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COMBAT AND TRAINING DEVELOPER'S TEST SUPPORT PACKAGE FOR THE POCKET RADIAC, AN/UDR-13

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SECTION I

DOCTRINAL AND ORGANIZATIONAL TEST SUPPORT PACKAGE

POCKET RADIAC, AN/UDR-13

1.0 MEANS OF EMPLOYMENT

1.1 The Pocket RADIAC (PR) consists of nuclear sensors in a small, compact, lightweight unit that will detect and measure radiation in terms of initial neutron and gamma radiation total dose from a nuclear detonation, total dose and dose rate from neutron induced gamma radiation at and immediately adjacent to ground zero, and total dose and dose rate gamma radiation resulting from nuclear fallout. The data obtained in both the initial radiation and the fallout will be provided on demand in a digital display. A visual and an optional audible alarm will alert the user at a default dose rate level. This alarm can be reset by the operator. The device will be approximately 15 cu inches and will weigh no more than 400 grams. The PR will be a fully intelligent device designed with a microprocessor and on board memory. Some of the features will include a self test mode, temperature compensation, statistical calculations, and many other software capabilities including over-range indicator, visual and audible alarms. System description is at Appendix E.

a. The PR will be small and light enough to be carried in the chest pocket of the Army Battle Dress Uniform (BDU) or elsewhere on personnel that allows for hands free operation.

b. The PR shall be powered by an internal 6 volt DC Lithium Battery (BA-5372/U) which is readily accessible for easy replacement via a removable screw out cap by the lowest level of maintenance. (Battery is manufactured by Power Conversion Inc.).

c. The PR will complement existing standard U.S. Army tactical ground survey and monitoring instruments and tactical dosimeters and will be electromagnetically compatible with sensitive electronic equipment. The PR will also be capable of operating in all types of weather and terrain to include the extremely cold environment found in the northern latitudes.

d. The PR will be used as an expedient method to determine total dose before DT-236 individual dosimeters are read and will be used in radiation survey, personnel, equipment, and materiel monitoring, and decontamination operations.

e. The PR will be issued to units on the basis of one per squad, crew, section, or equivalent that tactically operates as an element and one per team or equivalent that habitually operates independently. The PR will be operated by an MOS immaterial assigned operator.

1.2 The PR operational concept calls for three major missions:

a. Pre-nuclear weapons employment. Pre-nuclear and nuclear weapons employment missions are characterized by two tasks; ground survey and radiation monitoring.

b. Nuclear weapons employment. Nuclear weapons employment missions are characterized by ground survey and radiation monitoring tasks.

c. Dosimetry. Nuclear dosimetry is the only full-time mission for the PR.

The maximum mission duration of shall be 168 hours for wartime and 72 hours for peacetime.

1.3 PR Functions and Displays.

a. Dosimeter. The detecting element(s) of the dosimeter detector will be sensitive to both neutrons and gamma rays. As the neutron and gamma radiation affects the dosimeter, the internal circuitry of the PR will detect and convert these readings into tissue dose from 1 to 1000 cGy. The dosimeter element is independent of the dose rate detector. The dosimeter is configured such that it can be electronically reset to zero at any time, but the accumulated dose up to this point will be saved in nonvolatile memory of the dosimeter element. A mission reset must be performed when the accumulated dose reaches 1000 cGy; however, a mission reset may be done at any time. The dosimeter

element will display within 6 seconds to within 10 percent of the final dose reading from the time of operating the read buttons to the time of the reading appearing on the data display.

b. Ratemeter Detector. The dose rate meter detector will be sensitive to gamma radiation and will be proportional to the amount of radiation absorbed in human tissue per hour (cGy/hr). The ratemeter element will be capable of detecting radiation from 0.1 to 1000 cGy/hour.

c. Dosimeter/Ratemeter Indicator. The PR indicator will consist of a Liquid Crystal Display (LCD). The size of the LCD will be compatible with the overall pocket size dimensions and yet afford good legibility of the data displayed at arm's length. Night and low visibility readability and night vision compatibility IAW secure lighting requirements are provided. The LCD displays the total dose in cGy and displays a dose rate in cGy/hour. Both modes of the PR will display values without requiring any mental computation. The detecting element of the ratemeter will not be saturated at dose rates up to 10,000 cGy/hour. The PR display will indicate a reading either of "Off Scale" or "Over Range" and will not show a false low or zero reading.

d. Alarms. The PR incorporates a visual and an audible alarm feature and provides for the capability for switching between two alarm modes; Visual and Audio Enabled and Visual Only

(Audio Disabled). The visual alarm will meet secure lighting requirements. The PR includes a switching function to acknowledge (ACK) the audible alarm, so that the alarm may be turned off quickly after it is activated. A PR provides a switching function to select the Rate and/or Dose alarm and a means so that the level at which the alarm is activated can be varied. A default 1 cGy/hour alarm is provided.

e. Power Supply. A compact battery will be used to power the instrument, to provide a minimum operating life of 40 hours (continuous use). An automatic "Sleep Mode" will be utilized to decrease the drain on the battery and increase the operating time of the PR. A battery condition check or remaining life feature will be provided as a select feature from the PR key pad. The battery used must be military type IAW AMCR 700-83, Battery Power Sources and Battery Chargers.

f. Software. The major functions of the software are to obtain raw sensor data, compute the desired radiation output, and interface with the user. All functions will be pre-programmed by the manufacturer except the desired output of alarm level and attenuation factor. The total dose or dose rate modes and alarm levels will be internally calculated and displayed without operator involvement.

g. Calibration and Interfaces. The PR must be compatible with standard Test Measurement and Diagnostic Equipment (TMDE),

including the AN/UDM-1, AN/UDM-1A calibration devices and the AN/UDM-2 check source.

