Equipment which reaches the end of serviceability during the period of this contract shall be reported by the Contractor for scheduled replacement. Upon completion or termination of the contract, all Government-owned equipment shall be returned to the Government in the same condition as received, except for normal wear and tear. The Contractor shall be responsible for the cost of any repairs caused by negligence or abuse by the Contractor. Charges will be determined by the Contracting Officer.

C.3.3 Utilities: The Government will furnish heat, air-conditioning, water, electricity, sewer, and other utility services currently available in the Government-furnished facilities. Contractor shall comply with the Energy Conservation Program as specified in C.1.11.

C.3.3.1 Telephone Services: Class "C" telephone service for intra-post telephone calls shall be provided by the Government at no cost to the Contractor. The Contractor shall be responsible for the installation of commercial telephones for off-post calls.

C.3.4 Inventory and Control:

C.3.4.1 Prior to beginning work under this contract, the Contracting Officer will furnish to the Contractor the Government's inventory of parts and materials which are to be used for normal and routine maintenance. A joint inventory will be taken and duplicate copies prepared and agreed to by the Contractor. It is estimated that inventory value is approximately $_____ with _____ line items.

C.3.4.2 Inventory: Contractor shall promptly replace parts and materials as they are used. The Contractor must report to the Contracting Officer within 10 days after each 90-day period of the contract those parts and materials that have been used and provide evidence that they have been replaced or placed on order. Upon expiration or termination of the contract, a joint inventory of parts and materials will be taken. The

Contractor shall pay to the Government the current market value of all parts and materials that have not been replenished to the pre-contract levels. If the joint inventory discloses that the parts or materials have been lost or damaged, the Contractor shall also pay to the Government the current market value for the lost or damaged items.

C.3.4.3 Emergency Standby Equipment Items: Individual equipment items with a dollar item greater than $_____ shall be stored, maintained, and controlled by the Contractor. The Contracting Officer shall be notified of any stock depletion. The Government has the option not to replace the item.

C.3.5 Operating Manuals and Catalogs: Equipment operating manuals and suppliers' catalogs currently maintained by the Government will be turned over to the Contractor prior to the start of work. Inventory of suppliers' catalogs will not be taken because the catalogs are disposable items. Contractor shall update catalogs as new issues are published by the suppliers. Contractor shall maintain up-to-date supplier catalog file of pertinent supplies and components for Government-furnished equipment maintained under this contract. Contractor shall obtain and maintain manufacturers' operating instructions and maintenance manuals on all new equipment. These files shall be turned over to the Government upon completion or termination of this contract.

C.3.5.1 Other documents which shall be updated and maintained by the Contractor include:

C.3.5.1.1 A complete set of as-built drawings of the range complex.

C.3.5.1.2 Available manufacturer's literature and applicable mechanical, plumbing and electrical drawings and functional schematic diagrams.

C.3.5.1.3 Standard Government forms required for the fulfillment of this contract. Forms and logs are subject to change periodically. Changes in a form which affect contract cost or price will be subject to the General Provisions of this contract entitled "Changes."

SECTION C-4

CONTRACTOR-FURNISHED PROPERTY

C.4.1 Property: Contractor shall furnish all plant, facilities, vehicles, equipment, supplies, or materials necessary to accomplish all required services except as described in Section C.3.

C.4.2 Equipment, Materials, Parts, Supplies and Tools: Contractor shall furnish all equipment, materials, parts, supplies, and tools necessary to perform the work of this contract unless otherwise specified herein.

C.4.2.1 Items of equipment shall be maintained by the Contractor.

C.4.2.2 Power tools, handtools, and testing apparatus shall be maintained by the Contractor. Power tools may include, but are not limited to saws, planers, drills, lathes, and grinders. Handtools may include, but are not limited to, hand saws, hammers, screwdrivers, rules, squares, wrenches, and oil cans. Testing apparatus may include, but is not limited to, gauges and meters necessary to perform all work necessary under this contract.

C.4.2.3. Administrative supplies and equipment shall be furnished by the Contractor, except for Government-furnished forms, etc., as specified elsewhere.

C.4.2.4 A sufficient number of vehicles suitable for the transportation of personnel and materials shall be furnished by the Contractor. All vehicles used by the Contractor shall meet applicable State vehicle safety standards, Army installation regulations, and should be maintained serviceable and presentable.

C.4.2.5 Fuel oil, kerosene, gasoline, etc., for use in the Contractor's vehicles and equipment shall be furnished by the Contractor. The storage of combustible materials shall be in conformance with applicable fire and safety regulations.

C.4.3 Failures: Contractor-furnished equipment or items, inoperable or unserviceable for whatever reason including failure to meet Federal, State, or local safety requirements, shall be removed from the installation within 24 hours after failure unless otherwise authorized by the Contracting Officer. Such failure shall not be cause for the Contractor to reduce service or performance. Contractor shall not use Government-furnished property to perform maintenance or repair on Contractor-furnished equipment unless so authorized in writing by the Contracting Officer.

SECTION C-5

DESCRIPTION OF WORK/SPECIFIC TASKS

WORK DESCRIPTION

C.5.1 Levels of Work:

C.5.1.1 Work Level I: Work Level I includes all scheduled work and services. Scheduled service includes operating the range, performing recurring preventive maintenance, and performing start-up/shut-down maintenance on equipment and facilities.

C.5.1.2 Work Level II: Work Level II includes all repair, maintenance, and replacement of existing equipment or facilities which exceeds Work Level I but is less than $_____ (labor and materials). All Level II work shall be ordered and done at the unit prices and/or the composite Service Contract Act (SCA) labor rate established in the Requirements Section of the bid schedule. Government will reimburse Contractor for actual material cost based on submission of the source invoice(s). [Dollar limits to be determined at each installation.]

C.5.1.3 Work Level III: This level of work includes all "new" work defined as minor construction and alteration which does not exceed a total job cost of $_____ (labor and materials); and for repair and maintenance which exceeds Work Level II but does not exceed a total job cost of $_____ (labor and materials). All Level III work will be ordered and done at the unit prices and/or composite Davis-Bacon Act (DBA) labor rate established in the requirements section of the bid schedule. Government will reimburse Contractor for actual material cost based on submission of the source invoice(s). However, the Government also reserves the right to have this work done by other contractors in other ways. [Dollar limits to be determined at each installation.]

Caution: all work defined as Level II or III must be approved, in writing, by the Contracting Officer prior to performance, except for Level II and III work specified as emergency (Priority 1) by the Contracting Officer.

C.5.2 Work Requests: Work requests will be authorized by the Contracting Officer prior to accomplishment. Work requests will be issued on the following documents:

C.5.2.1 Service Order (SO): Service orders will be issued by the Contracting Officer on a DA Form 4287 or local computer-produced form containing the same information. SOs will be used for scheduled and unscheduled repair and maintenance that exceeds Work Level I criteria, limited to one facility per SO, and no more than a combination of three components or task codes. [Labor and material dollar limits to be set at individual installations.]

C.5.2.2 Individual Job Order (IJO): Individual Job Orders (work orders) shall be issued for Work Levels II and III on a DA Form 4283 (Facility Engineer Work Request)/4284 (Facility Engineer Work Order) for maintenance and repair and for minor construction and alteration work which exceeds Work Level I criteria. The IJO will also be used for work that the Government desires to track for other purposes. [Labor and material dollar limits to be set at individual installations.]

C.5.2.3 Standing Operating Orders (SOO): Standing Operating Orders shall be issued on a DA Form 4283/4284 for range operation, operator maintenance, and recurring preventive maintenance services or other services for which specific work and manpower

requirements are relatively constant and predictable. SOOs will be issued by the Contracting Officer following a review of Contractor work plans and schedules.

[Note to Specification Writer: To facilitate the tracking of cost by individual categories or items, establish IJOs and SOs with one phase for each bid item in the contract.]

C.5.3 Priorities: There are two categories of priorities. The Contracting Officer will assign categories to all work. The two categories are established as:

C.5.3.1 Emergency (Priority 1): Work which takes priority over all other work orders and requires immediate action, including diverting mechanics from other jobs, if necessary, to cover the emergency. Usually, the work is necessary for the protection of health, safety, security of sensitive Government property, or prevention of damage to property. ALL EMERGENCY LEVEL II WORK WILL BE APPROVED VERBALLY ONLY BY THE CONTRACTING OFFICER. Examples of emergency priorities include:

C.5.3.1.1 Gas leaks.

C.5.3.1.2 Electrical problems which could lead to personal harm, damage to property, or a power failure affecting occupied buildings.

C.5.3.1.3 Serious water leaks.

C.5.3.1.4 Complete restriction or inoperation of plumbing fixtures or drain lines where no alternative facilities are available in the building.

C.5.3.1.5 Loss of air-conditioning where it is required for data processing or other essential purposes.

C.5.3.1.6 Door and lock repair where it is necessary to close buildings for security.

C.5.3.1.7 Broken glass where it is necessary to close a building for security.

C.5.3.1.8 Leaking roofs where damage to building contents may result.

C.5.3.1.9 Problems arising from flash floods and storms to include washouts in roads, plugged drainage, fallen trees, landslides, barricades, etc.

C.5.3.1.10 Repair of security fences and gates.

C.5.3.2 Routine (Priority 2): Work that does not meet the criteria for Priority 1. Work in this category generally will be done in the most economical way, on a first-come, first-served basis. These jobs cover required work which, if not accomplished, would only continue as an inconvenience or an unsightly condition.

C.5.3.3 Priority Work: Government will establish priorities for all work in accordance with Section C.5.3 of the contract. Contractor shall schedule all Level II or III work according to the priority established by the delivery order, DD Form 1155, or change order, as applicable.

C.5.4 Response Time:

C.5.4.1 Emergency Maintenance: Emergency repair or maintenance work shall be done whenever required and shall be continued to completion without interruption,

notwithstanding normally scheduled working hours, weekends, or holidays, until the emergency is alleviated. Response time to emergency service calls during off-duty hours shall not exceed 2 hours regardless of the time of day or night, weekends, or holidays. Emergency service call response time during normal duty hours shall not exceed 30 minutes.

C.5.4.3 Routine Maintenance: Contractor shall perform maintenance during normal working hours. Work shall be accomplished within 2 working days after receipt of the service order.

C.5.5 Work Control:

C.5.5.1 Contractor shall schedule, control, and perform all work described herein in accordance with all terms and conditions contained in this contract. Contractor shall develop and provide written work plans and schedules for all Work Level I services to include range operation and recurring preventive maintenance schedules for daily, weekly, biweekly, monthly, quarterly, semiannual, and annual start-up and shutdown work. The schedule shall reflect current maintenance document recommendations (to include manufacturer's maintenance recommendations and instructions). All tasks shall be performed in accordance with these recommendations. The schedule(s) shall be kept current. Two copies of all work plans and schedules shall be provided and shall be subject to review by the Contracting Officer. Contractor shall not change the work plan or schedule without prior review by the Contracting Officer. Proposed changes shall be provided to the Contracting Officer at least 2 working days prior to the requested change.

