

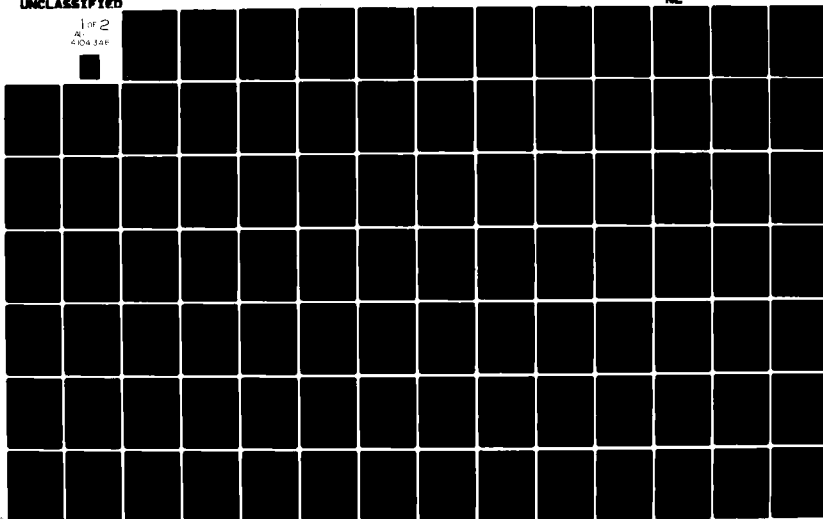
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ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT --ETC F/S 6/8
ANNUAL PROGRESS REPORT FY1980, 1 OCTOBER 1979-30 SEPTEMBER 1980--ETC(U)
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REPORT MEDDH-288 (R1)

US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LABORATORY
ANNUAL PROGRESS REPORT FY1980

AD A104346

US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LABORATORY
Fort Detrick
Frederick, MD 21701

1 October 1980

Annual Progress Report for Period 1 October 1979 - 30 September 1980

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US ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK
FREDERICK, MD 21701

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER MEDDH-288 (R1)	2. GOVT ACCESSION NO. AD-A104346	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) US Army Medical Bioengineering Research and Development Laboratory Annual Progress Report FY1980		5. TYPE OF REPORT & PERIOD COVERED Annual Progress Report Oct 1979-Sep 1980
7. AUTHOR(s) John N. Albertson, Jr., COL, MSC		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Medical Research & Development Command Fort Detrick, Frederick, MD 21701		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS See Reverse
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) <i>(Handwritten: 16)</i>		12. REPORT DATE 1 October 1980
		13. NUMBER OF PAGES 156
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. <i>(Handwritten: 16)</i>		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. Key Words Aquatic Toxicology, Biological Control, Casualty Evacuation, Chemical Decontami- nation, Chemical Warfare Defense, Combat Medical Materiel, Environmental Fate, Field Dental Equipment, Field Water Supplies, Field X-ray Equipment, Hazardous/ Toxic Waste Disposal, Health Standards for Military Pollutants, Medical Systems in Nonconventional Environments, Occupational Health Related to Chemicals, Pest Management, Pesticide Dispersal, Pesticide Disposal, Wastewater Treatment.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Annual Progress Report, Fiscal Year 1980, summarizes research per- formed by the US Army Medical Bioengineering Research and Development Laboratory in projects authorized by The Surgeon General, US Army, and the Commander, US Army Medical Research and Development Command; and supported by RDTE funds from the US Army Medical Research and Development Command.		

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62772A 3S162772A874.BA.232
62772A 3S162772A874.BA.234
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62778A 3S162778A838.00.060

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63732A 3S263732A835.AA.005
63732A 3S263732A835.BA.006

64717A 3S464717D832.00.002
64717A 3S464717D832.BB.003
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PREFACE

The United States Army Medical Bioengineering Research and Development Laboratory (USAMBRDL), a subordinate unit of the United States Army Medical Research and Development Command (USAMRDC), is located at Fort Detrick, Maryland, at the apex of a triangle between Baltimore and Washington on the outskirts of the City of Frederick.

The unit was established on 1 September 1972 by the merger of the US Army Medical Equipment Research and Development Laboratory (USAMERDL) and the US Army Medical Biomechanical Research Laboratory (USAMBRDL). On 1 July 1973, USAMBRDL was directed to absorb the resources and mission of the US Army Medical Environmental Engineering Research Unit (USAMEERU), located at Aberdeen Proving Ground (Edgewood Arsenal), Maryland. This action was completed on 30 October 1973, with the simultaneous discontinuation of USAMEERU and the formation of the Environmental Protection Research Division within USAMBRDL. By September 1974, all of the division's personnel and materiel resources had been relocated to Fort Detrick.

Organized in September 1921 at Carlisle Barracks, Pennsylvania, the former USAMERDL was established to provide engineering development of medical items required for field use of the Army. During the years 1946-1957 the laboratory was under the command of the former Army-Navy Medical Procurement Office, and in 1948 was moved to Fort Totten, New York. Subsequently, under the technical supervision of the Armed Services Medical Materiel Coordination Committee, it came under complete control of the Army in June 1962 as a subordinate element of The Surgeon General's Research and Development Command. USAMERDL through the years continued to develop and improve upon medical materiel peculiar to the needs of the Armed Forces.

Established in 1946 by the Army Medical Service, the former USAMBRDL was originally known as the Army Hand Laboratory, and later changed to Army Prosthetics Research Laboratory (APRL). During the early years, APRL research involved the development of new prosthetic devices. Around 1955, the research effort became more diversified and included the development of new surgical repair materials. With the expansion of the mission to include internal body prosthetics, the name of the laboratory was changed in 1963 to US Army Biomechanical Research Laboratory.

The former USAMEERU was activated on 1 July 1972. USAMEERU represented a major Army "first" in that its mission was to conduct continuing environmental health engineering research in support of The Surgeon General's responsibilities in air and water pollution control and abatement.

Today, USAMBRDL's facilities are housed in five separate buildings on Fort Detrick with total floor space exceeding 100,000 square feet.

With the exceptions that USAMBRDL no longer performs research in the area of prosthetic devices or surgical materials and there is much greater emphasis on pest management research, current missions can be traced back to the original three laboratories. Not surprisingly, these missions reflect a highly interdisciplinary staff and the need for a responsive and flexible management structure. Current missions are as follows:

Conducts in-house and extramural research, development acquisition of medical, dental and pest management materiel on a continuing basis for the Army and on an as required basis for the Navy and Air Force. This includes managing the developer's portion of the AMEDD materiel life cycle and product improvement program, coordinating an integrated pest management program, and constructing initial pilot prototypes, test models, and producing limited quantities of medical materiel to support urgent military requirements.

Conducts comprehensive basic and applied research and management of research contracts in support of all The Surgeon General's responsibilities in environmental protection to include air, land and water pollution control and solid, hazardous/toxic wastes and pesticide disposal; and occupational health associated with exposure to chemicals.

To accomplish these missions, the laboratory is authorized 136 positions consisting of 20 officers, one warrant officer, 13 enlisted personnel, 93 general schedule civilians and nine wage grade civilians. In addition, the personnel complement is augmented through various cooperative training programs with universities, colleges and other government agencies. Professional disciplines represented in the organization include:

Air Pollution Engineering
Aquatic Biology
Biomedical Engineering
Chemical Engineering
Chemistry
Computer Sciences
Electrical Engineering
Electronic Engineering
Engineering Crafts & Drafting
Entomology

General Engineering
Graphic and Photographic Arts
Microbiology/Virology
Mechanical Engineering
Pathology
Physiology
Sanitary Engineering
Statistics
Toxicology/Pharmacology