1.4 Operation and Logistical Suitability.

1.4.1 The PR will be operable in field and in garrison and in OCONUS theaters and be read both day and night during conditions of low visibility and in all battlefield environments, under all types of weather and terrain to include extremely cold environment found in the northern latitudes. The PR shall be able to withstand all battlefield conditions such as storage temperature ranges from -51° C to +71° C, operating temperature ranges from -51° C to +49° C, shock, corrosion, vibration, rain, dust, and mildew.

1.4.2 The PR will be transportable by standard air, ground, and water systems and will have a serviceability shelf life of no less than 10 years when properly stored. Nuclear survivability will be required tc the levels that the operator would be expected to survive. The PR will be produced as a throw away item and will be produced and stocked in quantities sufficient to provide readily replaceable systems for battlefield damaged or destroyed devices. The PR will be NBC contamination survivable using currently available systems techniques and procedures. The PR will be safe to operate by the soldier, will not present health or engineering hazards and will be environmentally safe. The PR is under consideration to fill the

need for a device of minimal size, weight, and cost to detect, measure, and display total dose of initial nuclear radiation from nuclear detonations plus the dose rate and dose from residual gamma radiation. There is no method in the field to measure and display quantifiable dose from initial neutron and gamma radiation hazard while concurrently providing a real time display of gamma dose rate hazard for monitoring, survey, and decontamination operations. By filling the void in equipment required to sustain the combat forces in an environment where nuclear weapons have been used the PR will greatly improve a unit's survivability and operational sustainability while conducting effective combat, combat support, and combat service support operations in a nuclear environment.

1.5 Employment Techniques: Tasks for employment of the PR will be incorporated into applicable TM and FM. Task lists will be developed concurrently with other elements of the acquisition cycle by proponent school. Introduction of the PR will not generate a new MOS or Additional Skill Identifier (ASI) for operation or maintenance of the equipment.

1.5.1 The PR will require operation and maintenance New Equipment Training (NET) for instructor and key personnel (IKP) during testing and fielding phases. Requirements for NET teams (NETT) versus New Materiel Introductory Briefing Team (NMIBT), new equipment instructional tapes, and instructional method for doctrine and tactics training (team or package), if required, will be considered.

1.5.2 Training in the institution on the PR will be through appropriate existing officer and noncommissioned officer (NCO) courses which will be modified, if required, to incorporate necessary soldier training publication (STP) tasks. Military qualification standards (MQS) tasks will be modified or newly developed if necessary. Training programs at the following TRADOC activities will provide institutional training for the PR.

a. Basic Training (BT) and One-Station Unit Training (OSUT). There will be no training on the PR at BT. OSUT students will be taught applicable training task as outlined in proponent schools training strategy.

b. Precommissioning Military Qualification Standard (MQS1). The MQS1 students will not be trained on the PR.

c. USACMLS. Institutional training will be based on logistics support analysis requirement data, task analysis, and knowledge gained from Initial Operational Test and Evaluation (IOT&E). Officer and enlisted operator and maintenance function requirements will be integrated into existing school courses.

d. USASIGS. The Qualitative and Quantitative Personnel Requirements Information (QQPRI) has not been developed. It is assumed that no institutional training will be required and self study of technical manuals will be sufficient for training.

e. USAIS. PR training will be incorporated into USAIS Precommand Course, IOAC, IOBC, ANCOC courses. Since the PR will replace or augment currently fielded RADIAC equipment no increase in programs of instruction (POI) hours is forecast.

f. USAOC&S. PR training will be incorporated into ANCOC, Officer Advanced, and Officer Basic courses.

1.5.3 Manuals, publications, and training material to support the PR will be developed by the MAT DEV for inclusion as part of the Initial Operational Test and Evaluation (IOT&E). System training support materials, consisting of technical documentation, extension training materials, training literature publications, and other training products to be identified in the Training Developers' System Training Plan (STRAP) will be developed for concurrent testing and fielding with the materiel system. The training package provided by the proponent school (system/MOS) will be used for support of training in units.

1.5.4 The Pocket RADIAC Trainer (PRT) being developed concurrently for the PR will be based on performance requirements obtained through analysis of data generated in accordance with AMC Pam 750-16. The training products developed as part of the training subsystem will be designed according to the Systems Approach to Training (SAT), TRADOC Reg 350-7.

1.5.5 Any other training devices/simulators identified as a result of the analysis will identified for concurrent development, testing, and fielding with the PR.

1.5.6 The PR will be operated at squad level by an MOS immaterial operator who has been designated as monitor and has previously received appropriate training on the system. It is expected that the PR will provide units with the capability to survive and sustain combat operations in a nuclear environment.

1.6 Doctrine. The PR will be operated at squad level in CONUS and OCONUS. The PR will be operated in a field environment in a monitoring, survey, or dosimeter role. The PR detects and measures radiation dose of prompt neutron and gamma radiation from a nuclear detonation and measures radiation dose rate from neutron induced gamma radiation at and immediately adjacent to ground zero and gamma radiation associated with radioactive fallout.

2.0 ORGANIZATION

2.1 Personnel Impact

2.1.1 The Basis of Issue Plan (BOIP) will be 2 per squad with a nuclear reconnaissance mission and 1 per squad for all other units. The PR will augment or delete the requirement for the IM-93 dosimeter and the PP-1578/UD charger. Although the

QQPRI has not been developed, it is assumed that no institutional training will be required and self study of technical manuals will suffice for training. No additional personnel authorizations for operation or maintenance will be required due to introduction of this system.