[Note to Specification Writer: The relative limits for SOs and IJOs need to be established. Because of the scope of Level I work (Lump-Sum Bid), there will be a considerable amount of routine maintenance done on SOs and IJOs. This results from the impossibility of accurately estimating the amount of destruction by any individual battalion or combination of battalions. If the dollar limit for SOs is set too low, the result will be an unusually large number of IJOs. If the approval process for IJOs is complex, the downtime of the range could easily be increased by waiting for approval to begin routine maintenance.]

C.5.5.2 Contractor shall receive work orders from the Contracting Officer and schedule, control, and perform all work covered by the fixed price portion of this contract. Contractor shall initiate additional work requirements that the Contractor becomes aware of while performing work under this contract. Level II or III work requirements shall be reported on DA Form 4283, Job Order Request, or DA Form 4287, Service Order, and submitted to the Contracting Officer for approval. All Contractor-initiated work will be approved by the Contracting Officer prior to commencement.

C.5.5.3 Contractor shall provide estimates or firm fixed prices, as applicable, for Level II and III work within the contract scope, as requested, for negotiation under the requirements portion of this contract.

C.5.5.4 Cost Estimates: Contractor shall prepare labor and material cost estimates for all work requiring more than ___ hours of labor or $____ in materials as requested by the Government.

C.5.5.4.1 Preliminary Estimates: Contractor shall prepare [scoping or empirical] estimates based on a clear understanding of the scope of work requirements. The preliminary estimates will be used by the Government for budgeting or planning only.

C.5.5.4.2 Detailed Estimates: Contractor shall prepare detailed cost estimates. The detailed estimates shall include site inspection; preparation of a job phase calculation sheet (NAVFAC 11014/23 or DA Form 2764) using Army Engineering Performance Standards (EPS) (TB 420-Series) for a minimum of [the current in-house use of EPS] percent of the estimated labor hours; a Bill of Materials (DA Form 2702) using Government Supply Agency catalogs or other similar and appropriate materials catalogs; and an SO (DA Form 4287) or a Facilities Engineer Work Order (IJO) (DA Form 4284). The DA Form 4287 or 4284 shall be completed to show work phasing so that actual cost of work accomplished, by facility number and other component code [K or L work] or functional group code [J or M work], can be captured. EPS shall be used on all IJOs for which there is an appropriate standard, but in any case, for not less than [the current in-house use of EPS] percent of the estimated labor requirements. The Government will use the detailed estimate for budgeting and work management.

C.5.5.4.3 Emergency Work: Contractor shall prepare a detailed estimate for emergency repairs within 2 days of notification of the emergency. Preparation of the estimate, however, shall not delay the start of emergency repairs authorized either verbally or in writing by the Contracting Officer. EPS shall be used for a minimum of [the current in-house use of EPS] percent of the labor requirements.

C.5.5.4.4 Accuracy: Preliminary estimates shall be accurate within plus or minus 15 percent of final detailed estimates.

C.5.5.4.5 Change of Scope: When a change of scope of work alters the job content, the Contractor shall update the detailed cost estimate and provide it to the Contracting Officer for reauthorization to proceed with the work. Except as provided herein for accomplishing emergency work, the Contractor shall stop all work until authorization to proceed is obtained from the Contracting Officer.

C.5.5.5 Work Exceeding Contractor Limits of Responsibility: Work identified by the Contractor and estimated by him/her to exceed the limits of his/her responsibility shall be reported to the Contracting Officer not later than the end of that work day. The Contracting Officer will advise the Contractor on how to proceed from this point.

C.5.5.6 Emergency Work: In case of an emergency work requirement, the Contracting Officer may verbally authorize or direct the Contractor to proceed. Contractor shall obtain a follow-up signature for record on all verbally authorized emergency work. Written confirmation will follow at the earliest possible date. Verbal authorization shall be documented by the Contractor to include time, date, who, what, where, etc., and shall be retained in the files. The Contracting Officer will establish any limitation ("not to exceed," etc.) necessary at the time of call.

C.5.5.7 Work Coordination: Contractor shall prearrange and coordinate with the Range Officer for access to the range. If work requires scheduled or unscheduled interruption, disconnection or cut-off of any utility to or within the range, or requires that the range be vacated, the Contractor shall provide a 48-hour advance notification of a scheduled interruption to the Range Officer and the Contracting Officer, avoid damage to customer equipment, and plan to minimize disruption of the training activities.

C.5.5.8 Records and Reports:

C.5.5.8.1 Records: Complete and accurate operating, maintenance, and repair records shall be maintained by the Contractor of all work in accordance with [installation's supplement] AR 340-1, Records Management Program, and as otherwise specified in this contract.

C.5.5.8.2 Utility Operational Files and Logs: Contractor shall maintain operating logs and an operating log file on all equipment. Contractor shall use standard Government forms, charts, and logs. These documents shall be available for Contracting Officer review. All operational files and logs shall be turned over to the Government upon completion or termination of the contract.

C.5.5.9 Reports: Contractor shall provide all reports described herein and in Technical Exhibit No. 8. Unless otherwise specified, two copies of the following reports shall be provided to the Contracting Officer:

C.5.5.9.1 Weekly Berm Report: Contractor shall complete and submit the report entitled "Weekly Berm Report" by 10 a.m. on each Monday. This report details the present condition of the protective berms surrounding the target emplacements after a week of training. The report will be a compilation of the results of the daily berm inspection which is conducted by the Contractor and the Contracting Officer's representative. An example of the report appears in Technical Exhibit No. 8.

C.5.5.9.2 Maintenance and Repair Data: Contractor shall collect and maintain a current record of maintenance and repair performed on the range during the course of the contract. The form for reporting this information is provided in Technical Exhibit No. 8.

C.5.5.9.3 Management Reports: Provide various information, available only through the Contractor, which must be reported to higher levels of command and as specified in Technical Exhibit No. [XX--see note to Specification Writer below] Contractor shall develop and maintain a data system which will provide accurate and complete data for the reports.

[Note to Specification Writer: If information concerning management procedures is required--beyond the scope of those report forms already included--then a Technical Exhibit shall be cited here. The individual installations shall determine the form of the exhibit.]

C.5.5.9.4 Hazardous Condition Reports: Report any unhealthful or hazardous conditions. Such reports shall be made as expeditiously as possible by the Contractor to the Contracting Officer. In any event, the report shall be made no later than close of business on the same day.

C.5.5.9.5 Other Reports: Report other circumstances which would affect the Contractor's performance of work required under this contract.

[Note to Specification Writer: IFS, the Integrated Facility System, is an automated system available at most installations. The system can be extremely useful in recording and retrieving maintenance and repair data for the range. Use of the system is recommended. It is left to the individual installation to determine the extent of the Contractor's responsibilities in providing information in a form which can then be fed directly into IFS.]

SPECIFIC TASKS

C.5.6 Grounds Maintenance:

C.5.6.1 Scope: Contractor shall inspect, service and maintain all range grounds. Work shall include inspecting, scheduling, and performing mowing, clearing of storm damage, correction of soil erosion areas or problems, tree and shrub maintenance, snow and ice removal, maintenance of drainage system, access roads, and foxholes, and maintenance and repair of protective berms surrounding the target emplacements. All grounds maintenance tasks, except unscheduled services described herein, are the Contractor's responsibility (Work Level I). Tasks specified as unscheduled services shall be done under the appropriate work level as described in Section C.5.1.

C.5.6.2 Berm Repair:

C.5.6.2.1 Preventive Maintenance: Inspect: Contractor shall, in conjunction with the Contracting Officer, inspect all protective berms associated with targets and target emplacements on the range once per week. The results of this inspection will determine which, if any, target emplacements are in danger of damage if fired upon. The decision to shut down any target shall be the Contracting Officer's.

C.5.6.2.2 Reshape Berms: Contractor shall reshape damaged protective berms surrounding the target emplacements. The berms shall be reshaped using soil from the area surrounding the berm as closely as possible to design specifications without adding any new material. Contractor will coordinate a schedule of repair with the CO and the Range Officer. The range shall be returned to the operational readiness level as stated in Section C.1.1.1 following the reshaping of the berms.

C.5.6.2.3 Berm Repair: Contractor shall repair all protective berms surrounding target emplacements. The berms shall be repaired to conform to the original as-built drawings and design specifications. Berms shall be repaired in the time period between training sessions for light infantry division units on the range. Contractor shall coordinate the schedule of repairs with the CO and the Range Officer. The range shall be returned to operational readiness before its next scheduled use.

C.5.6.3 Foxhole Repair:

C.5.6.3.1 Specific Tasks and Standards:

C.5.6.3.1.1 Repair Foxholes: Contractor shall perform maintenance, when directed to, on the foxholes to ensure that the foxholes conform to the original as-built drawings and design specifications. Maintenance shall include, but is not limited to, replacement and mending of foxhole covers and platforms. All materials used to repair the foxholes shall meet applicable Federal Specifications and shall be approved by the Contracting Officer.

C.5.6.3.1.2 Exposed Concrete Surfaces: Cracked, broken, or spalled areas shall be patched with a nonshrinking cement mortar. Areas shall be cleaned and all loose concrete removed. Underlying surfaces shall be chipped to insure bond with the patch. Shallow spalled areas shall be chipped to provide space for an adequate patched thickness. The patch shall be finished evenly with the adjacent patch thickness. The patch shall be finished evenly with the adjacent surfaces and finished to match the existing texture. Concrete shall conform to Federal Specification SS-C-192.

C.5.6.4 Range Fencing:

C.5.6.4.1 Fence Repair: Contractor shall maintain all fences to ensure the security of the Range and the fences' general appearance. Maintenance shall include, but is not limited to, replacement and mending of broken or sheared fences. All materials used to repair the fence shall meet applicable Federal Specifications and shall be approved by the Contracting Officer.

C.5.6.4.1.2 Fence Painting: Contractor shall paint all range fences when so directed. Application of paint shall be by brush or roller. Paint shall not be applied on rainy, foggy, or windy days. Ambient temperature at time of application shall meet the manufacturer's recommendations. There shall be one coat of paint and it shall be thick enough to completely cover the previous coat or surface. Edges of paint adjoining other materials or colors shall be sharp and clean without overlapping.

C.5.6.5 Access Roads and Vehicle Holding Area:

C.5.6.5.1 Maintenance and Repair: Contractor shall maintain and repair earth-surface roads and gravel-surfaced areas in the vehicle maintenance and holding area in accordance with TM 5-624 and TM 5-822-4.

C.5.6.5.2 Road Shoulders and Drainage: Road shoulders shall be maintained to ensure proper surface drainage and to protect the road edge. Proper drainage is defined to be a smooth flow from road surface to ditch. Grass or other treatment shall be applied to prevent erosion.

C.5.6.5.3 Blading and Dragging Roads and Holding Area: When Contractor is so directed, gravel roads, other earth-surface roads, and the vehicle maintenance and holding area shall be reworked by blading or dragging the surface until all ruts and holes are filled. Surfaces shall be graded to maintain a uniform crown that permits proper drainage in accordance with TM 5-624.

C.5.6.5.4 Resurfacing Roads and Holding Area: When so directed, the Contractor shall haul fill material from material storage areas to earth-surface roads and the vehicle maintenance and holding area to use for filling ruts and holes as necessary. Contractor shall provide additional fill materials as required. The roads and holding area shall be resurfaced to conform to the as-built drawings and design specifications.