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IN-HOUSE LABORATORY INDEPENDENT RESEARCH

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION	2 DATE OF SUMMARY	REPORT CONTROL SYMBOL	
				DA DB 6238	80 10 01	DD DR&E(AK)636	
3 DATE PREV SUMMARY	4 KIND OF SUMMARY	5 SUMMARY SECT	6 WORK SECURITY	7 REGRADING	8A DISSEM INSTR	8B SPECIFIC DATA CONTRACTOR ACCESS	9 LEVEL OF SUM
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10 NO. COPIES	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER		WORK UNIT NUMBER		
	61101A	3AT61101A91C	00		014 APC FT58		
11 PRIMARY							
12 CONTRIBUTING							
13 CONTROLLING							
14 TITLE (Provide with Security Classification Code)							
(U) Foreign Body Locator, Ultrasonic, Non-Invasive							
15 SCIENTIFIC AND TECHNOLOGICAL AREAS							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
16 START DATE		17 ESTIMATED COMPLETION DATE		18 FUNDING AGENCY		19 PERFORMANCE METHOD	
7810		8012		DA		C. In-House	
20 CONTRACT ORIGIN				21 RESOURCES ESTIMATE		22 PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER				FISCAL YEAR		C. FUNDS (in thousands)	
C. EXPIRATION				80		0.0	
D. AMOUNT				81		0.0	
E. CUM. AMT.						00	
23. RESPONSIBLE INDIVIDUAL				24. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
25. GENERAL USE				26. PRINCIPAL INVESTIGATOR (Provide SSAN if U.S. Academic Institution)			
Foreign Intelligence Not Applicable				NAME: Salisbury, L.L.			
				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
				SOCIAL SECURITY ACCOUNT NUMBER:			
				ASSOCIATE INVESTIGATORS			
				NAME: Stup, J.L.			
				NAME: Crampton, K.T.			
				POC: DA			
27. KEYWORDS (Provide EACH with Security Classification Code)							
(U) Ultrasonic; (U) Non-Invasive; (U) Foreign Body; (U) Locator							
28. TECHNICAL OBJECTIVE, 29. APPROACH, 30. PROGRESS (Provide individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) A need exists for a non-invasive, portable device for locating metallic and non-metallic foreign bodies in combat patients for use at field military hospitals.							
24. (U) An existing technique utilized for range and altitude information employed in the radio frequency part of the spectrum will be modified to operate in the ultrasonic range. By suitable selection at the fixed and variable parameters, the information will be shifted from the frequency domain to the spacial domain and this will eliminate the need for sophisticated spectral analysis equipment.							
25. (U) 7810 - 8010. Using existing laboratory equipment, an ultrasonic transmitter was fabricated. The receiver portion consisted of a pre-amplifier, mixer and a 10 KC filter. Using a water media, discontinuities of approximately 1.25 mm could be detected. The approach appears feasible but increased receiver's gain is required as well as an automatic gain control to allow for the 60 db variation in signal strength. Because of a higher priority program, no additional effort was expended. The project was terminated when it appeared that no effort could be scheduled in the near future.							

DETAIL SHEET

TITLE: Foreign Body Locator, Ultrasonic, Non-Invasive

FUNDING HISTORY: PY - OK; CY - OK; BY - OK

PROBLEM DEFINITION: To develop a system for the non-invasive location of foreign bodies within the wounded soldier.

IMPORTANCE: A need exists for a non-invasive, portable device for locating metallic and non-metallic foreign bodies in combat patients for use at field military hospitals. This would be used when x-ray would be unavailable.

APPROACH: An existing technique utilized for range and altitude information employed in the radio frequency part of the spectrum will be modified to operate in the ultrasonic range. By suitable selection at the fixed and variable parameters, the information will be shifted from the frequency domain to the spacial domain and this will eliminate the need for sophisticated spectral analysis equipment.

ACHIEVEMENTS: Using existing laboratory equipment for the transmitter portion (10 MHZ voltage controllable oscillator and a low frequency function generator) a system was implemented. The receiver portion consisted of a 10 MHZ preamplifier, a broad band mixer and a 10 KHZ narrow band pass filter.

Using an oscilloscope as the detector and commercial crystals from an ultrasonic blood flow meter, discontinuities of approximately 1.25 mm in a water media could be detected. Using fixed parameter, it would be possible to calibrate modulations amplitude in mm and thus provide a calibrated output. This project was terminated when it became apparent that no further effort could be expended due to higher priority programs.

RELATIONSHIP TO CORE PROGRAMS: This ILIR project is in accord with the Laboratory's mission of providing simple, reliable diagnostic equipment for field use.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL	
				DA OB 6239	80 10 01	DD DR&E(AR)036	
3. DATE PREV. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY.	6. WORK SECURITY	7. REGRADING	8. DESGN INSTRN	9. SPECIFIC DATA CONTRACTOR ACCESS	10. LEVEL OF SUB
79 10 01	H. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
11. NO. CODES	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	61101A	3A161101A91C	00	015 APC F159			
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) (U) Development of a Rearing and Colonization System for Laboratory Evaluation of Integrated Pest Management Program for Black Flies (Simuliidae)							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7/310		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER				80		0.1	
C. TYPE				FISCAL YEAR		06	
D. KIND OF AWARD				81		0.0	
E. CUM. AMT.						00	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS:				ADDRESS:			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Frommer, R.L.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Kardatzke, J.T.			
				NAME: Hembree, S.C.			
				POC: DA			
23. KEYWORDS (Precede EACH with Security Classification Code) (U) Disease Vectors; (U) Arthropod Control; (U) Integrated Control; (U) Black Flies							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a rearing and colonization system for laboratory evaluation of an integrated pest management program for black flies (Simuliidae).							
24. (U) Using experimental methods previously used for other species of black flies, colonization of <u>Similium vittatum</u> , the pest at Holston, was initiated. This method involved development of field collection and transportation methods and creation of an in-laboratory artificial rearing system. In addition, several rearing and colonization systems for rapid screening of various control strategies have been and are to be constructed and tested. Each system will be tested in view of obtaining a rapid operational assessment of a control method using an artificial system which simulated the natural environment.							
25. (U) 7910 - 8010. Project was terminated because a basic system for laboratory rearing and colonization was unable to be established. The present state-of-the-art for accomplishing such a system has not been fully established; at least not to support the requirements of producing large numbers (1,000s) of immature black flies for continuous (daily) laboratory bioassays. Systems at civilian agencies have fallen short of projected expectations in producing large numbers of specimens through rearing and colonization.							

DETAIL SHEET

TITLE: Development of a Rearing and Colonization System for Laboratory Evaluation of Integrated Pest Management Program for Black Flies (Simuliidae)

FUNDING HISTORY: PY - 10K; CY - 6K; BY - 0K

PROBLEM DEFINITION: To develop a system for laboratory evaluation of integrated pest management potential for black flies.

IMPORTANCE: Black flies represent both a nuisance and medical problem to the military. In tropical areas they are significant vectors of onchocerciasis. At several military installations, such as Fort Drum, NY and Holston Army Ammunition Plant, Kingsport, TN, large concentrations of black flies have caused reduced productivity and restricted area availability for training. There currently exists no established operational system for evaluating control strategies for black flies.

APPROACH: Using experimental methods previously used for other species of black flies, colonization of Similium vittatum, the test at Holston, was initiated. This method involved development of field collection and transportation methods and creation of an in-laboratory artificial rearing system. In addition, several systems for rapid screening of various control strategies have been and are to be constructed and tested. Each system will be tested in view of obtaining a rapid operational assessment of a control method using an artificial system which simulated the natural environment.

ACHIEVEMENTS: Project terminated because a basic system for a self-contained colony of black flies is not technically and economically feasible. Current state-of-the-art technology could not provide adequate specimens to maintain research effort. Field collection of required specimens was more economical and trustworthy.

RELATIONSHIP TO CORE PROGRAM: In order to evaluate any integrated pest management program, a system must be developed where the black flies can be reared and maintained in a stable laboratory environment. This project provides a technology base for our integrated pest management program against black flies.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV SUMMARY 80 08 28	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SEC ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DISSEM INSTR ^a NL	9. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	10. LEVEL OF SUB A. WORK UNIT
10. NO. CODES ^a		PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY		61101A	3A161101A91C	00	066 APC 174		
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) ^a (U) Silver Chloride Photovoltaic Cell							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 000450 Conversion Techniques; 008300 Inorganic Chemistry							
13. START DATE 8007		14. ESTIMATED COMPLETION DATE 8009		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		C. CURRENT	
C. TYPE:				80		0.0	
D. AMOUNT:				81		0.2	
E. KIND OF AWARD:				10			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: ^a Hoke, S.H.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Photocell; (U) Solar Cell; (U) Photovoltaic							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To determine whether or not a photocell can be constructed using silver chloride to produce electricity from light.							
24. (U) Initially a literature search will be conducted. Then a photocell will be designed and constructed. Parameters will be varied in order to determine the optimum conditions for converting sunlight to electricity.							
25. (U) 8008 - 8010. A literature search has been conducted and materials and chemicals have been ordered. A preliminary cell has been designed.							

DETAIL SHEET

TITLE: Silver Chloride Photovoltaic Cell

FUNDING HISTORY: PY - 0K; CY - 2K; BY - 10K

PROBLEM DEFINITION: The objective of this project is to design and evaluate a photovoltaic cell made from the photoactive compound silver chloride.

IMPORTANCE: The U.S. Army has always been a leader in developing new technologies. This photovoltaic cell could provide an economical source of electrical power to remote installations and would prove valuable, therefore, to both the military and the private sector.

APPROACH: A literature search will be conducted initially. The photocell will then be designed and constructed. The performance of the cell will be evaluated by varying parameters to determine the optimum conditions for converting sunlight into electricity.

ACHIEVEMENTS: A literature search has indicated no research activity in this area. Materials and chemicals have been procured. A preliminary cell has been designed and constructed. A change in electrical potential is observed when this cell is placed in the light path of a sunlamp.