2.1.2 A Human Factors Engineering Analysis will be conducted by Human Engineering Laboratory (HEL) to ensure performance of all critical tasks associated with the PR with a .95 reliability by no less than .90 of the population and reduce the error likelihood of high, and moderately high, critical errors to less than .05. The PR will be capable of being operated, maintained, and repaired by representative personnel (5th percentile female through 95th percentile male) while dressed in MOPP up to and including MOPP 4 and in approved military issue cold weather ensemble.

2.1.3 The PR will be operated by a MOS immaterial operator/monitor at squad level. No additional personnel or MOS are required. The PR will be designed as a maintainable system. Use of a repairability or a throw away concept will be determined through the Level of Repair Analysis (LORA). Organizational maintenance will involve only cleaning the device and changing the batteries. General Support (GS) maintenance will only calibrate the PR. The PR will be checked for calibration by currently fielded or future fielded calibration sets. The PR will be able to operate continuously for at least two years

before failing. Calibration verification check will be performed by Support Activities Calibration Specialist, MOS 35H located at U. S. Army Materiel Command (USAMC) Test Measurement Diagnostic Equipment (TMDE) support activities. If the PR is further developed as a maintainable system, a task/workload analysis will be performed to determine what MOS will be required to perform maintenance, the extent of required/authorized maintenance to be performed, and determine if current MOS authorization can manage these additional tasks within present resources.

2.2 ORGANIZATIONAL PLAN

2.3 Unit Structure/Coordination for Units. There will be no change in unit structure or additional Military Occupational Specialty (MOS) requirement with the issue of the PR.

3.0 LOGISTICAL CONCEPT

3.1 Logistical Impact

3.1.1 The PR will require a calibration verification check not more frequently than annually. Support for the PR will be provided through the existing logistics system. The total impact on logistics cannot be fully determined until the Level of Repair Analysis (LORA) is finalized. Since the PR may augment rather than replace the IM-93 dosimeter and the PP-1578/UD

charger and the PR may be a maintainable rather than a throw away system, the actual logistical support requirement may increase substantially. Existing TOE tools, Test Measurement and Diagnostic Equipment (TMDE), and/or presently approved emerging TMDE or support equipment will be used. The system support package (SSP) will be validated and tested during IOT&E. The Integrated Logistics Support (ILS) Plan will be developed by the MATDEV. Calibration will be by AMC TMDE support activities. Other repair will be performed by MOS 39E (formerly MOS 35E) personnel at the GS maintenance activity and by qualified personnel at installation maintenance activities.

3.1.2 If costs prohibit making the PR a throw away device, repair of the system will be by components. Support for components of the PR will be provided through existing logistics systems and standard TMDE.

3.2 Support Concept

3.2.1 The PR will be mass produced and stocked in quantity on the battlefield, such that damaged or destroyed devices can be readily replaced, therefore, nuclear survivability greater than that at which the soldier monitor would be expected to survive will not be required. The PR will be decontaminable using currently available systems, materials, techniques, and procedures for electronic equipment. Decontaminability of the PR and any associated carrying case will be determined separately.

3.2.2 A Logistics Support Analysis (LSA) will be used to determine if there will be any additional tasks, skills, or other support for the operation, maintenance, and employment of the PR.

3.2.3 Normal supply channels will be utilized for replacement of the PR.

3.3 Transportation. The PR will be transported during mission support by any standard ground, air, or water mode. The PR will not exceed mission load limits.

3.4 Resupply. Transportation of the PR and packaging for resupply will conform to applicable criteria for highway, rail, water, and air as specified in AR 70-44 and AR 70-47.

3.5 Maintenance Concept. A throw away concept will be utilized unless precluded by cost. Organizational maintenance will involve only cleaning the device and changing the batteries. If maintainable, repair of the system will be by components through GS maintenance. Calibration certification will be accomplished as an element of maintenance.

3.6 Technical Publication. To be published.

4.0 OPERATIONAL MODE SUMMARY/MISSION PROFILE

4.1 Mission Profile

4.1.1 General

a. The PR operational concept calls for three major missions; pre-nuclear weapons employment, nuclear weapons employment, and dosimetry. Pre-nuclear and nuclear weapons employment missions are characterized by two tasks; ground survey and radiation monitoring. Nuclear dosimetry is the only full-time mission for the PR. The maximum mission duration of shall be 168 hours for wartime and 72 hours for peacetime.

b. The mission essential functions of the PR are to detect and measure neutron and gamma radiation dose, and radioactive contamination and ambient dose rate. In addition, the PR shall alarm the user at one dose level and one dose rate level; a preset 1 cGy/hour default level which can be reset by the user and at a user selected total dose level.

4.1.2 Combat Developer Analysis:

a. The wartime and peacetime operational availabilities (A_O) must be at least .89. With this A_O, at least .90 of the platoons in a company will have at least 4 of the 5 assigned PR in operational condition.

b. The PR maintenance constraints and their approximate Direct Productive Annual Maintenance Man-Hours (DPAMMH) are shown in the following table:

DPAMMH

MOS	Unit Level	DS Level	GS Level
31V	3.0	---	----
35H	---	4.0	10.0

4.1.3 Materiel Developer Analysis:

a. Three Maintenance and Support Concepts were considered in the development of the RAM Rationale Analysis.

(1) Scenario 1 -- In this support environment, repairs will be performed only at the GS Level. This concept will incorporate the replacement of modular components.

(2) Scenario 2 -- This scenario represents the maintenance concept established for the AN/VDR-2. Failed parts will be replaced on the component level, and maintenance will be performed at the GS and Depot Level.