C.5.6.6 Seasonal Maintenance:

C.5.6.6.1 Grass Mowing: Contractor shall maintain the areas of grass adjacent to and surrounding the range buildings in addition to the grass on the range proper. The grass is to be maintained between 2 and 6 inches in height on the range proper and between 2 and 4 inches in height around the buildings. Contractor shall provide a clean, even cut; prevent scalping, uneven mowing or rutting by equipment; and prevent damage to trees and shrubs. Remove and dispose of all clippings.

C.5.6.6.2 Snow Removal: Contractor shall begin snow and ice removal within 2 hours after initial notification by the Contracting Officer to provide free and clear access to these areas. Contractor shall remove snow from the following areas:

a. Access roads into the range.
b. The vehicle maintenance and holding area in the range complex.
c. Sidewalks and walkways on the range.

Contractor shall remove snow from the target emplacements and targets following a snowfall of 3 inches or greater and/or if the functioning of the target mechanism is impaired as determined by the CO. Contractor shall begin snow removal within 2 hours after notification by the Contracting Officer.

C.5.6.6.3 Herbicides and Brush Removal: Contractor shall apply herbicide to underbrush and other foliage and brush that obstruct sight lines to the targets or block drainage ditches and culverts. Contractor shall be liable for all damages incurred due to failure to follow the manufacturer's recommendations and instructions given on the product label or literature. All pesticides applied by the Contractor shall be approved by the EPA.

C.5.6.7 Utilities: Electrical Distribution: Repair/replace any part or element of the electrical distribution system which runs from the electrical power drop or the Range Control Station to the individual target emplacements and mechanisms. All overhead distribution lines on the range shall be maintained and repaired.

[Note to Specification Writer: Responsibility for the maintenance of utility distribution systems may reside with any one of the following possibilities: (1) the Utility Branch of the Facility Engineer, (2) the utility company, or (3) a commercial Contractor who has replaced the Facility Engineer at an installation. If none of these conditions exists, then this section of the contract should be written so that the Contractor has responsibility for the electrical distribution system on a cost-reimbursable basis. Because of the many possibilities, only the general intent of this section has been outlined above.]

C.5.7 Facilities Maintenance:

C.5.7.1 Scope: Contractor shall inspect, service, maintain, and repair all buildings and structures as shown in the as-built drawings. All services shall be performed in accordance with applicable National Codes, Department of Army Regulations, Technical Manuals, Publications, applicable manufacturer's recommendations, and State and local laws. Maintenance, repair, and alteration of buildings and structures shall include foundations, structural components, roofs, the building envelope, exterior and interior finishes, and civil, electrical, mechanical, and plumbing systems and other equipment affixed or installed as part of the building.

C.5.7.2 Preventive Maintenance:

C.5.7.2.1 Preventive maintenance, including seasonal work, shall be scheduled in advance by the Contractor and shall be performed in an orderly, continuous, and uniform way. Preventive maintenance shall be performed for each facility on a semiannual basis.

C.5.7.2.2 Contractor shall submit a draft Preventive Maintenance Plan to the Contracting Officer for approval. Contractor shall complete all work in accordance with that scheduled.

C.5.7.2.3 Contractor shall perform the scheduled preventive maintenance activities and shall notify the Contracting Officer of conditions that require repairs exceeding the scope of this contract. Preventive and seasonal maintenance activities shall include, but are not limited to, the list in Technical Exhibit No. 1.

C.5.7.3 Heating System: Contractor shall maintain the heating system and associated components to conform with the as-built drawings and specifications. The heating system includes, but is not limited to:

a. Forced-warm-air furnaces.

b. Fuel-oil piping, valves, pumps, tanks, and filters.

c. Ventilation ducting (warm-air supply and return).

d. Air filters.

e. Ventilating fan and motor assemblies.

C.5.7.3.1 Oil-Fired, Warm-Air Furnace. Repairs or replacements on oil-fired, warm-air furnace shall include, but are not limited to:

a. Adjustment of air/fuel mixture and main burner.

b. Cleaning of mixer and burner port interiors.

c. Adjustment of pilot flames and fail-safe thermocouples on oil-fired furnaces.

d. Cleaning of port orifices.

e. Repair/replacement of malfunctioning fail-safe thermocouples.

f. Cleaning and adjustment of air shutters.

g. Repair of oil leaks in supply lines.

h. Adjustment of oil regulators.

i. Repair or replacement of malfunctioning oil regulators.

j. Replacement of air filters.

k. Repair/replacement of malfunctioning valves and controls.

l. Adjustment or replacement of deteriorated recirculating fan/motor belting.

m. Repair or replacement of defective bearings on recirculating fans or motors.

n. Cleaning of motors.

o. Repair or replacement of malfunctioning motors.

p. Repair or replacement of malfunctioning fuel-oil pumps.

q. Replacement of unrepairable furnace units.

r. Replacement of malfunctioning thermostats.

C.5.7.3.2 Heat Pump Systems. Repairs or replacements on heat pump systems shall include, but are not limited to:

a. Replacement of filters.

b. Repair/replacement of malfunctioning valves and controls.

c. Recalibration of control system.

d. Cleaning of motors.

e. Repair or replacement of malfunctioning motor.

f. Replacement of bearings on shafts.

g. Replacement of malfunctioning thermostats.

h. Replacement of resistance heating coils.

i. Repair or replacement of defrost system.

j. Adjustment of compressor heat switches.

k. Repair or replacement of refrigerating components and piping.

l. Repair or replacement of compressor.

m. Cleaning and adjustment of shutters and dampers.

n. Replacement or adjustment of drive belts.

o. Cleaning of heat exchanger.

p. Cleaning of duct work.

q. Repair or replacement of condenser units.

r. Repair or replacement of evaporator coil assemblies.

C.5.7.4 Plumbing System: Contractor shall maintain the plumbing system and associated components to conform with the as-built drawings and specifications. The plumbing system includes, but is not limited to:

a. Domestic water system.

(1) Cold-water piping.

(2) Cold-water piping supports.

(3) Cold-water pipe fittings and pipe sections.

(4) Cold-water faucets, hose bibbs, and valves.

(5) Hot-water piping.

(6) Hot-water pipe supports.

(7) Hot-water pipe fittings and pipe sections.

(8) Hot-water faucets and valves.

(9) Water pipe insulation.

(10) Exterior piping.

(11) Shut-off valves.

(12) Hose bibbs.

(13) Water heaters.

b. Lavatories.

(1) Hot- and cold-water faucets.

(2) Drain stopper and traps.

(3) Sinks.

c. Water Closets.

(1) Tank fill-valve assemblies.

(2) Tank float assemblies.

(3) Tank flushing assemblies.

(4) Tank-to-commode seals.

(5) Commode-to-sewer seals.

(6) Toilet seats.

(7) Commode component replacements.

(8) Tank cover replacements.

C.5.7.5 Electrical System:

C.5.7.5.1 Contractor shall maintain the electrical system and associated components to conform with the as-built drawings and specifications. The electrical system includes, but is not limited:

a. All electrical conduit.

b. Main entrance switches.

c. Distribution panels.

d. Breaker panels.

e. Ground fault circuit interrupters.

f. Circuit breakers.

g. Switches.

h. Receptacles.

i. Outlets.

j. Exterior receptacles.

k. Exterior wiring to lighting.

l. Grounds and grounding rods.

m. Light fixtures (incandescent and fluorescent).

n. All interior lighting.

C.5.7.5.2 Repair and/or replacement of components associated with the electrical system shall be done such that a safe, reliable electrical system is provided. All work shall conform to the requirements of NFPA No. 70-1975 where applicable. Replacement materials and parts and workmanship shall conform to the as-built drawings and specifications.

C.5.7.5.3 Common repair procedures shall include:

a. Breaker panels: Repair of breaker panels shall include replacement of circuit breakers, replacement of wiring, tightening of connections, securing of mounting mechanisms, and replacement of the entire panel in the event of physical damage.

(1) Circuit Breakers: All replacement circuit breakers shall be from the same manufacturer as that of the breaker panel and shall be installed in accordance with the manufacturer's instructions.

(2) Wiring. General splicing of nonmetallic sheathed cable will be allowed except in cases where the cable must be replaced due to deteriorated insulation. All splices will be made in accordance with the National Electrical Code (NEC). All replacement wiring also shall be in accordance with NEC.

(3) Connections: All connector screws shall be tightened to insure proper connection.

b. Interior Light Fixtures (Fluorescent): Any fluorescent light fixture having physical damage, loose or defective wiring, improper grounding, improper operation, worn lamp holders, burned-out lamps, or an excessively noisy or otherwise defective ballast shall be repaired or replaced to correct the deficiency. If a fixture is replaced, the replacement fixture shall be the same quality and size as the original fixture. Ballast or starter components shall conform to the fixture manufacturer's installation requirements.

c. Main Entrance Switch: Repair activities shall include replacement of switch or circuit breaker assembly, tightening of loose connections, and operational checkout after assembly. In the event of arcing or other improper operation, the Contractor shall first identify the defective element, connection, or circuit and then take appropriate corrective action.

d. Main Grounding System: The main grounding system includes the conductor and clamps and may include driven grounding electrodes. Repair may involve replacement of conductor, clamps, driven electrodes, or a combination thereof. Badly corroded clamps shall be replaced and the grounding conductor shall be cleaned or cut to insure a clean end for clamping to either the pipe or electrode. The pipe or electrode to which the conductor is clamped shall also be cleaned prior to making the connection. After completion of repair, the ground resistance shall be less than 25 ohms in the case of driven electrodes. In all cases, the conductor clamping shall insure less than 0.1 ohms resistance between ground conductor and electrode or pipe.

e. General Wiring: Repair shall consist of replacing wiring where there is evidence of:

(1) Charred insulation or conductors.

(2) Cracked or missing insulation.

(3) Otherwise defective or deteriorated insulation.

(4) Broken conductors.

C.5.7.6 Building Components:

C.5.7.6.1 Metal Building Components: Contractor shall maintain and repair or replace metal components of buildings and structures, installed building equipment, firing range fixtures, and dining facility equipment, and shall construct and install metal components in support of other maintenance activities. Metal-working shall include heating and bending to form metal shapes, drilling, torch-cutting, hammer-forging, grinding, and sawing and fitting metal parts. Contractor shall also weld all types of metals using electric, acetylene, and/or inert gas-shielded welding processes. Welding will be performed on light, heavy-gauge, and hardened metals using flat, vertical, horizontal, and overhead positions. Processes include preheating, brazing, bead-welding, flame-cutting, pressure-welding, and heat-treating. Metal-working includes the full range of metal-working and sheet-metal tasks to include:

C.5.7.6.1.2 Exterior Walls: Damaged or deteriorated wall areas shall be restored to be serviceable, watertight, and weathertight. The work shall include, but is not limited to, replacing damaged masonry units, tuckpointing loose or eroded mortar joints, sealing penetrations in wall openings, replacing damaged or deteriorated siding and metal panels, and replacing miscellaneous hardware.

C.5.7.6.1.3 Roof: Damaged or deteriorated roof areas shall be restored to be serviceable, watertight, and weathertight. The work shall include, but is not limited to, fabrication, installation, replacement, or repair of parts or complete assemblies required for a weathertight and watertight roof system.