RELATIONSHIP TO CORE PROGRAM: This type of cell could provide power for water purification systems and pollution control monitoring instrumentation in remote locations. Also, the cell would not pollute the environment as many other energy sources currently do.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DES'N INSTR ^a	9a. SPECIFIC DATA - CONTRACTOR ACCESS ^a	9. LEVEL OF SUB ^a
80 08 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO / CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
61101A		3A161101A91C		00		067 APC F175	
11. CONTRIBUTING							
12. CONTRIBUTING							
13. TITLE (Precede with Security Classification Code) ^a							
(U) Formation and Evaluation of Specific Adsorbent Surfaces							
14. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 008000 Industrial Process; 012100 Organic Chemistry							
15. START DATE		16. ESTIMATED COMPLETION DATE		17. FUNDING AGENCY		18. PERFORMANCE METHOD	
8008		8109		DA		C. In-House	
19. CONTRACT / GRANT				20. RESOURCES ESTIMATE		21. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER:				80		0.0	
c. TYPE:				CURRENT		19	
d. KIND OF AWARD:				81		0.3	
e. CUM. AMT.							
22. RESPONSIBLE DOD ORGANIZATION				23. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: Kulkarni, R.K.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
24. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
25. KEYWORDS (Precede EACH with Security Classification Code) (U) Adsorption; (U) Pesticides; (U) Dyes; (U) Mechanism; (U) Wastewater; (U) Hazardous Waste							
26. TECHNICAL OBJECTIVE, 27. APPROACH, 28. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To consolidate the pertinent data in literature regarding the specific adsorbent surfaces on silica gel for azo dyes, and to investigate the feasibility of preparation of specific adsorbents for pesticides like chlordane, malathion, baygon and wetting agents like triton. To prepare the adsorption isotherms, Langmuir plots, and BEI plots from the data obtained. If time permits, to study the formation of specific adsorbents from Fe, Al, Sn and Ti hydroxides, and study their properties.							
24. (U) Literature search will be made on synthetic polymers as absorbents (specific) and the use of polymers in preparation of antibodies. The specific adsorbents will be prepared as described in 23 and study their properties. Pertinent polymers expected to have desired characteristics will be purchased or custom made, and subjected to study as specific adsorbents.							
25. (U) 8008 - 8010. A protocol was prepared for the experimental work needed to confirm the specific results on silica gel adsorbents. A survey of the literature on the preparation of synthetic copolymers for specific adsorption was carried out. The preparation and evaluation of the adsorbents is scheduled for FY81.							

DETAIL SHEET

TITLE: Formation and Evaluation of Specific Adsorbent Surfaces

FUNDING HISTORY: PY - OK; CY - 12K; BY - 19K

PROBLEM DEFINITION: This study involves the preparation of specific adsorbent surfaces on silica gel under acid pH and aluminum hydroxide in alkaline pH for ethyl orange or methyl orange, and evaluation through the study of adsorption isotherms. This study may lead to the study of the cross-linked heme and block copolymers for dyes and pesticides.

IMPORTANCE: This study is important in elucidation of the behavior of Si and Al gels as template-like specific adsorbents, for any organic molecules. This behavior, if proved to be true, may lead to the preparation of high potency adsorbents for the pollutants in wastewater. Such adsorbents may facilitate the treatment of Army-unique or relevant wastewater for removal of pesticides and other toxic substances.

APPROACH: The preparation and evaluation of silica gels in the presence of methyl or ethyl orange, and also, p-chlorophenyl methyl sulfone, in order to reproduce and establish the data available in the literature. Then the same technique may be established for other pesticides and pollutants. The silica gels can be modified by aluminum hydroxide or chlorosilicon compounds, to suit the adsorbent surfaces to the structure of the pollutants.

ACHIEVEMENTS: A protocol was prepared for the experimental work needed to confirm the specific results on silica gel adsorbents. A survey of the literature on the preparation of synthetic copolymers for specific adsorption was carried out. Five different silica gel adsorbents for ethyl orange and p-chlorophenyl methyl sulfone have been prepared. The study of their adsorption isotherms will be continued in FY81.

RELATIONSHIP TO CORE PROGRAM: The basic concept of producing a highly efficient specific adsorbent with capability of regeneration, is useful in the research program for removal of toxic contaminants that have been found in waste streams and ground water at Army installations.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ¹	7. DATE OF SUMMARY ²	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREPARED ³	4. KIND OF SUMMARY ⁴	5. WORK SECURITY ⁵	6. REGRADING ⁶	8A. DISSEM INSTN ⁸	8B. SPECIFIC DATA- CONTRACTOR ACCESS ⁹	9. LEVEL OF SUB A. WORK UNIT	
7/9 10 01	U. TERMINATION	U		NL	☒ YES ☐ NO		
10. NO./CODES ¹⁰	11. PROJECT NUMBER	12. TASK AREA NUMBER		13. WORK UNIT NUMBER			
A. PRIMARY	61301A	5A:01101A91C		00		311 APC F131	
B. CONTRIBUTING							
C. CONTRIBUTING							
14. TITLE (Provide with Security Classification Code)							
(U) Sterilization Techniques Using High Boiling Point Fluids							
15. SCIENTIFIC AND TECHNOLOGICAL AREA ¹⁵							
010100 Microbiology; 009800 Medical and Hospital Equipment							
16. START DATE		17. ESTIMATED COMPLETION DATE		18. FUNDING AGENCY		19. PERFORMANCE METHOD	
7609		8006		DA		C. In-House	
20. CONTRACT/GRANT				21. RESOURCES ESTIMATE		22. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE				B. PREVIOUS		C. FUNDS (in thousands)	
B. NUMBER				FISCAL YEAR		0.0	
C. YEAR				CURRENT		00	
D. KIND OF AWARD				80		0.1	
E. CUM. RATE						06	
23. RESPONSIBLE GOV ORGANIZATION				24. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Prenskey, W.C.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE (301) 663-7237; AUTOVON 343-7237			
25. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
26. KEYWORDS (Furnish with Security Classification Code)							
(U) Sterilizers; (U) Field Sterilizers; (U) Fluids; (U) High Boiling Point							
27. TECHNICAL OBJECTIVE ²⁷ AS APPROACH, AS OF APPROACH (Provide text of each with Security Classification Code.)							
23. (U) To search for high boiling-point fluids effective as sterilization media at much lower positive pressures than in current steam sterilization practice.							
24. (U) Complete a literature search for non-toxic, non-corrosive candidate fluids. Modify a standard steam sterilizer to operate at lower positive pressures corresponding to 250-270 F saturation temperatures of these fluids. Measure killing ability with spore strips.							
25. (U) 1910 - 2001. Data terminated due to insufficient funds.							

DETAIL SHEET

TITLE: Sterilization Techniques Using High Boiling-Point Fluids

FUNDING HISTORY: PY - OK; CY - OK; BY - OK

PROBLEM DEFINITION: Modern steam sterilizers utilize saturated steam at 270°F or more which is equivalent to pressures of 27 psig or greater. This results in disadvantages especially important in field sterilizer design which are the requirements for thick and heavy pressure vessels and doors and difficult pressure seals at the doors. If a suitable fluid with a higher boiling point than water was used as a sterilant, the chamber pressure at 270°F could be much lower than 27 psig resulting in a lighter and safer sterilizer. If the resulting pressure was less than 15 psig, its design and construction would not fall under the jurisdiction of the ASME Boiler and Pressure Vessel Code which would be likely to reduce costs.

IMPORTANCE: Reduces weight and cost of field sterilizers with increased safety.

APPROACH: Select a sterilant fluid which has desired thermodynamic characteristics and is non-toxic, non-corrosive and reasonably inexpensive. Select a simple gravity displacement sterilizer, modify and instrument it as necessary and make runs establishing operating parameters and spore killing capability. Pass ILIR into next phase which would be design, construction and evaluation of a lightweight sterilizer using this principle and comparison with a similar, conventional machine.

ACHIEVEMENTS: Earlier work in this study (F131) established butanol as a candidate fluid. It has a boiling point at atmospheric pressure of about 244°F and a calculated pressure as a saturated vapor at 270°F of less than 8 psig. Tests with integrating steam sterilization indicators were successful, but no actual spore tests had been run at the time that the program was suspended. Study has now been terminated due to lack of sufficient funds.