(3) Scenario 3 -- This concept presents the PR as being a throw away item. The throw away decision will be made at the GS Level, where minor maintenance may be performed.

b. Tabulated below are some of the significant values obtained from the materiel developer analysis.

SUPPORT ALTERNATIVE Scenario	P/W	A_o	ALDT (Hours)	MR	MOST CONSTRAINING MR		MTBOMF	MOST CONSTRAINING MTBOMF	CONSTRAINING COST UNIT ($)	CONSTRAINING COST LIFE CYCLE (MILL $)	MAINTENANCE MAN HOURS (Hours)
1	W	.89	58.7	.004	.004	MN	W 318 P 226	318	1645	214	679,000
	P	.89	80.9	.011		TL	W 2180 P	2180	1417	184	101,000
2	W	.89	94.2	.004	.004	MN	W 510 P 359	510	1020	132	376,000
	P	.89	128.6	.011		TL	W 2180 P 2180	2180	1341	174	90,000
3	W	.89	12.4	.004	.004	MN	W 67 P 51	67	2163	281	1,778,000
	P	.89	18.4	.011		TL	W 2180 P 2180	2180	1428	186	56,000

Note: W = Wartime
P = Peacetime
MR = Maintenance Ratio
MN = Mission Need
TL = Technical Limit
A_o = Operational Availability

c. Conclusion:

(1) Drawing from the RAM analysis, it is recommended that the maintenance and support of the PR be modeled after that as represented for scenario 2.

(2) The data demonstrates that for any MTBOMF, scenario maintains the lower O&S costs, even though scenario 3 demonstrated a lower maintenance man-hours requirement.

d. Environment for both Wartime and Peacetime Conditions: The very nature of radiation prohibits the use of the actual PR for other than classroom demonstration and low level radiation training using source sticks and calibrators. The PR consists of nuclear sensors that will detect and measure initial radiation in terms of neutron and gamma total dose and dose rate from gamma radiation resulting from nuclear fallout. The PR will be carried in the chest pocket of the Army Battle Dress Uniform (BDU) or elsewhere on personnel that allows for hands free operation during movement by foot and vehicular patrols to conduct reconnaissance missions to determine the extent and intensity of a fallout field and in monitoring and decontaminating operations. The PR will be capable of operating in all types of weather and terrain to include the extremely cold environment found in the northern latitudes. The PR has the important function of measuring the total dose of mixed radiation (neutron and gamma) to which the holder has been exposed. The PR will provide commanders with accurate data concerning gamma dose rate in areas contaminated by fallout, neutron-induced gamma activity, or radiological agents, and the total gamma and neutron radiation dose to which their troops have been exposed. The PR will alert the command to the arrival of fallout, alert units on the move when they encounter a contaminated area, keep the commander informed of the degree and extent of the radiological hazard in his unit area, and aid in developing radiological intelligence and data for the purpose of NBC reports. The PR will also provide a quantitative measure of tactical levels of gamma

contamination of personnel, equipment, and other supplies. The total dose (dosimeter) information will be one of the factors that will assist commanders in assessing the radiation exposure status (RES) of their troops. This information will be an integral part of combat, combat support, and combat service support unit survivability and operational sustainability in a nuclear environment.

5.0 TEST SETTING

5.1 General. Test site is suggested to create conditions representative of the environments which will be representative of selected scenario of the OMS/MP summary. Test scenario will be designed to insure participants are tested in operational aspects of the PR which will include tactical ground survey, monitoring, and tactical dosimeter. Test scenario will be designed to test participants in the operation of the PR modes, such as dose rate meter, dosimetry, alarms, power supply, and maintenance.

5.2 PR Operation/Maintenance. Test scenario will include common tasks related to operation of the PR by the user. Tasks which relate to GS repair and calibration verification checks will be planned for and conducted.

5.3 Decontamination. Decontaminability of the PR will be accomplished with currently available materials, systems,

techniques and procedures. Decontamination procedure(s) selected for use will not be harmful to electrical circuitry. Discard versus decontamination will be considered based upon decontaminability, time to decontaminate, versus cost and time to replace. Decontamination levels will be verified by laboratory procedures. When decontamination level(s) fall below the detectable level for currently available field chemical agent detection techniques, laboratory techniques (such as bubblers) will be utilized to determine the level of contamination remaining, following decontamination.

5.4 Limitation. Testing may be conducted at any location where approved facilities are available. The very nature of radiation prohibits the use of the actual PR for other than classroom demonstration and low level radiation training using source sticks and calibrators. Exposure of the PR to neutron and gamma radiation dose rates to technical limits will be accomplished during Technical Testing (TT). The PR operational concept calls for three major missions; pre-nuclear weapons employment, nuclear weapons employment, and dosimetry. Pre-Nuclear and nuclear weapons employment missions are characterized by two tasks; ground survey and radiation monitoring. Nuclear dosimetry is the only full-time mission for the PR. Since radiation will not be utilized in an operational environment, the dosimeter aspects of the PR cannot be fully utilized. Since nuclear weapons employment will not occur during operational testing, those aspects of initial radiation exposure gathering will not occur.