C.5.7.6.2 Exposed Concrete Surfaces: Cracked, broken, or spalled areas shall be patched with a nonshrinking cement mortar. Areas shall be cleaned and all loose concrete

removed. Underlying surfaces shall be chipped to insure bond with the patch. Shallow spalled areas shall be chipped to provide space for an adequate patch thickness. The patch shall be finished evenly with the adjacent surfaces and finished to match the existing texture. Concrete shall conform to Federal Specification SS-C-192.

C.5.7.6.3 Doors and Windows:

C.5.7.6.3.1 General: Slightly damaged items shall be restored to be sound, serviceable, and attractive. Doors out of alignment with the door frame shall be adjusted and screws tightened so that the door fits squarely in the frame and operates freely. Doors and windows with badly damaged or deteriorated components shall be removed and replaced.

C.5.7.6.3.2 Screens and Screen Doors: Oxidation deposits shall be removed from metal parts. The affected area shall be cleaned and given a protective coating of paste wax conforming to Federal Specification DD-G-1403. Replacement screening shall be of the same material as existing metallic screening and shall conform to Federal Specification RR-W-365. Small holes in screens shall be repaired with a patch matching the existing screening. The patch shall be installed over the damaged section. The free ends of the patch shall be bent around the screen to secure the patch in position. Exposed screening ends shall be cemented with a colorless plastic cement. No exposed screening ends shall protrude from the screen. Warped screen doors and frames shall be straightened if possible to fit squarely in the opening. If beyond repair, warped items shall be replaced.

C.5.7.6.3.3 Windows: Damaged, deteriorated, missing, or inoperative window components shall be repaired or replaced to be sound, serviceable, and weathertight.

C.5.7.6.3.3.1 Removal and Replacement: Contractor shall remove and discard cracked or broken glass. Glazing compound or sealant shall be removed. Damaged or deteriorated sashes, frames, and other components shall be removed and replaced. Misaligned frames shall be realigned and made plumb.

C.5.7.6.3.3.2 Installation of Glazing: Preparation and installation of glazing shall be in accordance with the *FGMA Glazing Manual* and the manufacturer's application recommendations. Replacement glass shall be installed the same day damaged glass is removed, if possible. If this is not possible, the Contractor shall completely close and seal the window opening with 1/2-inch plywood. Plywood shall be secured on the exterior and shall be mounted to deflect rain from the building. Temporary enclosures shall be subject to approval by the Contracting Officer.

C.5.7.6.3.3.3 Glass Specifications: Glass shall conform to Federal Specification DD-G-451 and shall be Flat Sheet Glass, Type II, Class I, Quality q6, and of the same strength and thickness as the original glass.

C.5.7.6.3.3.4 Glazing Compound and Sealant Specifications: Glazing compound and preformed glazing sealant shall conform to the FGMA Glazing Sealing Systems Manual and shall be used according to the manufacturer's recommendations. Nonskinning compounds, nonresilient-type preformed sealers, and preformed impregnated-type gaskets will not be permitted. The glazing compound shall conform to Federal Specification TT-G-410. Materials used with aluminum frames shall be aluminum-colored, nonstaining, and shall not require painting. Glazing materials for aluminum frames which will be exposed to view and unpainted shall be gray or neutral.

C.5.7.6.3.3.5 Glazing Accessories: Missing, damaged, or deteriorated glazing points, clips, shims, angles, beads, setting blocks, spacer strips, and other glazing accessories shall be replaced to provide a complete, sound, glazing assembly. Ferrous metal accessories which will be exposed shall have a noncorroding, nonstaining finish.

C.5.7.6.3.3.6 Excessive Deterioration: Frames damaged or warped beyond economical repair shall be replaced. Frames shall be securely anchored to the supporting construction. Rusted metal frames shall be wire brushed and primed with a rust-inhibitive primer.

C.5.7.6.4 Weatherstripping: Damaged or deteriorated weatherstripping shall be replaced according to the manufacturer's recommendations. Flattened spring-type weather-stripping shall be lifted to provide an effective seal.

C.5.7.6.5 Hardware: Hardware items shall include, but are not limited to, latches, keepers, hinges, door and window hardware, and other types of building hardware. Exterior and interior hardware items shall be repaired or replaced as necessary. Operating hardware shall be lubricated and adjusted. Missing screws shall be replaced. Small damaged parts such as strike plates and seal inserts shall be replaced. Unrepairable hardware items shall be replaced. Replacement hardware shall match existing hardware in type, size, quality, and finish and shall meet Builders' Hardware Manufacturers Association (BHMA) product standards. Hardware shall be installed in accordance with the manufacturer's recommendations.

C.5.7.6.6 Painting:

C.5.7.6.6.1 General: This section covers touch-up and repair painting. "Paint" includes all enamels, paints, varnishes, stains, and other coatings, whether primer, intermediate, or finish coat. Paint used in touch-up painting shall blend with the color and texture of surrounding areas. The color of paint for entire walls or rooms shall be selected by the Contracting Officer from samples supplied by the Contractor. Touch-up painting shall be done as a maintenance activity.

C.5.7.6.6.2 Application: Application of paint shall be by brush, roller, or airless spray. Exterior paint shall not be applied on rainy, foggy, or windy days. The temperature shall meet the manufacturer's recommendations. Each coat of paint shall be thick enough to completely cover the previous coat or surface. Edges of paint adjoining other materials or colors shall be sharp and clean without overlapping.

C.5.7.6.7 Specialty Equipment:

[Note to Specification Writer: Include in this section any unique equipment or fixtures which must be maintained or repaired and can be included within the scope of this contract.]

RANGE OPERATIONS

C.5.8 Operations: Contractor shall perform the operational tasks of the computer operator. These operations shall conform to Army TM 9-6920-742-10. The four major tasks of the computer operator are:

a. Start-up--all tasks required to get the RCS to a fully operational status at the beginning of the day.

b. Shutdown--all tasks required to shut down and secure the RCS at the end of the day.

c. Operating procedures for training exercises--all tasks required to operate the RCS during training exercises.

d. Developing, recording, and debugging the training scenario.

MAINTENANCE AND REPAIR OF RETS EQUIPMENT

C.5.9 Maintenance and Repair of the RETS Equipment:

C.5.9.1 Scope: Contractor shall provide all work and services required to maintain, install, remove and/or repair, as applicable, all RETS equipment. Work shall include inspecting, scheduling, installing, and repairing RETS equipment; establishing and conducting user training; and all related services necessary to maintain and repair the equipment efficiently.

C.5.9.2 Operational Readiness: The target system shall be restored to a fully operational status every day before training exercises begin. Once training exercises begin for the day, the target system shall then meet or exceed the operational readiness rate stated in Section C.1.1.1. If the operational readiness of the range falls below the specified mininum, emergency replacement and repair shall be done to reestablish the required status.

C.5.9.3 RETS Equipment Maintenance and Repair: All RETS equipment maintenance shall meet or exceed the reliability and operational rates expressed in Technical Exhibit No. 4 and Section C.1.1.1, respectively. Contractor is responsible for, and shall provide, an inspection, preventive maintenance, and repair program which shall ensure that the reliability and operational rates in Technical Exhibit No. 4 and in Section C.1.1.1 are met. The type and quality of work shall be in accordance with and meet manufacturer's specifications, applicable documents as listed in Technical Exhibit No. 4, and Contractor's Quality Control Plan. Work shall be performed to prevent further deterioration of the equipment. Equipment maintenance encompasses preventive maintenance (Contractor-initiated inspection, checks, and maintenance) and breakdown maintenance (repairing failed components). If possible, maintenance should be performed when equipment is shut down (not energized). Only in extreme circumstances should equipment be maintained while it is "hot." Contractor's Quality Control Plan shall provide specific details as to how Contractor plans to ensure that his/her personnel take necessary precautions. Contractor shall require proper safeguards.

C.5.9.3.1 Preventive Maintenance (PM): Contractor shall perform PM on RETS equipment in accordance with the PM schedule given in Technical Exhibit No. 3. PM shall be scheduled in advance by the Contractor and shall be performed in an orderly, continuous way. Contractor shall notify the Contracting Officer of tasks beyond the scope of PM.

C.5.9.3.1.1 Replacement During PM: Contractor shall replace all failed components of any target system discovered during routine PM to restore the target system to a fully operational state. PM is a Level I task as stated in Section C.5.1.1. Contractor shall repair the component removed during replacement according to the provisions given in Section C.5.9.3.1.2. Replacement during PM will be bid on a lump-sum basis as stated in the bid schedule.

C.5.9.3.1.2 Repair of Components Found Defective During PM: Contractor shall repair all equipment which was removed during the PM cycle. The cost of repair shall not exceed the repair limits of Section C.5.9.3.5. PM repair is Level II work as stated in Section C.5.1.2. Repair work shall be bid on a per-hour basis as specified in the bid schedule.

C.5.9.3.2 Replacement and Repair in Emergency Situations: Emergency replacement and repair are required when target system operational readiness falls below the acceptable level specified in Section C.1.1.1. Emergency replacement and repair are Level II work as stated in Section C.5.1.2. Contractor must begin repairing the failed component of the target system in an emergency within 30 minutes after notification or receipt of the emergency call as stated in Section C.5.4.2. Contractor shall repair the failed component according to Section C.5.9.3.4. Emergency replacement and repair shall be bid on a per-hour basis as specified in the bid schedule.

C.5.9.3.3 Replacement During Start-up Procedures: Contractor shall replace all failed components of the target system discovered during start-up procedures as described in Section C.5.8 to restore it to a fully operational status. Start-up replacement is a Level I task as stated in Section C.5.1.1. Contractor shall repair the component removed according to Section C.5.9.3.3.1. Start-up replacement will be bid on a lump-sum basis as stated in the bid schedule.

C.5.9.3.3.1 Repair of Components Removed During Start-up Procedures: Contractor shall repair all equipment which was removed during the start-up. The cost of repair shall not exceed the repair limits of Section C.5.9.3.5. Start-up repair is Level II work as stated in Section C.5.1.2. Repair work shall be bid on a per-hour basis as specified in the bid schedule.

C.5.9.3.4 Repair: Contractor shall repair and replace all damaged and defective parts. The cost of repair shall not exceed the repair limits of Section C.5.9.3.5. Repair is Level II work as stated in Section C.5.1.2. Repair work shall be bid on a per-hour basis as specified in the bid schedule.

C.5.9.3.5 Repair Limits: If the labor and costs of repairing a part or piece of equipment total more than 80 percent of the purchase price for an identical piece of equipment or part, then the part or piece of equipment will be replaced according to the provisions of Section C.5.9.3.5.1.

C.5.9.3.5.1 Equipment Replacement: If an item is determined by Contractor to be beyond economical repair, Contractor shall recommend to the Government, in writing, that such equipment be replaced. Substantiating data to support the recommended replacement shall be included. If the Government decides that such equipment should be repaired and repair is ordered in accordance with ordering provisions, Contractor shall be reimbursed in accordance with the appropriate work level criteria.

C.5.9.3.5.2 Documentation: Contractor shall provide a support statement (justification to accompany requisitions or recommendations) to purchase new and replacement equipment. Contractor shall provide the following information:

1. Age of equipment in question.

2. Cost of repair parts.

3. Replacement cost and availability.

4. Rationale for replacement rather than repair.

Serviceability and repairability of equipment shall be determined by the Government.