RELATIONSHIP TO CORE PROGRAM: At least four programs are underway at this Laboratory involving field steam sterilizers.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL	
				DA DB 6224	80 10 01	DD-DR&E(AR)636	
3. DATE PREV. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCY	6. WORK SECURITY	7. REVISION	8. DISSEMINATION	9. SPECIFIC DATA CONTRACTOR ACCESS	10. LEVEL OF BUN
79 10 01	D. CHANGE	U	U		HL	☒ YES ☐ NO	A. WORK UNIT
11. NO. CODES	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	61101A	3A161101A91C	00	315 APC F152			
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) (U) Development of System for Laboratory Evaluation of Biological Control Potential of Arthropod Pathogens for Medically Important Arthropods							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS							
005000 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7708		8103		DA		C. In-House	
17. CON. AACT/GRANT				18. RESOURCES ESTIMATE			
A. DATES/EFFECTIVE		EXPIRATION		B. PROFESSIONAL MAN YRS		C. FUNDS (in thousands)	
A. NUMBER				0.3		32	
C. TYPE		D. AMOUNT		0.1		5	
E. KIND OF AWARD		F. COM. AMT					
19. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish JEAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Hembree, S.C.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Nelson, J.H.			
				NAME: Van Essen, F. PQC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pathobiology; (U) Insect Pathology; (U) Disease Vectors; (U) Arthropod Control; (U) Biological Control; (U) Integrated Control							
23. (U) To develop a system for laboratory evaluation of biological control potential of arthropod pathogens for arthropods of medical importance.							
24. (U) Two protozoan mosquito pathogens of Thai <u>Aedes aegypti</u> will be used as models to develop and test protocols for the preliminary evaluation of the efficiency, safety, mass production potential, storage characteristics, and resistance to denaturation in the environment, of candidate biological control agents for mosquitoes.							
25. (U) 7910 - 8010. Efficiency studies have been completed as originally planned and expanded upon to find a dose of each pathogen that would provide at least 80% control to all age larvae by the time the mosquitoes were old enough to take a second blood meal. Developmental cycle of the Helicosporidian has been studied and found to be similar to that of <u>Helicosporidium parasiticum</u> . The life cycle of the microsporidian, a new species, has been elucidated, and the species is being described. Safety testing has not been done, but a protocol has been developed which parallels WHO recommendations.							

GENERAL SUMMARY

TITLE: Development of Types for Biological Control
Potential of Antigenic Protein of Several Important Arthropods

FUNDING HISTORY: PY - 72K; CY - 12K; FY - 40

PROBLEM DEFINITION: Mosquitoes are being used in the culture and forestry for the biological control of insect pests. Several hundred mosquito pathogens have been identified but only a few have been successfully produced commercially as control agents for mosquitoes. They have never been studied to assess their potential as mosquito control agents. Further study is needed to permit the selection of mosquito pathogens for production, storage and development as biological control agents.

IMPORTANCE: Public concern in environmental pollution by conventional chemical pesticides and strains of resistance to insecticides in pest populations signal the need for development of new technology for integration with presently available techniques for effective, efficient, efficient pest management with minimum environmental pollution.

APPROACH: Two species of mosquito pathogens were being used as models to develop and evaluate procedures for the evaluation of safety, efficiency, mass production potential, stability and resistance to denaturation by environmental factors.

ACHIEVEMENTS: Efficiency studies have been completed as originally planned and expanded upon to find a dose of each organism that would provide at least 20% control to all age larvae by the time the mosquito were old enough to take a second blood meal. Developmental cycle of the *Helicospiridium* has been studied and found to be similar to that of *Helicospiridium parasiticum*. The life cycle of the microsporidian, a new species, has been elucidated, and the species is being described. Little testing has been done, but a protocol has been developed which parallels all recommendations.

RELATIONSHIP TO CORE PROGRAM: Biological control methods are one of the triad of control methods available to a vector control program. Project is providing technical base for this part of the vector control system against mosquitoes.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION		2. DATE OF SUMMARY		REPORT CONTROL SYMBOL													
				DA 00 0701		80 10 01		DD-DR&E(AR)636													
3. DATE PREPARED		4. DATE OF SUMMARY		5. SUMMARY		6. WORK SPECIFICITY		7. REPORTING													
79 11 01		80 10 01		U		U		U													
8. PRIMARY		9. SECONDARY		10. PROJECT NUMBER		11. TASK ORDER NUMBER		12. WORK UNIT NUMBER													
61000		34161301A310		90		316		APC F164													
13. TITLE		14. EFFECTS OF <i>Bacillus thuringiensis</i> var. <i>israelensis</i> on Selected Non-Target Invertebrates																			
15. TECHNICAL ABSTRACT		16. ESTIMATED COMPLETION DATE																			
005000 Environmental Biology, 002000 Biology		11/10																			
17. CONTRACT		18. FUNDING AGENCY		19. PERFORMANCE METHOD		20. RESOURCES ESTIMATE															
DA 00 0701		DA		C. In-House		<table border="1"> <thead> <tr> <th colspan="2">21. PROFESSIONAL MAN YRS</th> <th colspan="2">22. FUNDS (in thousands)</th> </tr> </thead> <tbody> <tr> <td>80</td> <td>0.0</td> <td>00</td> <td></td> </tr> <tr> <td>81</td> <td>0.1</td> <td>10</td> <td></td> </tr> </tbody> </table>				21. PROFESSIONAL MAN YRS		22. FUNDS (in thousands)		80	0.0	00		81	0.1	10	
21. PROFESSIONAL MAN YRS		22. FUNDS (in thousands)																			
80	0.0	00																			
81	0.1	10																			
23. RESPONSIBLE ORGANIZATION		24. PERFORMING ORGANIZATION																			
US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701		US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701																			
25. PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)		26. NAME																			
Van Essen, F.W.		Van Essen, F.W.																			
27. TELEPHONE		28. SOCIAL SECURITY ACCOUNT NUMBER																			
(301) 663-7237; AUTOVON 343-7237																					
29. ASSOCIATE INVESTIGATOR		30. NAME																			
Reimbrey, S.C.		Reimbrey, S.C.																			
31. NAME		32. POC: DA																			
Fronnier, R.L.		Fronnier, R.L.																			
33. KEYWORDS (Provide each with Security Classification Code) (1) Pathobiology; (2) Invertebrate Pathology; (3) Biological Control; (4) Integrated Pest Management																					
34. TECHNICAL ABSTRACT (A. APPROACH; B. PROGRESS; C. CONCLUSIONS; D. RECOMMENDATIONS; E. REFERENCES; F. SUMMARY; G. OTHER) (Provide text of each with Security Classification Code.)																					
23. (U) To assess the safety of a new prospective biological control agent for mosquito, <i>Bacillus thuringiensis</i> var. <i>israelensis</i> , for selected non-target organisms representing insect, decapod arthropods, fish, and molluscs.																					
24. (U) Numerous prey organisms, representing insect and decapod arthropods, fish, and molluscs, will be determined and identified in a study area where field trials of <i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Bt) are to be conducted. Bioassays will be conducted to assess the safety of Bt for the selected non-target organisms.																					
25. (U) Numerous prey organisms, representing insect and decapod arthropods, fish, and molluscs, will be determined and identified in a study area where field trials of <i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Bt) are to be conducted. Bioassays will be conducted to assess the safety of Bt for the selected non-target organisms.																					

DETAIL SHEET

TITLE: Effects of Bacillus thuringiensis var. israelensis on Selected Aquatic Non-Target Organisms

FUNDING HISTORY: PY - OK; CY - OK; BY - 10K

PROBLEM DEFINITION: When releasing Bacillus thuringiensis israelensis (Bti) into the aquatic environment in an effort to control mosquitoes, we should know what effects it may have on other organisms that share the habitat.

IMPORTANCE: Registration of Bti by Environmental Protection Agency (EPA) for use against mosquitoes is contingent upon demonstration of safety to non-target organisms. Data generated by this effort will contribute to the process of registration.

APPROACH: The most common insects, decapods, fish and mollusks will be collected at Ft. Eustis, VA and brought back to the laboratory and bioassays will be performed to assess their vulnerability to Bti.

ACHIEVEMENTS: Task postponed until FY81 due to shortage of funds.

RELATIONSHIP TO CORE PROGRAM: Project involved technical base development in the area of vector control and environmental quality.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL	
				DA 06 0673	80 10 01	DD-DR&E(AR)636	
3. DATE PREV. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8. DISSEM INSTR	9. SPECIFIC DATA CONTRACTOR ACCESS	10. LEVEL OF SUM
79 10 01	D.CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES		PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY		61101A	3A161101A91C	00		317 APC F165	
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) (U) Comparative Pathology of <u>Bacillus thuringiensis</u> var. <u>israelensis</u> in <u>Aedes aegypti</u> and <u>Simulium vittatum</u>							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8108		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER:				FISCAL YEAR		C. CURRENT	
C. TYPE:				80		0.1 08	
D. KIND OF AWARD:				81		0.3 25	
E. AMOUNT:							
F. CUM. AMT.							
20. RESPONSIBLE OOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS:				ADDRESS:			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Hembree, S.C.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J.H.			
				NAME: Van Essen, F.W. POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code) (U) Pathobiology; (U) Insect Pathology; (U) Disease Vectors; (U) Arthropod Control; (U) Biological Control; (U) Integrated Control							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To determine the site of action and time and dose related structural changes caused by <u>Bacillus thuringiensis</u> var. <u>israelensis</u> in <u>Aedes aegypti</u> and <u>Simulium vittatum</u> at the light microscope and ultrastructural level.							
24. (U) Histopathological and ultrastructural methods, well established in the study of <u>Bacillus thuringiensis</u> in lepidopteran agricultural pests, will be adapted to study the pathology of <u>B. thuringiensis</u> var. <u>israelensis</u> in mosquitoes and black flies. Site of action and dose and time related structural changes will be studied at the light microscope and ultrastructural level. Information derived will facilitate the process of registration of this important new prospective biological control agent for use against black flies and mosquitoes.							
25. (U) 7910 - 8010. Bioassays have related dose to time of death, an essential first step in this project. Specimens have been treated, collected at various times after treatment at selected dosages, and preserved for histological examination.							