SECTION II

THREAT SUPPORT PACKAGE

POCKET RADIAC, AN/UDR-13

1.0 REFERENCE.

a. Operational and Organizational Plan for the Pocket RADIAC (PR), 7 Nov 86.

b. Draft Required Operational Capability for the Pocket RADIAC (PR), AN/UDR-13, 6 Nov 90

2.0 THREAT. (Extracted from the Draft Required Operational Capability for the Pocket RADIAC (PR), AN/UDR-13, 6 Nov 90). The Soviet forces reflect the Soviet leadership's belief that they can fight and win a war waged under conditions that include the employment of nuclear weapons. Accordingly, a variety of nuclear delivery systems are organic to Soviet forces, even at the division level, improving their capability for waging theater nuclear warfare. In addition, other countries are seeking a nuclear capability; within the next 10 - 15 years some third world countries may adopt doctrine, training, and equipment similar to the Soviets. Nuclear delivery systems available include aircraft, surface-to-surface guided missiles, free-flight rockets, and artillery howitzers, and guns. The initial nuclear strike will be accomplished suddenly throughout the depth of the enemy's combat deployment and in coordination with non-nuclear

fires. Nuclear fires will be employed to support the main attack while other fire support means support secondary or supporting attacks. The threat to the Pocket RADIAC will be direct and indirect fires, and Radio Electronic Combat (REC) affecting the operational capability of the system. The direct fire threat will be minimal due to the size and location of the system on the battlefield. Enemy forces have, and plan to use an abundance of artillery, multiple rocket launchers, air-to-surface and surface-to-surface missile systems which will enhance the threat. If in a vehicle, damage or destruction of the vehicle may render the PR inoperable as well. Any solid state electronic components are subject to the effects of electromagnetic pulse (EMP). The PR is not expected to cause the Soviets to alter their nuclear warfare doctrine, training, or equipment. Detailed information can be found in the RDI STAR dated 1 March 1990. Information cutoff date is 15 May 1990.

TRAINING CONCEPT

POCKET RADIAC, AN/UDR-13

March 1991

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SECTION III

TRAINING SUPPORT PACKAGE

POCKET RADIAC, AN/UDR-13

1.0 TRAINING CONCEPT

1.1 General.

a. The PR is in the developmental stage; therefore, many relevant questions affecting the proper training strategy to be used are unanswered. Until the Systems Approach to Training (SAT) process has been completed and the final training strategy identified, the system training plan (STRAP) will list all of the available training.

b. The U.S. Army Chemical School (USACMLS), as proponent for the PR, is responsible for the development and submission of the STRAP and will task schools as appropriate to provide input to the USACMLS.

c. The USACMLS Directorate of Training and Doctrine (DOTD) is responsible for integrating training into USACMLS and other schools' resident/nonresident training programs and for integrating strategies into the STRAP. For the USACMLS, training input will consist of media selection for military occupational specialty (MOS) qualification and familiarization. Individual training to support the PR consists of resident training for

operator and operator maintenance tasks. Specifically, DOTD, USACMLS will require training departments to:

(1) Determine appropriate media and written materials to support exportable training packages.

(2) Ensure development of exportable training packages.

(3) Continuously review all programs of instructions with a view toward improvement in instructional media and methods.

d. Institutional training will be conducted for the PR operator and maintenance personnel. This training will be designed to support the fielding of the PR and will be based on results from the initial operational test and evaluation (IOT&E) and on evaluation of operator and maintenance training courses conducted during full-scale development. Since these training courses will be validated and approved by the appropriate TRADOC school or center, they should require minimal restructuring to support the institutional training requirements.

1.1.1 Who Will Be Trained:

1.1.1.1 Training Programs. In planning training strategy, the following three phases of training are considered:

a. Phase One: New Equipment Training.

b. Phase Two: Institutional Training.

c. Phase Three: Unit Training.

1.1.2 Skills To Be Trained.

1.1.2.1 Active Army Training.

a. New Equipment Training.

(1) Staff Planner Courses: NA

(2) Instructor and Key Personnel (IKP) Training: IKP training requirements will be determined prior to IOT&E, but not later than 3Q94.

(3) New Equipment Training Team (NETT): NETT requirements will be determined prior to FOT&E.

b. Institutional Training. Appropriate existing officer and NCO courses will be modified to incorporate necessary soldier training publication (STP) tasks, and the military qualification standards (MQS) tasks will be modified or newly developed if necessary. Training programs at the following TRADOC activities will provide institutional training for the PR:

(1) Basic Training (BT) and One-Station Unit Training (OSUT). There will be no training on the PR at BT. OSUT students will be taught applicable training task as outlined in proponent schools training strategy.

(2) Precommissioning Military Qualification Standard (MQS1). The MQS1 students will not be trained on the PR.

(3) USACMLS. Institutional training will be based on logistics support analysis requirement data, task analysis, and knowledge gained from IOT&E.

(a) Enlisted Training. As an integrated part of their training, MOS 54B soldiers will be taught the functions and operational capabilities of the PR. Enlisted training will be conducted in accordance with the approved STRAP and will incorporate the following:

1. Use and maintain the Pocket Radiac.

2. Plan for and Supervise Radiological Survey.

3. Read and Record Radiological dose rates.

4. Monitor personnel, food, and equipment for contamination.

(b) Officer Training.

1. Chemical Officer Basic Course (COBC). The COBC students will be taught the functions and operational capabilities of the PR listed in 1.1.2.1b(3)(a)1 thru 1.1.2.1b(3)(a)4 above.

2. Chemical Officer Advance Course (COAC). The COAC students will be trained to perform tasks listed in 1.1.2.1b(3)(a)1 thru 1.1.2.1b(3)(a)4. After transition COAC students will receive only sustainment training on the PR.

(4) U.S. Army Signal School (USASIGS). Although the Qualitative and Quantitative Personnel Requirements Information (QQPRI) has not been developed, it is assumed that no institutional training is required and self study of technical manuals should be sufficient for training. Training base has already been established with similar equipment.

(5) U.S. Army Infantry School (USAIS). USAIS Precommand Course, IOAC, IOBC, and ANCOC will include PR training. Since the PR will replace current radiac equipment being trained, no increase in POI hours is forecast.