C.5.9.4 Replace Targets:

[Note to Specification Writer: Include detailed specifications for replacing the infantry targets. Refer to Technical Exhibit No. 6 for the expected number of targets to be replaced for each type of battalion.]

SECTION C-6

INSPECTION

Contract performance inspection will be by the Contractor and/or the Contractor's representative and the designated Government proponent. The designated Government proponent is responsible for developing and administering the inspection program for the contract operation. The Contracting Officer's representatives not only will inspect the appearance and functional use of the work area, but will also inspect the materials and supplies used (both Contractor- and Government-furnished items), work performance methods, tools, equipment, and contract administration processes.

SECTION C-7

TECHNICAL EXHIBITS

TECHNICAL EXHIBIT NO. 1

PREVENTIVE MAINTENANCE LIST

PREVENTIVE MAINTENANCE--FACILITIES

a. Basic Building Components:

(1) Repair damaged metal siding or masonry on the exterior walls up to 20 sq ft.

(2) Replace missing or deteriorated wall joint caulking.

(3) Resurface cracked, peeling or otherwise damaged painted surfaces and repaint with scheduled paint up to 100 sq ft.

(4) Repair damaged/deteriorated roofing up to 100 sq ft.

(5) Repair cracked or broken concrete.

(6) Repair damaged areas in wallboard up to 12 inches in diameter.

(7) Repair/replace damaged vinyl wall covering up to 16 sq ft.

(8) Replace damaged floor tiles up to 10 sq ft.

(9) Repair damaged vinyl sheet flooring up to 10 sq ft.

(10) Repair/replace damaged doors, door closers, screens, and broken glass.

(11) Replace damaged/missing door/window caulking.

(12) Repair damaged window frames.

(13) Replace damaged/missing weather stripping.

(14) Replace damaged/missing hardware items such as keyless locks and hinges; reset screws and nails.

(15) Repair/replace damaged stair treads, risers, handrails, brackets, and other components; reset loose nails and screws.

(16) Repair/adjust damaged countertops, cabinets, drawers, doors, shelving, and hardware.

b. Electrical Components:

(1) Replace damaged components of breaker boxes; tighten loose breaker box connections.

(2) Replace damaged outlets, switches, and cover plates; tighten loose connections.

(3) Replace damaged light fixtures and fixture covers; tighten loose connections.

(4) Replace burned-out light bulbs; clean bulbs and prisms.

c. Plumbing Components:

(1) Repair damaged or leaking gas, water, and sewer piping and insulation.

(2) Tighten/replace loose/broken pipe supports.

(3) Repair leaky faucets.

(4) Repair malfunctioning, dripping, or running plumbing fixtures.

(5) Replace broken toilet tank lids and toilet seats.

SEASONAL MAINTENANCE--FACILITIES

a. Heating:

(1) Check system operation.

(2) Adjust furnace controls.

(3) Calibrate/repair malfunctioning thermostat.

(4) Clean, adjust, and light pilot.

(5) Clean buildup from burner ports; adjust air/fuel mixture.

(6) Repair leaks in fuel lines.

(7) Repair damaged flues.

(8) Clean louvers and screened openings.

(9) Adjust gravity dampers to close properly.

(10) Replace filters.

(11) Test for carbon monoxide leak.

(12) Tighten/replace duct hangers.

b. Cooling System:

(1) Check system operation.

(2) Adjust system controls.

(3) Calibrate/repair malfunctioning thermostat.

(4) Adjust/lubricate fan motor, bearings, and other components.

(5) Replace damaged fan belts.

(6) Recharge coolant; repair line leaks.

(7) Clean louvers, screened openings, and condensate drain lines.

(8) Remove buildup from cooling coils.

(9) Remove buildup from condenser coils.

(10) Tighten and replace duct hangers.

(11) Scale traps.

TECHNICAL EXHIBIT NO. 2

LIST OF RETS EQUIPMENT

The RETS is composed of several pieces of equipment combined in several different configurations to enable realistic training. Components include:

Infantry Hostile Fire Simulator (IHFS)--simulates the audio portion of hostile fire by a spark plug igniting a mixture of oxygen and propane gas.

Infantry Moving Target Carrier (IMTC)--D.C. motor-driven rail/trolley system used to move infantry targets at selected speeds. The carrier uses a 12-meter track as a guide for target moving.

Infantry Target Mechanism (ITM)--unit designed to raise and lower infantry targets on command. It also contains the hit-sensing subsystem which determines target hits.

Interconnecting Box, High-Power (LJB-H)--environmentally protected electrical enclosure which contains electrical/electronic components to convert 240 VAC to 24 VDC. It provides power/data interface between underground cables and the IMTC.

Interconnecting Box, Low-Power (LJB-L)--environmentally protected electrical enclosure which contains electrical/electronic components to convert 240 VAC to 24 VDC. It provides power/data interface between underground cables and all target equipment except the IMTC.

Night Muzzle Flash Simulator (NMFS)--visually simulates hostile small-arms muzzle flash.

Range Control Station (RCS)--electronic system designed to provide automatic or manual control of downrange equipment, provide status of target mechanisms, and provide a hardcopy printout of hit data and engagement results. Major subunits include a control console, scoring printer, and electronic junction box. The RCS is housed in a range control tower.

TECHNICAL EXHIBIT NO. 3

PREVENTIVE MAINTENANCE—RETS EQUIPMENT

Organizational
Preventive Maintenance Checks and Services

RETS Equipment—ITM

Frequency	Item to Be Inspected and Procedure	Duration (hr)
	INFANTRY TARGET MECHANISM.	
W	Set circuit breaker CB1 to ON position and activate local test switch.	0.1
M	Check that connectors are securely mounted. If necessary, tighten mounting nut. Check for broken, bent, or loose pins.	0.2
M	Check for loose, broken, or missing hardware, damaged or frayed cables, and any other damage to the unit. Insure that cables are clear of target arm.	0.2
M	Check exterior finish for scratches and bare metal areas. Touch up using paint No. 34087, color olive drab, per Fed. Std. 595.	0.5
	MUZZLE FLASH SIMULATOR.	
M	Check for loose, broken, or missing hardware, damaged or frayed cables, and any other damage to the unit.	0.2
M	Check exterior finish for scratches and bare metal areas. Touch up using paint No. 34087, color olive drab, per Fed. Std. 595.	0.5
W	Check target for proper attachment, tight hit sensor clamps, and any obstructions in the path of target and target arm.	0.1

Organizational
Preventive Maintenance Checks and Services

RETS Equipment—IMTC

Frequency	Item to Be Inspected and Procedure	Duration (hr)
W	ELECTRONICS ASSEMBLY. Set circuit breaker CB1 to the OFF position. Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and any other damage to the assembly.	0.2
W	MOTOR/BELT DRIVE ASSEMBLY. Check for loose, broken, or missing hardware and any visible damage. Check the drive assembly belt and V-belt for damage. Insure all connectors are properly connected and tight.	0.2
W	CARRIAGE ASSEMBLY. Check assembly for loose, broken, or missing hardware and any visible damage. Insure all connectors are properly connected and tight. Move the carriage assembly manually on the track assembly to insure freedom of movement.	0.2
W	TROLLEY ASSEMBLY. Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and any visible damage. Insure that all connectors are connected properly connected and tight.	0.2
W	IMTC. After completion of preventive maintenance checks and services, set circuit breaker CB1 to the ON position. The test switch (S1) is used following the correction of an RCS-reported malfunction to insure IMTC operability.	0.1

Organizational
Preventive Maintenance Checks and Services

RETS Equipment—IHFS

Frequency	Item to Be Inspected and Procedure	Duration (hr)
	WARNING	
	Insure power to the RFS is turned off at the ICB and ITM before servicing the equipment. Failure to do so could result in electrical shock, burns, or damage to hearing.	
M	Check RFS assembly for loose, broken, or missing hardware, damaged or frayed cables, and any visible damage to the assembly.	0.1
	WARNING	
	Insure power to the RFS is off before checking or servicing the equipment. Failure to do so could result in electrical shock, burns, or damage to hearing.	
W	Inspect oxygen pressure gauge for indication of oxygen in tank. The gauge indicates, in pounds of pressure, the relative amount of oxygen remaining in the cylinder. The propane tank should be replaced every time the oxygen cylinder is replaced.	0.1
W	Insure that, when so commanded by the range control station, the RFS fires in both the single and automatic burst modes.	0.1
M	Check exterior finish for scratches and bare metal areas. Touch up using olive drab paint No. 34087 per Fed. Std. 595.	0.1

Organizational
Preventive Maintenance Checks and Services

RETS Equipment—LJB-H

Frequency	Item to Be Inspected and Procedure	Duration (hr)
M	HOUSING ASSEMBLY. Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and deterioration of the finish.	0.1
M	MOUNTING PLATE ASSEMBLY. Set circuit breaker to the OFF position and check for loose cables.	0.2

Organizational
Preventive Maintenance Checks and Services

RETS Equipment—LJB-L

Frequency	Item to Be Inspected and Procedure	Duration (hr)
M	HOUSING ASSEMBLY. Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and deterioration of the finish.	0.1
M	MOUNTING PLATE ASSEMBLY. Set circuit breaker to the OFF position and check for loose cables.	0.2

Operator/Crew
Preventive Maintenance Checks and Services

RETS Equipment—RCS

Frequency	Item to Be Inspected and Procedure	Duration (hr)
M	CONTROL PROCESSOR CONSOLE (PROCESSOR ASSEMBLY). Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and any visible damage.	0.1
M	MAGNETIC TAPE HEAD. Notify DS/GS to perform the cleaning procedures.	0.1

W	KEYBOARD/DISPLAY UNIT. Check unit for any damaged or sticky keys and loose, broken, or missing hardware.	0.1
W	SCORING PRINTER ASSEMBLY. Check printer for loose, broken, or missing hardware, damaged or frayed cables, and any other visible damage. Insure paper is properly loaded and check ribbon for serviceability.	0.1
W	PRINTER. Brush out the printer or vacuum once a week. Clean the ribbon guides every month.	0.1
W	SIGNAL DISTRIBUTION ASSEMBLY. Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and any other visible damage.	0.1

Organizational
Preventive Maintenance Checks and Services

RETS Equipment—RCS

Frequency	Item to Be Inspected and Procedure	Duration (hr)
W	CONTROL PROCESSOR CONSOLE. Check assembly for loose, broken, or missing hardware, damaged or frayed cables, and any other visible damage.	0.1
M	Notify DS/GS maintenance to replace fan assembly filter.	0.1
W	KEYBOARD/DISPLAY UNIT. Check unit for any damaged or sticking keys and loose, broken, or missing hardware. Check that coiled cable between keyboard and display unit is not damaged or frayed.	0.1
W	SCORING PRINTER ASSEMBLY. Check printer for loose, broken, or missing hardware, damaged or frayed cables, and any other visible damage to the assembly. Check ribbon guides and clean if necessary. Check for ribbon serviceability and replace if necessary.	0.1
M	Lubricate the printer.	0.2