DETAIL SHEET

TITLE: Comparative Pathology of Bacillus thuringiensis var. israelensis in Aedes aegypti and Simulium vittatum

FUNDING HISTORY: PY - OK; CY - 8K; BY - 25K

PROBLEM DEFINITION: Bacillus thuringiensis var. israelensis (Bti) is nearing commercial availability as the first economical, effective biological control agent for mosquitoes and black flies. Definitive studies of its pathology and mode of action have not yet been published.

IMPORTANCE: Decisions concerning the suitability of this agent for use within the military pest management context should consider the mechanism by which it kills target pests as well as data from bioassay and field studies already underway.

APPROACH: Specimens exposed to Bti for different times will be prepared for histopathological examination by conventional light microscope and ultrastructural methods. Site of action and the development of pathology will be described. These observations should provide approaches to mode of action studies.

ACHIEVEMENTS: Bioassays have related dose to time of death, an essential first step in this project. Specimens have been treated, collected at various times after treatment at selected dosages, and preserved for histological examination.

RELATIONSHIP TO CORE PROGRAM: This project involves development of a technology base in the mode of action of the emerging methodology for using insect pathogens as part of a comprehensive vector control program.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA OG 0674	80 10 01	DD-DR&E(AR)436	
3. DATE PREVIOUS SUMMARY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DES'N INSTR'N	8B. SPECIFIC DATA CONTRACTOR ACCESS ^a	9. LEVEL OF SUM ^a
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	61101A	3A161101A91C		00		318 APC FT66	
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) ^a (U) Development of an Automated Toxicant Screening Test Based on the Ventilatory Responses of Fish							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 005900 Environmental Biology; 016800 Toxicology; 012900 Physiology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
8010		8109		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PREVIOUS			
B. NUMBER:				FISCAL YEAR		C. FUNDS (in thousands)	
C. TYPE:				80		0.1	
D. KIND OF AWARD:				81		0.4	
E. CUM. AMT.						14	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Pursuit SSAN if U.S. Academic institution)			
NAME: Gensler, J.D., LTC (P)				NAME: ^a van der Schalie, W.H.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Pace, R.R.			
				NAME:			
				POC: DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Fish; (U) Toxicants; (U) Automated; (U) Ventilatory; (U) Screening							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Pursuit individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Evaluation of a screening test designed to estimate the chronic toxicity of materials to fish by a technique requiring considerably less time and expense than currently available methods. The test will be used in conjunction with a program to assess the environmental hazards associated with Army-relevant materials.							
24. (U) A microcomputer-based system will be used to monitor the ventilatory patterns of 30 bluegill sunfish exposed in groups of five to a series of toxicant concentrations. The lowest concentration affecting the ventilatory patterns will be compared to literature values for the lowest concentration of the same toxicant affecting bluegill survival, growth or reproduction during long-term exposure. The ability of the ventilatory monitoring system to predict chronic toxic effect levels will then be determined.							
25. (U) 7910 - 8010. The necessary microcomputer hardware and software for monitoring 30 fish have been completed. A toxicant delivery device is 80% completed. Literature values for the lowest concentration of 13 substances having toxic effects on bluegills during chronic exposure have been obtained.							

DETAIL SHEET

TITLE: Development of an Automated Toxicant Screening Test Based on the Ventilatory Responses of Fish

FUNDING HISTORY: PY - OK; CY - 4K; BY - 14K

PROBLEM DEFINITION: Current methods for determining the chronic effects of toxic materials on fish are costly and time consuming. A faster, less expensive screening test to estimate chronic effect levels would be quite useful. One possible method is based on recent evidence indicating a relationship between the concentrations of a toxicant causing chronic effect on fish growth, reproduction, and survival and the concentration causing abnormal fish ventilatory patterns. The goal of this project is to test this relationship using an automated system for monitoring the ventilatory signals of fish.

IMPORTANCE: A large number of materials are generated at Army facilities and discharged into receiving bodies of water. Regulatory requirements make the Army responsible, in many cases, for determining the impact of these materials on aquatic life. Only a very small number of these chemicals can be tested using full-life cycle tests with fish. The development of a sensitive screening test that could be used to estimate chronic toxic effect concentrations would save time, money, and would help set testing priorities so that limited resources could be used for those materials having the greatest potential toxicity. The chemicals in question are unique to the Army.

APPROACH: An automated system has already been developed to monitor the ventilatory patterns of 30 bluegill sunfish. Toxicants tested will be those for which the chronic toxicity to bluegills has already been determined. Comparison of these literature values with effect levels found in the ventilatory monitoring tests should indicate the usefulness of the monitoring system as a screening test for chronic toxicity.

ACHIEVEMENTS: A paper describing the basic test methodology has been published.¹ Data has been taken from several fish to provide a basis for the development of statistical methods for data analysis. A toxicant dilution system is being calibrated. Thirteen toxicants for which chronic effect levels for bluegills are known have been identified; materials will be selected from this list for use in evaluating the monitoring system.

RELATIONSHIP TO CORE PROGRAM: An important part of this Laboratory's responsibility for determining the environmental hazards posed by munitions wastes and other Army-related materials is to estimate the effects of these materials on aquatic organisms. One of the most sensitive and meaningful laboratory tests that can be conducted is a full-life cycle test with fish, but unfortunately this test is both lengthy and expensive. This ILIR project explores the use of a short-term screening test as a means to estimate the effect level of a toxicant in a full-life cycle test. If successful, the screening test would allow testing of many materials in a relatively short time and would aid in the setting of testing priorities and in the allocation of resources.

¹ van der Schalie, W.H. 1980. A new technique for automatic monitoring of fish ventilatory patterns and its possible use in screening tests for chronic toxicity. In J. Eaton, R. Parrish, and A. Hendricks, ed. Aquatic Toxicology, Proc. Third Aquatic Toxicology Symp., Spec. Tech. Publ. 707, American Society for Testing and Materials, Philadelphia, PA.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY 79 10 01	4. KIND OF SUMMARY K. COMPLETION	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. ORIGIN INSTR ^a NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUB A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	61101A	3A161101A91C		00		319 APC F167	
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) ^a (U) Chemistry and Molecular Biology of the Disinfection Process							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 007800 Hygiene and Sanitation; 005400 Environmental Biology; 010100 Microbiology							
13. START DATE 7910		14. ESTIMATED COMPLETION DATE 8009		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL		80 0.0 03	
C. TYPE:				CURRENT		81 0.0 00	
D. KIND OF AWARD:				E. AMOUNT:		F. CUM. AMT.	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering ADDRESS: ^a Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering ADDRESS: ^a Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Gensler, J.D., LTC (P) TELEPHONE: (301) 663-2014; AUTOVON 343-2014				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: ^a Dennis, W.H., Jr. TELEPHONE: (301) 663-2036; AUTOVON 343-2036 SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS NAME: Mitchell, W.R. NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Disinfection; (U) Virus; (U) Chlorination; (U) Water							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRAM (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) To investigate the chemistry and molecular biology of virus disinfection by hypochlorous acid, hypochlorite ion and monochloramine. 24. (U) The physical and chemical characteristics of protein and RNA derived from chlorine-inactivated f2 virus will be studied. Physical characteristics can be determined through gel electrophoresis. The behavior of RNA from inactivated f2 will be studied in cell-free extracts. The goal of these investigations will be to find which steps in the process of f2 infection are blocked by the disinfectant. 25. (U) 7910 - 8008. A paper was presented in FY80 at the Third Conference on Water Chlorination: Environmental Impact and Health Effects, Colorado: "Reactions of Chlorine and Chloramines with Nucleic Acids Under Disinfection Conditions," by Olivieri, Dennis, Snead, Richfield, and Kruse. Much of the planned molecular biology was independently performed by D.C. Young at the University of North Carolina. Her results have proven our hypothesis on the mechanism of virus disinfection by chlorine.							

DETAIL SHEET

TITLE: Chemistry and Molecular Biology of the Disinfection Process

FUNDING HISTORY: PY - OK; CY - 3K; BY - OK

PROBLEM DEFINITION: To investigate the chemical reactions occurring in a virus undergoing disinfection by free or combined chlorine. To determine the loci of chlorine interaction with nucleic acids. To study the reactions of chlorine with biological materials and determine products of such reactions under the conditions of water disinfection.