(6) U.S. Army Ordnance Center and School (USAOC&S). USAOC&S advance Noncommissioned Officer, Officer Basic, and

Officer Advanced course students will be trained to perform the tasks listed in paragraph 1.1.2.1b(3)(a)1 thru 1.1.2.1b(3)(a)4.

c. Unit Training/Collective Training.

(1) Unit Training. Training of unit personnel will be accomplished by teaching and sustaining proficiency in individual and collective skills that the unit requires to complete its mission. The unit NBC NCO (MOS 54B) will train the designated operators. Unit commanders will have the following responsibilities.

(a) Designate primary and alternate operators for PR.

(b) Ensure that designated operators are trained and able to perform required tasks to standard.

(c) Ensure that the deficiencies which can be attributed to formal training are reported to the appropriate service school so that corrective action be initiated.

(2) Collective Training. Unit level radiological survey personnel will be trained by the unit NBC Specialist (MOS 54B) or by the school trained unit NBC Officer of NBC NCO.

d. Other Considerations.

(1) Time Frame. Resident training will start 1QFY94.

(2) Nonresident Courses of Instruction. Current nonresident courses will be updated to include the PR as required.

(3) Exportable Training Materials. Exportable training materials will be developed by proponent TRADOC schools for individual training programs as appropriate.

(4) Technical Documentation and Training. The training developer USACMLS, will develop a complete training package and training test support package (TTSP) for PR operators.

(a) Validation. All training package materials will be validated by the developer and verified by the user.

(b) Training programs and manuals. Soldier training publications and MQS task manuals will be developed by the USACMLS. This material will be prepared and provided to the field on or about FUE date.

1.1.2.2 Reserve Component (RC) Training.

a. FORSCOM and WESTCOM, in coordination with the National Guard (NG) Bureau and Office of the Chief of the Army Reserve,

will ensure that appropriate NG and US Army Reserve Forces (USARF) users receive appropriate training.

b. The RC training program will be provided by the Army service schools or USARF schools and agencies and must be considered in the following areas:

(1) New Equipment/Systems Training (Initial Equipping).

(a) NETT. To Be Determined.

(b) Mobile Training Team. Provided as required.

(c) Individual Training. Soldiers attending advanced individual training, (MOS 54B) will be taught the concepts for the use of the PR.

(d) Unit Training. Accomplished at units' monthly drills and at Army installations during two-week annual training (AT).

(e) Instructor and Key Personnel Training. None required.

(f) Supplemental Training. Accomplished through the use of specially configured, exportable training packets, media, and training aids.

(2) Sustainment Training.

(a) Unit Training/Collective Training. Accomplished in the unit during multiple unit training assemblies and AT, using appropriate field manuals and technical manuals supplemented with exportable MOS support packets.

(b) Individual Training. None required.

(3) Doctrine and Tactics Training. To Be Determined.

1.1.3 When, Where and How Training Will Be Conducted.

a. Operator training for IOT&E players will be conducted by USACMLS instructors prior to test. IOT&E date is to be determined.

b. Instructor from the USACMLS will train MOS test players utilizing the training test support package (TTSP). Training requirements for MOS 35H, 39E (formerly 35E), and 63J will be determined by the respective maintenance proponent.

c. Instructor-Key Personnel (IKP) training for player training, instructors and training developers will be conducted by AMCCOM NET team (NETT) or contractor personnel as designated by the materiel developer (MAT DEV).

1.1.3.1 For IOT&E, trainer/instructor personnel must meet the following criteria:

a. Completion of primary technical course (required).

b. Completion of instructor training course (desirable).

c. Experience as a company/battalion NBC operation specialist (desirable).

d. Capable of conducting training on any supporting tasks listed in this TTSP.

1.2 Training Data Requirements. The Directorate of Training Development, USACMLS requests that the following data be provided as part of the test report.

a. Target Audience:

(1) Age

(2) MOS

(3) Military experience

(4) Civilian experience

(5) Job interest

(6) Equipment license

b. Tasks. Identify any critical tasks omitted from this training concept.

c. Procedures. Identify any steps in the manual or task outlines which are incorrect, incomplete (need more detail), or inadequate.

d. Standards. Identify standards that could not be met by user troops. Identify any standards that were particularly difficult for user troops to meet.

e. Time Required. Identify tasks that require less time to train and those that require more time to train using the time allotted in the TTSP as a baseline. Determine the time required to meet the standards for each task.

f. Prerequisite Training. Identify any specific training or course the soldier should receive prior to the PR training.

g. Job Aids. Identify any tasks or portions of tasks for which job aids would be beneficial. Identify type of job aid needed.

h. Recommendations. Provide any recommendations or suggestions from instructors or player personnel to improve the training program.

1.3 Critical Tasks and Performance Standards.

a. Task:

Standards: Start up, operate, and shut down the PR IAW TM 3-XXXX-XX-XX.

b. Task: XXX-XXX-XXXX, Perform Operator Maintenance on the PR.

Standards: Identify and correct all deficiencies/ shortcomings correctable at the operator level IAW appropriate TM. Report deficiencies/shortcomings not corrected to supervisor.

1.4 Supplementary Tasks. Training on the following tasks have been developed at the USACMLS and may be necessary to conduct IOT&E.