M	SIGNAL DISTRIBUTION ASSEMBLY. Check junction box for loose, broken, or missing hardware, damage or frayed cables, and any other visible damage to the assembly.	0.1
M	TOWER JUNCTION BOX. Check junction box for loose, broken, or missing hardware, damaged or frayed cables, and any other visible damage to the assembly.	0.1
M	RCS CABLES AND SWITCHES. Go through the cabling systematically and insure that all connections are sound and that the wiring insulation has not been damaged. Replace any damaged cables.	0.1
M	Insure that all switches and knobs are serviceable and tight. Tighten all loose switches and knobs.	0.1
M	Notify DS/GS to perform the cleaning procedures.	0.1

TECHNICAL EXHIBIT NO. 4

SYSTEM RELIABILITY

Equipment	Mean Time or Cycles Between Failure
Infantry Target Mechanism	16,666.67 cycles
Infantry Moving Target Carrier	222.22 cycles
Infantry Hostile Fire Simulator	1,315.78 cycles
Night Muzzle Flash Simulator	33,333.33 cycles
High-Power Junction Box	2,564.10 hours
Low-Power Junction Box	2,564.10 hours
Range Control Station	684.93 hours
Target Holding Mechanism, Tank Gunnery	3,225.81 cycles

TECHNICAL EXHIBIT NO. 5

REFERENCES

TECHNICAL MANUALS

Title	Manual Number
RCS - Console Target	TM 9-6920-742-24&P
- Operation of	TM 9-6920-742-10
IMTC - Infantry Moving Target Carrier	TM 9-6920-742-14&P-6
NMFS - Night Muzzle Flash Simulator	TM 9-6920-742-14&P-5
IHFS - Infantry Hostile Fire Simulator	TM 9-6920-742-14&P-7
ITM - Infantry Target Mechanism	TM 9-6920-742-14&P-5
LBJ-H - Interconnecting Box, High-Power	TM 9-6920-742-14&P-8
LBJ-L - Interconnecting Box, Low-Power	TM 9-6920-742-14&P-8
Surface Drainage Facilities for Airfields and Heliports	TM 5-820-1
Maintenance and Repair of Surfaced Areas	TM 5-624
Herbicide Manual for Non-Cropland Weeds	TM 5-629
Natural Resources and Land Management (Vegetation Control)	TM 5-630
Soil Stabilization for Road and Streets	TM 5-822-4

ARMY REGULATIONS

Title	Regulation Number
Motor Vehicle: Traffic Supervision	AR 190-5
Army Physical Security Program	AR 190-13
Security of Army Property at Unit & Installation Levels	AR 190-15
Records Management Program	AR 340-1
Real Property and Resource Management	AR 420-17

TECHNICAL REPORTS

Title

[Note to Specification Writer: Any MACOM supplements to applicable Army Regulations should be listed here.]

ESTIMATED WORKLOAD REPLACE/REPAIR RETS EQUIPMENT AT THE INFANTRY RETS RANGE

	Range Type Productive Labor (Hours)							
RETS Equipment	DTR	MDTR	AFF	MFF	ARF	MRF	SFF	Skill Title
Infantry Target Mechanism	0.1	0.1	0.1	0.1	0.1	0.1	0.1	WG 5378
	0.7	0.7	1.1	1.1	1.1	1.1	0.4	WG 2650
Infantry Moving Target Carrier	17.2	17.2	0	28.3	0	0	1.7	WG 5378
	11.2	11.2	0	18.5	0	0	1.2	WG 2650
	2.6	2.6	0	4.3	0	0	0.3	Contract
Infantry Hostile Fire Simulator	0.1	0.1	0	0	0	0	0.3	WG 5378
	0.4	0.4	0	0	0	0	2.4	WG 2650
	0.2	0.2	0	0	0	0	1.1	Contract
Night Muzzle Flash Simulator	0.1	0	0	0.3	0	0	0.2	WG 2650
High-Power Junction Box	0.3	0.3	0	0.3	0	0	0.1	WG 2650
Low-Power Junction Box	0.6	0.7	0.3	0.2	0.4	0.5	0.2	WG 2650
Range Control Station	0.1	0.1	0.1	0.1	0.1	0.1	0.1	WG 5378
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	WG 2650
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Contract
Total by Skill								
WG 4801	0	0	0	0	0	0	0	
WG 5378	17.5	17.5	0.2	28.5	0.2	0.2	2.2	
WG 2650	13.4	13.4	1.5	20.5	1.6	1.7	4.6	
Contract	2.9	2.9	0.1	4.4	0.1	0.1	1.5	
Total	33.8	33.8	1.8	53.4	1.9	2.0	8.3	

CALCULATED ANNUAL WORKLOAD FOR PREVENTIVE MAINTENANCE OF THE RETS EQUIPMENT

RETS Equipment	Range Type Productive Labor (Hours)							Skill
	DTR	MDTR	AFF	MFF	ARF	MRF	SFF	
Infantry Target Mechanism	265.2	237.6	46.8	18.0	109.2	140.4	187.2	Range Mechanic
Infantry Moving Target Carrier	259.2	259.2	0.0	129.6	0.0	0.0	43.2	Range Mechanic
Infantry Hostile Fire Simulator	12.0	12.0	0.0	0.0	0.0	0.0	144.0	Range Mechanic
Night Muzzle Flash Simulator	92.4	0.0	0.0	39.6	0.0	0.0	158.4	Range Mechanic
High-Power Junction Box	21.6	21.6	0.0	10.8	0.0	0.0	3.6	Range Mechanic
Low-Power Junction Box	39.6	43.2	10.8	7.2	25.2	32.4	39.6	Range Mechanic
Range Control Station	21.6	21.[illegible]	21.6	21.6	21.6	21.6	21.6	Computer Operator
_____	24.0	24.0	24.0	24.0	24.0	24.0	24.0	Range Mechanic
Total by skill								
Computer Operator	21.6	21.6	21.6	21.6	21.6	21.6	21.6	
Range Mechanic	714.0	619.2	71.6	229.2	158.4	196.8	600.0	
Total	735.6	640.8	93.2	250.8	180.0	218.4	621.6	

EXPECTED TARGET REPLACEMENT

Range	Training Unit	Target Type	No. of Targets
DTR	Company	Personnel	4.1
MDTR	Company	Personnel	4.1
ARF	Company	Personnel	6.7
MRF	Company	Personnel	6.7
AFF	Company	Personnel	6.9
MFF	Company	Personnel	6.9
SFF	Platoon	Personnel	16.0

GROUNDS MAINTENANCE SUMMARY

Task	Grounds Maintenance Frequency	Duration (hr)	Units	Labor (hr/yr)	Title
Herbicide	1/4 weeks	5	--	60	Maint. Worker
Brush Clearing	1/year	15	--	144	Maint. Worker
Grass Mowing (seasonal)	13/year	12	--	108	Heavy Equipment Op.
				36	Maint. Worker
Foxholes					
-cover	1/4 years	0.8	1/lane	0.2	Carpenter
-platform	1/4 years	0.6	1/lane	0.15	Carpenter
Range Gates, Fencing (Maintain and Repair)	1/year	8		8	Welder
		4		4	Carpenter
		4		4	Maint. Worker
Grade Roads	1/year	4		3	Heavy Equipment Op.
				1	Maint. Worker
Gravel Maint. Area	1/year	3.34	7050 sq ft	9.81	Heavy Equipment Op.
			1800 sq ft	3.27	Maint. Worker

*Skills are either: M - Maintenance Worker (Maint. Worker); Hea - (Heavy Equipment Op.); C - (Carpenter); or W - (Welder).

**[Note to Spec Writer: Due to regional seasonal conditions, the annual labor hours have to be estimated by estimating seasonal grass mowing season of the region.]

FACILITIES/BUILDINGS MAINTENANCE CHART

Component	Task	Unit of Measure (sf)	Number of Units (sf)	Duration Per Unit of Measure (hr)	Duration (hr)	Frequency (x/yr)	Annual Frequency	Labor-Hours (hr)	Skill	Title
Control Tower - Roof	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Control Tower - Roof	Paint	100	114	1.58	1.80	1:5	0.2	0.36	WG 4607	Painter
Control Tower - Floor	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Control Tower - Floor	Sweep/Dust	1000	114	0.58	0.07	52:1	52	3.64	WG 4749	Maintenance Worker
Control Tower - Floor	Mop	1000	114	1.1	0.13	26:1	26	3.38	WG 4749	Maintenance Worker
Control Tower - Floor	Repair	100	114	0.1	0.11	1:1	1	0.1	WG 4749	Maintenance Worker
Control Tower - Exterior Walls	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Control Tower - Exterior Walls	Repair/ Refinish	100	114	3.71	4.23	1:10	0.1	0.42	WG 4749	Sheet Metal
Control Tower - Heat Pumps	Annual Maintenance	1	1	1.1	1.1	2:1	2	2.2	WG 4749	HVAC Technician
Control Tower - Heat Pumps	Recurring Maintenance	1	1	0.3	0.3	1:1	1	0.3	WG 4749	HVAC Technician
Control Tower - Doors	Inspect	1	1	0.05	0.05	2:1	2	0.05	WG 4749	Maintenance Worker
Control Tower - Doors	Repair	1	1	2.6	2.6	1:14	0.07	0.18	WG 4607	Carpenter
Control Tower - Doors	Repaint	1	1	0.45	0.45	1:2	0.5	0.23	WG 4749	Painter
Control Tower - Windows	Inspect	1	7	0.05	0.35	2:1	2	0.35	WG 4749	Maintenance Worker
Control Tower - Windows	Repair	1	7	1.33	9.31	1:20	0.05	0.47	WG 4607	Carpenter
Control Tower - Windows	Repaint	1	7	1.63	11.41	1:5	0.2	2.28	WG 4749	Painter
Standard Building #1 - Roof	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Standard Building #1 - Roof	Paint	100	800	1.58	12.64	1:5	0.2	2.93	WG 4749	Painter
Standard Building #1 - Floor	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Standard Building #1 - Floor	Sweep/Dust	1000	800	0.58	0.46	52:1	52	23.92	WG 4749	Maintenance Worker
Standard Building #1 - Floor	Mop	1000	800	1.1	0.88	26:1	26	22.88	WG 4749	Maintenance Worker
Standard Building #1 - Floor	Repair	1000	800	0.1	0.08	1:1	1	0.08	WG 4749	Maintenance Worker
Standard Building #1 - Exterior Walls	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Standard Building #1 - Exterior Walls	Repair/ Refinish	100	1980	3.6	71.28	1:10	0.1	7.13	WG 4749	Sheet Metal
Standard Building #1 - Interior Walls	Clean	100	160	1.1	1.76	1:10	0.1	0.18	WG 4749	Maintenance Worker
Standard Building #1 - Doors	Inspect	1	4	0.05	0.2	2:1	2	0.4	WG 4749	Maintenance Worker

FACILITIES/BUILDINGS MAINTENANCE CHART (Cont'd)