IMPORTANCE: While chlorine has been used extensively for the last 80 years to disinfect water and wastewater, surprisingly little information has been available concerning the mode of inactivation of microorganisms with chlorine. Current concern for the formation of mutagenic and carcinogenic agents during disinfection underscores the necessity for understanding the interaction between chlorine and related species with biological materials. Further information on these reactions would provide a better understanding of disinfection mechanism and the possible adverse effects of water chlorination. This work is relevant to Army requirements for field disinfection of water for troop consumption.

APPROACH: The physical and chemical characteristics of protein and RNA derived from chlorine-inactivated f2 virus will be studied. Physical characteristics can be determined through gel electrophoresis. The behavior of RNA from inactivated f2 will be studied in cell-free extracts. The goal of these investigations will be to find which steps in the process of f2 infection are blocked by the disinfectant.

ACHIEVEMENTS: A paper was presented in FY80 at the Third Conference on Water Chlorination: Environmental Impact and Health Effects, Colorado: "Reactions of Chlorine and Chloramines with Nucleic Acids Under Disinfection Conditions," by Olivieri, Dennis, Snead, Richfield, and Kruse. A second paper was prepared for publication in Water Research, "Inactivation of Virus with Chlorine and Related Species," by Olivieri, Dennis, Snead, Richfield, and Kruse. Little time could be found for laboratory studies during FY80. However, much of the molecular biology that was planned was independently performed by D.C. Young at the University of North Carolina. Her results have proven our hypothesis on the mechanism of virus disinfection by chlorine.

RELATIONSHIP TO CORE PROGRAM: This research is related to requirements being defined in this Laboratory's Field Sanitation and Water Research Area.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL ^a	
				DA 06 0671	80 08 29	DD-DR&E(AR)636	
3 DATE PERIOD ^a	4 WORK SECURITY ^a	5 REGRADING ^a	6 DISSEM INSTR ^a	7 SPECIFIC DATA CONTRACTOR ACCESS ^a	8 LEVEL OF SUM ^a		
79 10 01	U		NL	☒ YES ☐ NO	A. WORK UNIT		
10 NO. CODE ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	61201A	3A161101A91C	00	320	APL F168		
B. CONTRIBUTING							
C. CONTRIBUTING							
11 TITLE (Provide with security classification code) ^a							
(U) Studies of the Mechanism of Chlorine Disinfection of Poliovirus I at pH 5							
12 SCIENTIFIC AND TECHNOLOGICAL AREA ^a							
005000 Environmental Biology; 010100 Microbiology; 007800 Hygiene and Sanitation							
13 START DATE		14 ESTIMATED COMPLETION DATE		15 FUNDING AGENCY		16 PERFORMANCE METHOD	
7910		8009		DA		C. In-House	
17 CONTRACT DATA ^a		18 RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS		B. FUNDS (in thousands)	
A. DATES EFFECTIVE:		PRECEDENCE					
B. NUMBER ^a		FISCAL YEAR		79		0.0	
C. TYPE		CURRENCY		80		0.2	
D. KIND OF AWARD		F. CUM. AMT.				10	
19 RESPONSIBLE COMMAND/AGENCY				20. PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering Research & Development Laboratory				NAME ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Provide SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME ^a Kenyon, K.F.			
TELEPHONE: (301) 663-2074, AUTOVON 343-2014				TELEPHONE: (301) 663-2340; AUTOVON 343-2340			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC: DA			
22 KEYWORDS (Provide with security classification code)							
(U) Poliovirus; (U) Disinfection; (U) Chlorination; (U) Anomaly							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Provide individual paragraphs identified by number. Precede text of each with security classification code.)							
23. (U) To ascertain the cause of the disinfection anomaly exhibited by Poliovirus I at pH 5.							
24. (U) Virus will be subjected to chlorination at pH 5 and then density gradient analyses. Virus will also be prepared to contain ³ H-label. Gradient samples will be counted for location of label and then compared to live virus counts. Experiments may proceed using ³⁶ Cl as well as ³ H.							
25. (U) 7910 - 8008. All enteroviruses tested by us (Cocksackie B3, Polio I) vaccine and Polio I (Dunhill) exhibit the same disinfection anomaly at pH 5. The anomaly is also observed in the disinfection of these viruses in bog water, pH 4.8. Although polio has been shown to aggregate at pH 5, it does not do so at the virus levels used in our testing because of the large dilution effect. Density gradient analyses of 2.0 mg/ml taken midway through the "hump" show label only at the top and bottom fractions indicating the presence of only degraded virus and large aggregates. We interpret this observation as follows: a) Polio aggregates spontaneously as chlorine is added. b) Chlorine destroys the outer virions on the aggregates, yielding degraded "pieces." c) Addition of this sample by sodium thiosulfate in phosphate buffered saline disrupts the clumps. We see an increase in virus titer in tissue culture. d) Chlorine eventually destroys aggregates, and the second linear decrease occurs.							

DETAIL SHEET

TITLE: Studies of the Mechanism of Chlorine Disinfection of Poliovirus I at pH 5

FUNDING HISTORY: PY - OK; CY - 10K; BY - OK

PROBLEM DEFINITION: Poliovirus I and other enteroviruses exhibit a "2-stage" disinfection curve at pH 5 with 2 mg/L free-available chlorine or less. The reason for this anomaly should be discovered.

IMPORTANCE: As a result of this disinfection anomaly at pH 5, disinfection of poliovirus proceeds faster at pH 7 than at pH 5. This finding is contrary to the accepted and generally true fact that microorganisms are inactivated faster at pH 5 than at pH 7. If fixed installation drinking water supplies are maintained by a 0.2 mg/L FAC residual at lower pH's, as specified by TBMED 229 (1980), many enteroviruses will not be inactivated in 30 min and some not at all.

APPROACH: Poliovirus I, ^3H labeled or unlabeled, will be subjected to chlorination at pH 5, followed by density gradient analyses. Location of poliovirus in the gradient, a function of the degree of clumping of virus particles, will be done by liquid scintillation counting and by live virus assay in tissue culture. Should results warrant its use, ^{36}Cl might be employed with the ^3H label to further elucidate the problem.

ACHIEVEMENTS: All enteroviruses tested by us (Cocksackie B3, Polio I (vaccine) and Polio I (Brunnhilde)) exhibit the same disinfection anomaly at pH 5. The anomaly is also observed in the disinfection of these viruses in bog water, pH 4.8. Although polio has been shown to aggregate at pH 5, it does not do so at the virus levels used in our testing because of the large dilution effect. Density gradient analyses of ^3H -polio taken midway through the "hump" show label only at the top and bottom fractions, indicating the presence of only degraded virus and large aggregates. We believe the mechanism is as follows:

- a. Poliovirus aggregates spontaneously as chlorine is added. Single virions are destroyed in seconds - the first linear decrease.
- b. Chlorine attacks the outer virions on the aggregates, yielding degraded "pieces." Neutralization of this sample by sodiumthiosulfate in PBS* dis-aggregates clumps. We see an increase in virus titer in tissue culture.
- c. Chlorine eventually destroys aggregates, and the second linear decrease occurs.

RELATIONSHIP TO CORE PROGRAM: This study produced data that will have direct consequences on the determination of chlorine disinfection criteria and will be a further step in the elucidation of disinfection mechanisms, also an objective of the core project (W.O. 640, DA OB 6936).