Task: XXX-XXX-XXXX

Task: XXX-XXX-XXXX

Task: XXX-XXX-XXXX

Task: XXX-XXX-XXXX

ANNEX A

REFERENCES

AR 71-3, Force Development User Testing

AR 70-38, Research Development, Test, and Evaluation of Materiel for Extreme Climatic Conditions

TRADOC Regulation 71-3, TRADOC Evaluation, Test, and Experimentation, 29 Aug 89

TRADOC Regulation 71-9, User Testing and Evaluation

Memorandum, ATCL-MRP, U.S. Army Logistics Center, Subject: RAM Rationale Report (RRR) for the Pocket RADIAC (PR)

Memorandum, ATZN-CM-CS, USACMLS, Subject: Redistribution of the Operational and Organizational (O&O) Plan for the Pocket RADIAC (PR), 21 Nov 88

Outline Test Plan (OTP), ATCT-AE-EN, 93-0T-ENBD-1305-1, Pocket RADIAC (PR), AN/UDR-13, Initial Operational Test & Evaluation, 29 Aug 89

Memorandum, ATZN-CM-CT, USACMLS, Subject: Approved Critical Operational Issues and Criteria (COIC) for Pocket RADIAC (PR), 8 Feb 90

Memorandum, USACMLS, ATZN-CM-CT, Subject: FY91 Concept Evaluation Program Schedule and Review Committee (CEPSARC), 5 Jul 90

Memorandum, ATCL-MES, U.S. Army Logistics Center and Fort Lee (Provisional), Subject: RAM Rationale Report for Pocket RADIAC Trainer (PRT)

Memorandum, PM NBC Defense Systems, AMCPM-NN-TM, Subject: Test and Evaluation Master Plan (TEMP) for AN/UDR-13 Pocket RADIAC, 6 Aug 90

Message, 091500Z Sep 90, ATCD-EP, TRADOC, Subject: FY91 TRADOC Concept Evaluation Program Scheduling and Review Committee (CEPSARC) Results

Memorandum, ATZN-CM-CS, USACMLS, Subject: Draft Required Operational Capability for the Pocket RADIAC (PR), AN/UDR- 3, 6 Nov 90

Message, 091430Z Nov 90, AMCPM-NN-TM, PM NBC Defense Systems, Subject: AN/UDR-13 Pocket RADIAC Concept Exploration Program (CEP), 91-CEP-809

Memorandum, PM NBC Defense Systems, AMCPM-NN-TM, Subject: AN/UDR-13 Pocket RADIAC (PR) Concept Exploration Program (CEP) Schedule, 21 Nov 90

Message, 280345Z Nov 90, AMCPM-NN-TM, PM NBC Defense Systems, Subject: AN/UDR-13 Pocket RADIAC Concept Exploration Program (CEP), 91-CEP-809

ANNEX B

POINTS OF CONTACT

ORGANIZATION	OFFICE SYMBOL	ACTION OFFICER	AUTOVON	FUNCTION
PM NBCDS, Aberdeen Proving Ground, MD 21010-5401				
	AMCPM-NN-TM	LTC Elkins	584-4251	Program Sponsor
	AMCPM-NN-TM	Mr. James Nealon	584-3888/2035	Project Officer
		Mr. Kevin Emery	671-4251	Project Officer
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DCD, TED	ATZN-CM-CT	Mr. Don Witt	865-5267/3100	Project Officer
DCD, TEC	ATZN-CM-C	Ms. Angela Robinson	865-5771	Program Analyist
DCD, MLSD	ATZN-CM-CS	Mr. Larry Daum	865-5569/3986	Project Officer
DOT	ATZN-CM-N		865-	Trainer
DOTD, New Systems Training Branch				
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Tng Devices	ATZN-CM-F	Mr. Tom Carroll	865-4779/5780	Training Developer
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Radiation Lab	ATZN-CM-NR	Mr. Charles A. Sondhaus	865-5919	
USACECOM (MAT DEV) Fort Monmouth, NJ 07703-5303				
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CED		Mr. Harvey Lai	995-4709	Project Officer
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	AMSEL-LC-LM-E	Ms. Patti Cushion	992-8428	Project Officer
	AMSEL-LC-LM-E	Ms. June Kahlert	992-4944	Project Officer
	AMSEL-RD-EW-SS	Mr. Bekir Osman	995-3206	Project Officer

ANNEX B

POINTS OF CONTACT

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	SMCCR-DD			
		Mr. (Dr.) Heimbach	584-	Project Engineer
U.S. Army TMDE Support Group, Redstone Arsenal, AL 35898-5400				
	AMXTM-SR			
	AMXTM-LMM			
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		CPT Rob Sarini	289-0382	OIE
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USAAVNC, Fort Rucker, AL 36362-5000				
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USAHEL			298-5924	Project Officer
USAEPG, Fort Huachuca, AZ				
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		Mr. Dick Sears	821-8100/8118	Project Officer

ANNEX B

POINTS OF CONTACT

ORGANIZATION	OFFICE SYMBOL	ACTION OFFICER	AUTOVON	FUNCTION
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		Mr. John Childress	927-3653	Project Officer
USAMSAA, Aberdeen Proving Ground, MD 21005-5071				
			298-	Log Evaluator
HQ TEXCOM, Fort Hood, TX 76541 (FAX - (817) 288-1644				
	CSTE-OP	COL Sisson	738-1024	Chief, Operations
	CSTE-TMA	MAJ Waggoner	738-9409 738-1483	Methodology & Analysis
TEXCOM Field Artillery Board, Fort Sill, OK 73503				
FABD	ATCT-FA	Mr. Don Krejcarek	639-4400/6202/5909	Project Officer
Modern Technologies Corporation		Mr. Tom Poskaitis	(201)530-9026	