Component	Task	Unit of Measure (sf)	Number of Units (sf)	Duration Per Unit of Measure (hr)	Duration (hr)	Frequency (x/yr)	Annual Frequency	Labor-Hours (hr)	Skill	Title
Standard Building #1 - Exterior Doors	Repair	1	3	2.6	7.8	1:14	0.07	0.55	WG 4607	Carpenter
Standard Building #1 - Exterior Doors	Repaint	1	3	0.4	1.2	1:2	0.5	0.06	WG 4749	Painter
Standard Building #1 - Interior Doors	Repair	1	1	2.6	2.6	1:20	0.05	0.13	WG 4607	Carpenter
Standard Building #1 - Interior Door	Repaint	1	1	0.45	0.45	1:6	0.17	0.08	WG 4749	Painter
Standard Building #1 - Windows	Inspect	1	8	0.05	0.4	2:1	2	0.8	WG 4749	Maintenance Worker
Standard Building #1 - Windows	Repair	1	8	1.33	10.64	1:20	0.05	0.53	WG 4607	Carpenter
Standard Building #1 - Windows	Repaint	1	8	1.63	13.04	1:5	0.2	2.61	WG 4749	Painter
Standard Building #1 - Oil Furnace	Annual Maintenance	1	1	1.1	1.1	1:1	1	1.1	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Clean Unit	1	1	0.6	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Service Oil Filter	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Service Nozzle Assembly	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Service Fuel Unit	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Service Fire Box and Flue	1	1	0.6	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Service Furnace Stack Switch	1	1	0.6	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Service Fan and Motor	1	1	0.3	0.3	1:1	1	0.3	WG 4749	HVAC Technician
Standard Building #1 - Oil Furnace	Conduct Operation Check	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #1 - Power Roof Ventilator	Service/ Repair	1	1	0.3	0.3	1:1	1	0.3	WG 4749	HVAC Technician
Standard Building #2 - Roof	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Standard Building #2 - Roof	Paint	100	800	1.58	12.64	1:5	0.2	2.53	WG 4749	Painter
Standard Building #2 - Floor	Inspect	1	1	0.5	0.5	2:1	2	1.0	WG 4749	Maintenance Worker
Standard Building #2 - Floor	Sweep/ Dust	1000	800	0.58	0.46	52:1	52	23.92	WG 4749	Maintenance Worker
Standard Building #2 - Floor	Mop	1000	800	1.1	0.88	26:1	26	22.88	WG 4749	Maintenance Worker
Standard Building #2 - Floor	Repair	1000	800	0.1	0.08	1:1	1	0.8	WG 4749	Maintenance Worker

FACILITIES/BUILDINGS MAINTENANCE CHART (Cont'd)

Component	Task	Unit of Measure (sf)	Number of Units (sf)	Duration Per Unit of Measure (hr)	Duration (hr)	Frequency (x/yr)	Annual Frequency	Labor-Hours (hr)	Skill	Title
Standard Building #2 - Exterior Walls	Inspect	—	—	—	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Standard Building #2 - Exterior Walls	Repair/ Refinish	100	1980	3.6	71.28	1:10	0.10	7.13	WG 4749	Sheet Metal
Standard Building #2 - Exterior Doors	Inspect	1	2	0.05	0.1	2:1	2	0.2	WG 4749	Maintenance Worker
Standard Building #2 - Exterior Doors	Repair	1	2	2.6	5.2	1:14	0.07	0.36	WG 4607	Carpenter
Standard Building #2 - Exterior Doors	Repaint	1	2	0.4	0.8	1:2	0.5	0.4	WG 4749	Painter
Standard Building #2 - Windows	Inspect	1	8	0.05	0.4	2:1	2	0.8	WG 4749	Maintenance Worker
Standard Building #2 - Windows	Repair	1	8	1.33	10.64	1:20	0.05	0.53	WG 4607	Carpenter
Standard Building #2 - Windows	Repaint	1	8	1.63	13.04	1:5	0.2	2.61	WG 4749	P inter
Standard Building #2 - Oil Furnace	Annual Maintenance	1	1	1.1	1.1	1:1	1	1.1	WG 4749	HVAC Technician
Standard Building #2 - Oil Furance	Clean Unit	1	1	0.6	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Standard Building #2 - Oil Furnace	Service Oil Filter	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #2 - Oil Furnace	Service Nozzle Assembly	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #2 - Oil Furance	Service Fuel Unit	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #2 - Oil Furnace	Service Fire Box and Flue	1	1	0.6	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Standard Building #2 - Oil Furnace	Service Furnace Stack Switch	1	1	0.6	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Standard Building #2 - Oil Furnace	Service Fan and Motor	1	1	0.3	0.3	1:1	1	0.3	WG 4749	HVAC Technician
Standard Building #2 - Oil Furnace	Conduct Operation Check	1	1	0.1	0.1	1:1	1	0.1	WG 4749	HVAC Technician
Standard Building #2 - Power Roof Ventilator	Service/ Repair	1	2	0.3	0.6	1:1	1	0.6	WG 4749	HVAC Technician
Latrine - Roof	Inspect	—	—	—	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Latrine - Roof	Paint	100	192	1.58	3.04	1:5	0.2	0.61	WG 4749	Painter
Latrine - Floor	Inspect	—	—	—	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Latrine - Floor	Sweep/Dust	1000	133	0.58	0.07	52:1	52	3.64	WG 4749	Maintenance Worker
Latrine - Floor	Mop	1000	133	1.1	0.15	26:1	26	3.9	WG 4749	Maintenance Worker
Latrine - Floor	Repair	1000	133	0.1	0.01	1:1	1	0.01	WG 4749	Maintenance Worker
Latrine - Exterior Walls	Inspect	—	—	—	0.2	2:1	2	0.4	WG 4749	Maintenance Worker

FACILITIES/BUILDINGS MAINTENANCE CHART (Cont'd)

Component	Task	Unit of Measure (sf)	Number of Units (sf)	Duration Per Unit of Measure (hr)	Duration (hr)	Frequency (x/yr)	Annual Frequency	Labor-Hours (hr)	Skill	Title
Latrine - Exterior Walls	Repair/ Refinish	100	361	3.71	13.39	1:10	0.1	1.34	WG 4749	Sheet Metal
Latrine - Interior Walls	Clean	100	143	1.1	1.57	1:10	0.1	0.16	WG 4749	Maintenance Worker
Latrine - Doors	Inspect	1	1	0.05	0.05	2:1	2	0.1	WG 4749	Maintenance Worker
Latrine - Doors	Repair	1	1	2.6	2.6	1:14	0.07	0.18	WG 4607	Carpenter
Latrine - Doors	Repaint	1	1	0.45	0.45	1:2	0.5	0.23	WG 4749	Painter
Latrine - Windows	Inspect	1	3	0.05	0.15	2:1	2	0.3	WG 4749	Maintenance Worker
Latrine - Windows	Repair	1	3	1.33	4.0	1:20	0.05	0.2	WG 4607	Carpenter
Latrine - Windows	Repaint	1	3	1.63	4.89	1:5	0.2	0.98	WG 4749	Painter
Latrine - Toilet Seat	Repair/ Replace	1	6	0.07	0.42	1:5	0.2	0.08	WG 4749	Plumber
Latrine - Urinals	Repair/ Replace	1	2	0.76	1.53	1:10	0.10	0.15	WG 4749	Plumber
Latrine - Power Roof Ventilator	Service/ Repair	1	1	0.3	0.3	1:1	1.0	0.3	WG 4749	HVAC Technician
Ammo Building - Roof	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Painter
Ammo Building - Roof	Paint	100	240	1.58	3.79	1:5	0.2	0.76	WG 4749	Maintenance Worker
Ammo Building - Floor	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Ammo Building - Floor	Sweep/Dust	1000	120	0.58	0.07	52:1	52	3.64	WG 4749	Maintenance Worker
Ammo Building - Floor	Mop	1000	120	1.1	0.13	26:1	26	3.38	WG 4749	Maintenance Worker
Ammo Building - Floor	Repair	1000	120	0.1	0.01	1:1	1	0.01	WG 4749	Maintenance Worker
Ammo Building - Exterior Walls	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Ammo Building - Exterior Walls	Repair/ Refinish	100	156	3.71	5.79	1:10	0.1	0.58	WG 4749	Sheet Metal
Ammo Building - Door	Inspect	1	1	0.05	0.05	2:1	2	0.1	WG 4749	Maintenance Worker
Ammo Building - Door	Repair	1	1	2.6	2.6	1:14	0.07	0.18	WG 4607	Carpenter
Ammo Building - Door	Repaint	1	1	0.45	0.45	1:2	0.5	0.23	WG 4749	Painter
Ammo Building - Shelving	Clean	100	40	0.55	0.22	2:1	2	0.44	WG 4749	Maintenance Worker
Ammo Building - Windows	Inspect	1	4	0.05	0.2	1:1		1		
Ammo Building - Windows	Repair - Exterior	1	4	1.33	5.32	1:20	0.05	0.27	WG 4749	Maintenance Worker
Ammo Building - Windows	Repair - Hardware	1	4	2.6	10.4	1:14	0.07	0.18	WG 4607	Carpenter
Ammo Building - Windows	P				.5	1:5	0.2	1.3	WG 4749	Painter
Covered Mess - Roof	Inspect	--	--	--	0.2	2:1	2	2.0	WG 4749	Maintenance Worker
Covered Mess - Roof	Paint	100	760	1.58	12.01	1:5	0.2	2.4	WG 4749	Painter
Covered Mess - Floor	Inspect	--	--	--	0.5	2:1	2	1.0	WG 4749	Maintenance Worker
Covered Mess - Floor	Repair	100	760	0.1	0.08	1:1	1	0.08	WG 4749	Maintenance Worker
Lyster Bag - Roof	Inspect	--	--	--	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Lyster Bag - Roof	Paint	100	102	1.58	1.61		0.2	0.32	WG 4749	Painter

FACILITIES/BUILDINGS MAINTENANCE CHART (Cont'd)

Component	Task	Unit of Measure (sf)	Number of Units (sf)	Duration Per Unit of Measure (hr)	Duration (hr)	Frequency (x/yr)	Annual Frequency	Labor-Hours (hr)	Skill	Title
Lyster Bag - Bag Holder	Replace/ Repair	1	1	—	16.0	1:3	0.33	5.33	WG 4749	Maintenance worker
Lyster Bag - Floor	Repair	100	102	0.1	0.10	1:1	1	0.1	WG 4749	Maintenance Worker
Covered Bleachers - Roof	Inspect	—	—	—	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Covered Bleachers - Roof	Paint	100	552	1.58	8.72	1:5	0.2	1.74	WG 4749	Painter
Covered Bleachers - Exterior Walls	Inspect	—	—	—	0.2	2:1	2	0.4	WG 4749	Maintenance Worker
Covered Bleachers - Exterior Walls	Repair/ Repaint	100	820	3.6	29.52	1:10	0.1	2.95	WG 4749	Sheet Metal
Covered Bleachers - Bleachers	Repaint	—	—	—	26.0	1:1	1	26.0	WG 4749	Painter
Covered Bleachers - Bleachers	Inspect	1	4	0.05	0.4	2:1	2	0.2	WG 4749	Maintenance Worker
Covered Bleachers - Bleachers	Repair	—	—	—	4.0	1:1	1	4.0	WG 4607	Carpenter
Covered Bleachers - Wall Vents	Repair - Exterior	100	8	3.6	0.29		0.07	0.02	WG 4607	Carpenter
Covered Bleachers Wall Vents	Paint	1	4	1.63	6.52	1:5	0.1	1.3	WG 4749	Painter
Covered Bleachers - Wall Vents	Repair - Hardware	1	4	2.6	10.4		0.07	0.73	WG 4607	Carpenter
AMTC Storage Building - Roof	Inspect	—	—	—	0.2	2:1	2.0	0.4	WG 4749	Maintenance Worker
AMTC Storage Building - Floor	Inspect	—	—	0.1	0.1	2:1	2.0	0.1	WG 4749	Maintenance Worker
AMTC Storage Building - Roof	Repair	100	938	1.58	14.82	1:5	0.2	2.96	WG 4749	Maintenance Worker
AMTC Storage Building - Floor	Repair	1000	622	0.1	0.05		0.1	0.05	WG 4749	Maintenance Worker
AMTC Storage Bu lding - Doors	Inspect	1	1	0.1	0.1	2:1	2.0	0.2	WG 4749	Maintenance Worker
AMTC Storage Building - Doors	Repair	1	2	2.6	5.2	1:14	0.07	0.36	WG 4749	Maintenance Worker
AMTC Storage Building - Doors	Repaint	1	2	0.45	0.9	1:2	0.5	0.45	WG 4749	Painter

DEH WORKLOAD

The workload calculations for any range facility were based on the life-cycle costs of maintaining that structure over its entire life, which in most cases is 25 to 30 years. The total number of hours required to maintain any component of a facility were averaged over the life of the component. This was the only reasonable method to estimate the number of manhours required to maintain the facilities on a yearly basis.