* plus 10% free available chlorine.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ²	2. DATE OF SUMMARY ²	REPORT CONTROL SYMBOL ²	
				DA OG 0658	80 10 01	DD-DR&E/AR)636	
3. DATE PRESENTED ²	4. KIND OF SUMMARY ²	5. COMM. SEC. ²	6. NON. SECURITY ²	7. REGRADING ²	8A. DISSEM INSTR. ²	8B. SPECIFIC DATA CONTRACTOR ACCESS ²	8. LEVEL OF SUM ²
79 10 01	U. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ²		11. PROJECT NUMBER		12. TASK AREA NUMBER		13. WORK UNIT NUMBER	
A. PRIMARY		B. CONTRIBUTING		C. CONTRIBUTING			
161101A		3F161101A91C		00		321 APC F169	
11. TITLE (Precede with Security Classification Code) ² (U) Development of Thin-Layer Chromatographic Procedures for the Rapid Analyses of Traces of Pesticides in Wastewater							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ²							
012100 Organic Chemistry; 012700 Physical Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8009		DA		C. In-House	
17. CONTRACT, GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/PERIOD				PRECEDING		B. FUNDS (in thousands)	
D. NUMBER ²				FISCAL YEAR		C. FUNDS (in thousands)	
E. TYPE				CURRENT		D. FUNDS (in thousands)	
F. KIND OF AWARD				80		0.1 08	
G. CUM. AMT.				81		0.2 15	
19. RESPONSIBLE ORG OR ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ² US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME ² US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS ²				ADDRESS ²			
21. INTERVIEW INFORMATION				22. PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Sawyer, J.D., LTC (P)				NAME ² Wade, C.W.P.			
TELEPHONE: (301) 356-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
23. GENERAL USE				24. ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Trybus, Theresa			
				NAME:			
25. KEYWORDS (Precede with Security Classification Code)							
(U) Thin-Layer Chromatography; (U) Mixed Pesticides; (U) Analysis; (U) Wastewater							
26. TECHNICAL OBJECTIVE ² 27. APPROACH 28. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
29. (U) To develop a rapid field method for the detection of traces of pesticides in effluent from Army carbon adsorption/filtration and sludge treatment systems. The methods may be used for detection of other pollutants such as dyes, munitions, and toxic substances in water.							
30. (U) Appropriate chromatographic procedures in the literature will be selected and integrated through research to give noninstrumental but precise systems for determining the pollutant quality of the water before and after treatment. The system will be designed to give numerous results quickly, and economically.							
31. (U) 7910 - 8010. Aqueous mixtures of pesticides have been completely separated into their individual carbamate, organophosphorus and halogenated compounds. Separations were done on thin-layer plates of silica gel using one solvent system (hexane/ethyl acetate, 2/1 v/v). As little as 10 and no more than 100 uL of the solution were needed for an analysis. Quantification of each component pesticide was achieved by comparing the sizes of spots of known with unknown concentrations. R _f values for the pesticides were: Dieldrin, 2.39; Dieldrin, 1.11; Diazinon, 1.66; Dursban, 1.26; and Dursban, 1.11. The pesticides with concentrations below 10 ppm, preadsorbents were detected with concentrations 100 fold or more. The single solvent system was used to separate the pesticides from effluents from an experimental carbon adsorption/filtration system. The investigators continuously monitored the operation for effectiveness and completeness and determined the quality of the treated water. Moreover, the pesticides, dieldrin, diazinon and vapona, were detected without any change using the method. The method appears to be feasible and reliable for use for pesti-							

DETAIL SHEET

TITLE: Development of Thin-Layer Chromatographic Procedures for the Rapid Analysis of Traces of Pesticides in Wastewater

FUNDING HISTORY: PY - 0K; CY - 8K; BY - 15K

PROBLEM DEFINITION: To determine if thin-layer chromatography (TLC) can be used in the field as an analytical technique for determining the quality of water produced by the treatment of aqueous pesticide waste at Army pest control facilities.

IMPORTANCE: Federal, State, and DA regulations prohibit the discharge of pesticide waste into sewer systems, into the soil, or into bodies of water unless the pesticide concentrations are below certain preestablished safe levels. To comply with these regulations, as well as reduce the storage of hazardous waste, Army pesticide waste treatment facility operators need a simple reliable system for determining the quality of treated wastewater and selecting the procedure for its disposal.

APPROACH: Chromatographic procedures found in the literature for specific pesticides will be evaluated and adapted to give a developing solvent mixture and adsorbent with potential for separation of mixture of pesticides.

ACHIEVEMENTS: In FY80, a chromatographic system using thin-layer plates and developing solution of hexane/acetone was used to separate and detect the pesticides, Baygon, Chlordane, Diazinon, Dursban, and Malathion in aqueous waste. The system was used successfully in the field at Ft Eustis, VA for the above pesticides. However, it also was used to effectively detect two other pesticides, Vapona and dimethoate that were thought to be in the aqueous waste. These seven pesticides represent a small percentage of the pesticides used at DA facilities, hence, a need exists to expand the number of pesticides to include more of the others commonly used by DA.

RELATIONSHIP TO CORE PROGRAM: Evaluation of the effectiveness of treatment programs is usually done in-house on expensive gas chromatographic equipment. This equipment is not suitable for field use. A need exists for a semiquantitative analytical system that can be operated successfully by anyone at a pest control facility. Because this Laboratory is designing and evaluating a treatment facility in its core program in response to a TRADOC request, a simple detection system would greatly facilitate the evaluation and be useful when such facilities are routinely updated.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL	
				DA CG 0657	80 10 01	DD DR&E(AR)636	
3. DATE PREV. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SEC. CLASS.	6. WORK SECURITY	7. REGRADING	8A. ORIGIN INSTR.	8B. SPECIFIC DATA: CONTRACTOR ACCESS	9. LEVEL OF SUM
79 10 01	II. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	61101A	3A161101A91C	00	322 APC F170			
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) (U) Investigation of the production of Trichloroacetic Acid During the Chlorination of Wastewater							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS							
007800 Hygiene and Sanitation; 012100 Organic Chemistry; 005900 Environmental Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8009		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER				FISCAL YEAR		80	
C. TYPE				CURRENT		0.0	
D. KIND OF AWARD						01	
E. CUM. AMT.				81		0.0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Provide SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: Siggins, B.A.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Dennis, W.P., Jr.			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Chlorination; (U) Trichloroacetic Acid; (U) Wastewater; (U) Formation							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRAM (Provide individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To look for the production of trichloroacetic acid (TCA) during the chlorination of water and determine the effect of dose and length of exposure on TCA production. To assess possible adverse effects through literature survey.							
24. (U) An analytical method will be chosen or modified for TCA analysis. Various waters will be dosed with chlorine at varying concentrations and lengths of time, then the TCA concentration will be determined. If TCA occurs in significant concentrations, a literature survey will be initiated to assess any adverse effects.							
25. (U) 7910 - 8010. Preliminary GC analysis has shown trichloroacetic acid to be in chlorinated tap water of Frederick and Baltimore, MD. A study by Linda Wilson (Hood College Intern, spring, 1980) showed that trichloroacetic acid is not broken down to chloroform at gastric pH levels. The first 6 months of the ILIR period was spent in attempts to repair and upgrade/overhaul the current GC/MS system. No other work was carried out, due to the failure of these efforts.							

DETAIL SHEET

TITLE: Investigation of the Production of Trichloroacetic Acid During the Chlorination of Wastewater

FUNDING HISTORY: PY - OK; CY - 1K; BY - OK

PROBLEM DEFINITION: To look for the production of trichloroacetic acid (TCA) during the chlorination of water and determine the effect of dose and length of exposure on TCA production. To assess possible adverse effects through literature survey.

IMPORTANCE: Trichloroacetic acid was found to be a constituent of Ft. Detrick tap water during a November 1977 experiment to develop a GC method for this compound. Subsequently, it was also found in Frederick City and Baltimore City waters. To our knowledge, this water contaminant has never been suspected in tap water and apparently forms during the chlorination of raw water. Presently, we know little about any adverse health or environmental impact this substance may have.

APPROACH: An analytical method will be chosen or modified for TCA analysis. Various waters will be dosed with chlorine at varying concentrations and lengths of time, then the TCA concentration will be determined. If TCA occurs in significant concentrations, a literature survey will be initiated to assess any adverse effects.

ACHIEVEMENTS: Preliminary GC analysis has shown trichloroacetic acid to be in chlorinated tap water of Frederick and Baltimore, MD. A study in early 1980 showed that trichloroacetic acid is not broken down to chloroform at gastric pH levels. No further work occurred because of a lack of GC/MS analytical capability to confirm the presence of TCA in these various waters.

RELATIONSHIP TO CORE PROGRAM: This research supports studies conducted under this Laboratory's research areas (core) dealing with treatability of domestic wastewater, and field sanitation and water.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV. SUMRY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DES'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
79 10 01	H. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		61101A		3A161101A91C		00	
B. CONTRIBUTING						323	
C. CONTRIBUTING						APC F171	
11. TITLE (Precede with Security Classification Code) ^a							
(U) Improved Method for Chemical Fixation of Heavy Metal Wastes by Insoluble Salt/Cement							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 003300 Chemical Engineering; 008300 Inorganic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8009		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER:				FISCAL		80	
C. TYPE:				YEAR		0.0	
D. KIND OF AWARD:				CURRENT		00	
E. AMOUNT:				81		0.0	
F. CUM. AMT.						00	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: ^a Rosencrance, A.B.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Dennis, W.H., Jr.			
				NAME:			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Heavy Metals; (U) Fixation; (U) Cement; (U) Silicates; (U) Sulfides							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To make improvements in the chemical fixation process for producing the insoluble silicates or other insoluble compounds (such as sulfides) of heavy metals contained in electroplating wastes. These improvements may provide an environmentally acceptable method for landfill disposal of heavy metal wastes.							
24. (U) Alterations in the existing chemical fixation process will be suggested which should result in a solid product having very low toxic metal leaching characteristics.							
25. (U) 7910 - 8010. Task terminated due to equipment failure and lack of time and funds.							