APPENDIX C

COORDINATION

1. First Coordination (Jan 1990).

SOURCE	COMMENTS RECEIVED ACCEPTED	NOT ACCEPTED	REMARKS
PM, NBCDS, AMCPM-NN-TM	Comments agreed to by TIWG		concurrence
USACECOM, AMSEL-RD-EW-SS	Comments agreed to by TIWG		concurrence
AMSEL-LC-LO-E	Comments agreed to by TIWG		concurrence
USATECOM	Comments agreed to by TIWG		concurrence

2. Second Coordination (Feb 1990).

SOURCE	COMMENTS RECEIVED ACCEPTED	NOT ACCEPTED	REMARKS
PM, NBCDS, AMCPM-NN-TM	Comments agreed to by TIWG		concurrence
USACECOM, AMSEL-RD-EW-SS	Comments agreed to by TIWG		concurrence
AMSEL-LC-LO-E	Comments agreed to by TIWG		concurrence
USATECOM	Comments agreed to by TIWG		concurrence

APPENDIX D

DISTRIBUTION

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APPENDIX D

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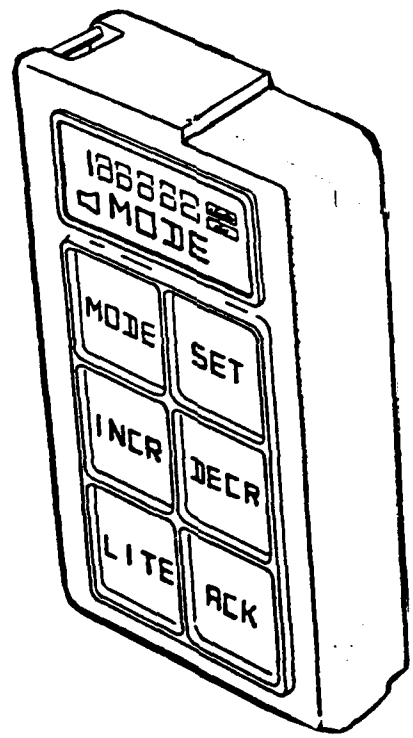
APPENDIX E

POCKET RADIAC, AN/UDR-13

SYSTEM DESCRIPTION

1. The AN/UDR-13 Pocket RADIAC (PR) Advanced Development Model is a Pocket-sized, battery powered instrument designed to measure tactical levels of gamma radiation dose rate in units of centiGray/hour (cGy/hr) and the combined gamma and neutron dose in units of cGy. The range of the instrument is 0.1 to 999.9 cGy/hr for dose rate and 1 to 1999.9 cGy for dose.

Pocket RADIAC



2. Pocket RADIAC Key Operations. The PR has three states of operation: "ON", "SLEEP", and "OFF".

a. ON: In the "ON" state the PR is fully operational and can be used as described in the following instructions. To turn the PR "ON", depress the "MODE" key.

NOTE: In the "ON" state the PR draws typically 12mA of supply current from the battery.

b. SLEEP: To conserve battery power, the PR has a "SLEEP" state. In the "SLEEP" state, power to most of the circuitry is turned off and the microprocessor's clock is stopped. The "SLEEP" state reduces the R power consumption to typically 90uA.

NOTE: The operator cannot put the PR into the 'SLEEP" state directly. "SLEEP" is controlled by the hardware/software in the following manner: When the PR is turned "ON", the PR will put itself to sleep after 5 minutes unless there is an alarm condition or one of the PR keys has been depressed. If there is an alarm condition, the PR will stay in the "ON" state until 5 minutes after the alarm condition no longer exists and has been acknowledged by depressing the "ACK" key. The PR will also stay in the "ON" state for 5 minutes if a key has been depressed. If multiple keys are depressed, the PR will remain on 5 minutes after the last key has been depressed. Once in the "SLEEP" state, the PR will stay in "SLEEP" for seconds. The operator

can force the PR out of "SLEEP" by depressing the "MODE" key. Once the PR comes out of the "SLEEP" state on it's own, it will remain in the "ON" state for 10 seconds. After 10 seconds the PR will go back to "SLEEP" unless one of the conditions described occurs.

c. OFF: In the "OFF" state, power is removed from all but one circuit. This is the PR lowest power consumption state. In the "OFF" state power consumption is reduced to typically 100 nA. NOTE: The "OFF" state disables the PR from detecting the presence of radiation. To place the PR in the "OFF" state, advance the "SET" display to "PWR" and press either the "INCR" or the "DECR" key so that "PWR-" is displayed in the Liquid Crystal Display (LCD) window. Then depress either the "MODE" key or the "SET" key and the PR will turn off.

3. PR Key Pad Key Description and Purpose:

a. MODE.

(1) RATE: Dose Rate Display.

(2) VRAT: Vehicle Rate Display.

(3) MDOS: Mission Dose Display (Dosimeter).

(4) TDOS: Total Dose Display (Dosimeter).

(5) BAT%: Remaining Battery Voltage Percent Display.

b. SET.

(1) PWR: Select Power ON/OFF.

(2) RTAL: Set Rate Alarm Set Point.

(3) VFAC: Set Vehicle Protection Factor Set Point.

(4) MDAL: Set Mission Dose Alarm Set Point.

(5) MDR: Select Mission Dose Reset.

(6) ALM: Select Alarm ON/OFF.

(7) AUD: Select Audio Alarm ON/OFF.

(8) SAV: Select Save Option.

c. INCR: Increase (Numeric) or Toggle +/-.

d. DECR: Decrease (Numeric) or Toggle +/-.

e. LT: Turn On Backlight.

f. ACK: Acknowledge Alarms or Activate BIT.

4. Key Pad Functions. All functions of the PR are controlled and accessed from the Key Pad located on the front of the instrument. Description of these functions and other PR functions are further defined in Appendix I to the PR Test Evaluation Plan, 28 Mar 91.