FACILITY LABOR-HOUR SUMMARY

Facility Name	Skill Level	Annual Labor Hours
Control Tower	Maint. Worker	8.72
	Sheet Metal Worker	0.42
	HVAC Tech.	2.50
	Painter	2.87
	Carpenter	0.65
Std. Bldg. #1	Maint. Worker	49.46
	Painter	5.68
	Sheet Metal Worker	7.13
	Carpenter	1.21
	HVAC Tech.	3.90
Std. Bldg. #2	Maint. Worker	50.40
	Painter	5.54
	Sheet Metal Worker	7.13
	Carpenter	0.89
	HVAC Tech.	4.20
Latrine	Maint. Worker	9.31
	Painter	1.82
	Sheet Metal Worker	1.34
	Carpenter	0.88
	Plumber	0.23
	HVAC Tech.	0.30
Ammo Stor. Bldg.	Maint. Worker	9.04
	Painter	2.29
	Sheet Metal Worker	0.58
	Carpenter	0.36
Covered Mess	Maint. Worker	3.08
	Painter	2.40
Lyster Bag Holder	Maint. Worker	5.83
	Painter	0.32

Covered Bleachers	Maint. Worker	1.4
	Painter	29.04
	Sheet Metal Worker	2.93
	Carpenter	4.75

TOTAL ANNUAL LABOR-HOURS SUMMARIZED BY SKILL LEVEL

	DTR MDTR ARF MRF AFF MFF SFF
Maint. Worker	137.24
Painter	49.96
Sheet Metal Worker	19.55
Carpenter	8.24
HVAC Tech.	8.40
Plumber	0.23

BERM REPAIR

Range	Lanes/Range	Berms/Lane	Annual Labor (Hours per Lane)	Skill
DTR	16	17	15.94	Heavy Equipment Op.
			5.31	Maint. Worker
MDTR	16	18	16.87	Heavy Equipment Op.
			5.63	Maint. Worker
ARF	16	7	6.56	Heavy Equipment Op.
			2.19	Maint. Worker
MRF	16	8	7.50	Heavy Equipment Op.
			2.50	Maint. Worker
AFF	32	3	2.81	Heavy Equipment Op.
			0.94	Maint. Worker
MFF	32	5	4.69	Heavy Equipment Op.
			1.56	Maint. Worker
SFF	4	12	11.25	Heavy Equipment Op.
			3.75	Maint. Worker

TECHNICAL EXHIBIT NO. 7

GOVERNMENT-FURNISHED PROPERTY

[Note to Specification Writer: A list of Government-furnished property must be provided with the contract. Contained within this list is any equipment provided by the Government, any shop stock, and the emergency stand-by items provided to the Contractor. An assessment of the supplied equipment's condition should also be included in this section.]

TECHNICAL EXHIBIT NO. 8

RECORDS AND FORMS

MAINTENANCE AND REPAIR DATA COLLECTION FORM**

FILE BY: RETS EQUIPMENT NAME _____

ASSEMBLY/SUBASSEMBLY _____

1.	Number of usage hours or cycles since last failure (whichever is applicable)	____ hours or cycles
2.	Number of failures	____ failures
3.	Total number of hours or cycles for the month (whichever is applicable)	____ hours or cycles
4.	Total number of failures for the month	____ failures
5.	Mean time/cycles (whichever is applicable) between failures (No. 3/No. 4 above)	____ hours or cycles per failure

To compute Nos. 3 and 4 above: add the value for No. 1 to the running total of hours or cycles (whichever is applicable) to get 3, and add the value for No. 2 to the running total of failures for the month to get No. 4.

Monthly: (1) summarize the information above for each piece/type and each assembly/subassembly of RETS EQUIPMENT, (2) summarize labor hours, labor cost, and materials cost for each piece/type and assembly/subassembly of RETS equipment.

Semiannually: summarize a running MTBF or MCBF (whichever is applicable) for each piece/type and each assembly/subassembly of RETS equipment.

**Nos. 1 through 5 should be written at the bottom of DA Form 2404 for Crew and Organizational Maintenance (PM and Replacement) and at the bottom of DA Form 2407 for Support and Depot Maintenance (Repair).

MONTHLY MAINTENANCE AND REPAIR SUMMARIZATION FORM

FILE BY: RETS EQUIPMENT NAME _____

ASSEMBLY/SUBASSEMBLY _____

1.	Total number of hours or cycles for the month (whichever is applicable)	____ hours or cycles
2.	Total number of failures for the month	____ failures
3.	Mean time/cycles between failures (MTBF or MCBF)	____ hours or cycles per failure

Monthly: summarize for each piece/type and for each assembly/subassembly of RETS equipment (as defined in the Maintenance Allocation Charts [MACs] of the Technical Manuals) the mean time/cycles (whichever is applicable) between failures (MTBF or MCBF) for the month.

To compute the MTBF or MCBF for the month: divide the final ruuning total of hours or cycles (whichever is applicable) for the month by the final running number of failures for the month.

MONTHLY LABOR HOURS, LABOR COSTS, AND MATERIAL COSTS SUMMARIZATION FORM

FILE BY: RETS EQUIPMENT NAME _____

ASSEMBLY/SUBASSEMBLY _____

1.	Total number of hours or cycles for all months	____ hours or cycles
2.	Total number of failures for all months	____ failures
3.	Mean time/cycles between failures (MTBF or MCBF)	____ hours or cycles per failure

Semiannually: summarize a running MTBF or MCBF (whichever is applicable) for each piece/type and for each assembly/subassembly of RETS equipment from the monthly summarizations.

To compute the running MTBF or MCBF: add together the final running totals of hours or cycles from all months and divide that total by the total number of failures from all months.

DAILY/WEEKLY BERM REPORT

This report is to be filled out by the Contractor's representative and the Contracting Officer or representative during the routine inspection performed each day prior to the opening of the range.

For each berm:

Berm location/number _____

Percent of berm removed or displaced _____

Damage probable to target emplacement during the course of today's training (YES/NO) _____

TECHNICAL EXHIBIT NO. 9

RANGE AS-BUILT DRAWINGS

[Note to Specification Writer: The Range As-Built Drawings must be included in the contract. The drawings, along with the accompanying design specifications, are cited in repair and maintenance specifications. Contractor is also responsibile for updating the as-built drawings upon completion of new construction at the range.]

TECHNICAL EXHIBIT NO. 10

EXISTING EQUIPMENT WARRANTIES

[Note to Specification Writer: All existing equipment warranties as well as any operating manuals should be provided to the Contractor.]

TECHNICAL EXHIBIT NO. 11

GENERAL DUTIES AND TASKS OF RETS EQUIPMENT PERSONNEL

1. Console Operator--Operator/Crew: inspects and modifies scenarios and operates the control console and peripheral console equipment.

2. Range Mechanic--Organizational Maintenance: performs all scheduled maintenance and inspection of individual range components. Diagnoses, isolates, adjusts, and removes and replaces unserviceable electronic and electro-mechanical assemblies as required.

3. System Repairman--Direct/General Support Maintenance: performs any required calibration, adjustment, and alignment to the individual range components that are beyond the scope of organizational maintenance. Diagnoses, isolates, removes, and replaces and repairs all repairable items to the subassembly level. Removes and replaces selected electronic parts such as diodes, relays, logic assemblies, solenoids, and switches.

4. Advanced System Repairman--Depot Maintenance: performs any required repair that is beyond the scope of general/direct support maintenance or for which special environmental facilities are required. This includes, but is not limited to, selected electronic parts such as diodes, relays, logic assemblies, solenoids, and switches.

TERMS AND ABBREVIATIONS

AFF: Automated Field Fire
AHFS: Armor Hostile Fire Simulator
AMTC: Armor Moving Target Carrier
ARF: Automated Record Fire
Assy: Assembly
ATKS: Army Target Kill Simulator
BHMA: Builders' Hardware Manufacturers Association
Bn: Battalion
CCA: Circuit Card Assembly
CO: Contracting Officer
CQR: Contractor Quality Control
DAART: Directorate of Army Ammunition, Ranges, and Targets
DEH: Directorate of Engineering and Housing
DIO: Directorate of Industrial Operations
DS/GS: Direct Support/General Support
DTR: Defense Test Range
EPA: Environmental Protection Agency
EPS: Engineered Performance Agency
FGMA: Flat Glass Marketing Association
FQQPRI: Final Quantitative and Qualitative Personnel Requirements Information
HVAC: Heating, ventilation, and air-conditioning
ICB: Interconnecting box
IHFS: Infantry Hostile Fire Simulator
IJO: Individual Job Order
IMTC: Infantry Moving Target Carrier
ISC: Installation Spill Contingency
ITM: Infantry Target Mechanism
LJB: Lane Junction Box
LJB-H: Interconnecting box--high-power
LJB-L: Interconnecting box--low-power
MAC: Maintenance Allocation Chart
MCBF: Mean Cycle Between Failures
MDTR: Modified Defense Test Range
MFF: Modified Field Fire
MPRC-H: Multipurpose Range Complex--Heavy
MPRC-L: Multipurpose Range Complex--Light Infantry
MRF: Modified Record Force
MTBF: Mean Time Between Failures
NMFS: Night Muzzle Flash Simulator
OSHA: Occupational Safety and Health Administration
PM: Preventive Maintenance
PMCS: Preventive Maintenance Checks and Services
QCR: Quality Control Representative
RCS: Range Control Station
RETS: Remoted Target System
RFS: Rifle Fire Simulator
SCA: Service Contract Act
SFF: Sniper Field Fire
SO: Service Order
SOO: Standing Operating Order
SCCM: Spill Control Counter Measures

STRACT: Standards in Training Commission
THMTG: Target-Holding Mechanism, Tank Gunnery
TIU: Target Interface Unit
TRADOC: U.S. Army Training and Doctrine Command
VHIL: Visual Hit Indicator Lamp