DETAIL SHEET

TITLE: Improved Method for Chemical Fixation of Heavy Metal Wastes by Insoluble Salts/Cement

FUNDING HISTORY: PY - OK; CY - OK; BY - OK

PROBLEM DEFINITION: To make improvements in the chemical fixation process for producing the insoluble silicates or other insoluble compounds (such as sulfides) of heavy metals contained in electroplating wastes. These improvements may provide an environmentally acceptable method for landfill disposal of heavy metal wastes.

Importance: New technology is needed for disposal of hazardous chemical wastes that are unique or relevant to Army industrial operations.

APPROACH: The present method of using cement and silicate to bind heavy metal wastes is inadequate. Alterations in this method will employ the formation of heavy metal sulfides prior to adding cement. This should result in a solid product having very low toxic metal leaching characteristics.

ACHIEVEMENTS: None. This task was terminated due to unavailability of analytical equipment and the requirement to use technician support elsewhere.

RELATIONSHIP TO CORE PROGRAM: This research supports this Laboratory's core program in the Hazardous Waste Disposal research area.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION #		2. DATE OF SUMMARY		REPORT CONTROL SYMBOL	
				DA 06 0654		80 10 01		DD-DR&E(AK)636	
3. DATE PREVIOUS SUMMARY		4. KIND OF SUMMARY		5. THE MAIN SUBJECT		6. WORK SECURITY		7. PRIORITY	
79 10 01		U. CHANGE		U		U		NL	
8. NO. CODES		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY		61101A		SA161101A91C		00		324 APC F172	
B. CONTRIBUTING									
C. CONTRIBUTING									
11. TITLE (Precede with Security Classification Code) (U) Evaluation of the Effect of an Antifoam Addition to Beef Extract Eluent on the Recovery of Enteroviruses from Water and Wastewater									
12. SCIENTIFIC AND TECHNOLOGICAL AREAS									
005900 Environmental Biology; 010100 Microbiology; 007800 Hygiene and Sanitation									
13. START DATE			14. ESTIMATED COMPLETION DATE			15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910			8109			DA		C. In-House	
17. CONTRACT GRANT					18. RESOURCES ESTIMATE				
A. DATES/EFFECTIVE					B. PRECEDING				
B. NUMBER					C. PROFESSIONAL MAN YRS				
C. TYPE					D. FUNDS (In thousands)				
D. KIND OF AWARD					E. FISCAL YEAR				
					80 0.0 01				
					81 0.1 05				
19. RESPONSIBLE OOD ORGANIZATION					20. PERFORMING ORGANIZATION				
NAME: US Army Medical Bioengineering Research & Development Laboratory					NAME: US Army Medical Bioengineering Research & Development Laboratory				
ADDRESS: Fort Detrick, Frederick, MD 21701					ADDRESS: Fort Detrick, Frederick, MD 21701				
RESPONSIBLE INDIVIDUAL					PRINCIPAL INVESTIGATOR (Precede SSAN if U.S. Academic Institution)				
NAME: Gensler, J.D., LTC (P)					NAME: Taylor, G.W.				
TELEPHONE: (301) 663-2014; AUTOVON 343-2014					TELEPHONE: (301) 663-2340; AUTOVON 343-2340				
21. GENERAL USE					SOCIAL SECURITY ACCOUNT NUMBER:				
Foreign Intelligence Not Applicable					ASSOCIATE INVESTIGATORS				
					NAME:				
					NAME: POC:DA				
22. KEYWORDS (Precede each with Security Classification Code)									
(U) Virus; (U) Antifoam; (U) Environmental Waters; (U) Detection									
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Precede individual paragraphs identified by number. Precede text of each with Security Classification Code)									
23. (U) To evaluate the effect of an antifoam additive to beef extract eluent on the recovery of enteroviruses from water and wastewater.									
24. (U) The previous study indicated that the recovery of an enteric virus from polished water is improved by the addition of an antifoaming agent to the beef extract eluent. Environmental waters and other enteroviruses should also be tested before preparing for publication. A comparison of the Bentonite-absorption system with the new positively-charged filters (AMF CUNG) would also benefit the study especially at minimal virus concentration. It might be of interest to determine the compound(s) responsible for "toxicity" to the recovery system.									
25. (U) 7910 - 8010. Two blocks of experiments (six samples/block) were completed to test for system variability using poliovirus as a model. This was followed by an optimum antifoam level study using a seeded distilled water source, then two random studies using a common, seeded, tap water source. By hand cleaning glassware and filter holders, the recovery of poliovirus has increased from 62.5% to 82.2% using beef extract eluent. With the addition of 0.15 cc 0.2% antifoam B (sonically dispersed) to the beef extract eluent, the recovery of virus is approaching 100% (99.1 - 5.3%).									

DETAIL SHEET

TITLE: Evaluation of the Effect of an Antifoam Addition to Beef Extract Eluent on the Recovery of Enteroviruses from Water and Wastewater

FUNDING HISTORY: PY - OK; CY - 1K; BY - 5K

PROBLEM DEFINITION: The current standard method for virus assay employs filters to trap and concentrate viruses from water environments. Foaming which occurs during elution of these viruses from the filters interferes with the assay procedure.

IMPORTANCE: Improved ability to detect virus in various waters for R&D purposes; secondarily, to reduce the physical and aerosol hazards during elution of these filters.

APPROACH: To test the effects on the recovery of various enteroviruses of adding small amounts of antifoam to the beef extract eluent.

ACHIEVEMENTS: Two blocks of experiments (six samples/block) were completed to test for system variability using poliovirus as a model. This was followed by an optimum antifoam level study using seeded distilled water source and two randomized studies using a common, seeded, tap water source. Quadratic regression analysis of the results indicated that there was a significant effect on the recovery of virus when Antifoam B was added to the eluent. By hand cleaning glassware and filter holders, the recovery of poliovirus has increased from 62.5% to 82.2% using beef extract alone. With the addition of 0.15 - 0.2% Antifoam B (sonically dispersed) to the beef extract eluent, the recovery of virus approached 100% ($99.1\% \pm 5.3\%$).

RELATIONSHIP TO CORE PROGRAM: This work will provide improved capability for virus assay in the ongoing evaluation of the Reverse Osmosis Water Processing Unit (ROWPU) that this Laboratory is conducting for USAMERADCOM.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3. DATE PREVIOUS ^a	4. KIND OF SUMMARY	5. SUMMARY ACTY ^a	6. WORK SECURITY ^a	7. REOR/DNO ^a	8. DES/INSTR ^a	9. SPECIFIC DATA CONTRACTOR ACCESS ^a	10. LEVEL OF SUM A. WORK UNIT
79 10 01	III. TERMINATION	U	U		NL	☒ YES ☐ NO	
11. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		61101A		3A161101A91C		00	
B. CONTRIBUTING						325 APC F173	
C. CONTRIBUTING							
12. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Droplet Dose Measurement							
13. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 005900 Environmental Biology; 002600 Biology							
14. START DATE		15. ESTIMATED COMPLETION DATE		16. FUNDING AGENCY		17. PERFORMANCE METHOD	
7910		8109		DA		C. In-House	
18. CONTRACT/GRANT				19. RESOURCES ESTIMATE		20. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER ^a				FISCAL YEAR		79	
C. TYPE				CURRENCY		0.0	
D. KIND OF AWARD						00	
E. QUANT. AMT.							
21. RESPONSIBLE DOD ORGANIZATION				22. PERFORMING ORGANIZATION			
NAME ^a : US Army Medical Bioengineering Research & Development Laboratory ADDRESS ^a : Fort Detrick, Frederick, MD 21701				NAME ^a : US Army Medical Bioengineering Research & Development Laboratory ADDRESS ^a : Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, S.H., POC				NAME ^a : O'Connor, R.J.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
SOCIAL SECURITY ACCOUNT NUMBER:				ASSOCIATE INVESTIGATORS			
23. GENERAL USE				NAME: Conway, W.H.			
Foreign Intelligence Not Applicable				NAME: Nelson, J.H.			
				POC:DA			
24. KEYWORDS (Precede EACH with Security Classification Code) ^a							
(U) Pesticide; (U) Toxicity; (U) Pest Control							
25. TECHNICAL OBJECTIVE ^a 26. APPROACH 27. SUMMARY (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) The investigation of methods to accurately measure the response of insects (ticks, flies, and cockroaches) to precisely determined droplet sizes of various pesticides.							
24. (U) Oscillator controlled vibrating needs will be used to produce precisely controlled droplets of insecticides. Droplet streams of precisely determined concentration will be directed at target insects. Dose response data will be collected and the mechanism of droplet impaction will be measured and documented.							
25. (U) 7910 - 8007. Literature review was initiated and a survey of droplet generation technology was begun. Work unit was terminated because of other tasks having higher priority.							

DETAIL SHEET

TITLE: Pesticide Droplet Dose Measurement

FUNDING HISTORY: PY - OK; CY - OK, BY - OK

PROBLEM DEFINITION: There is a need in an Integrated Pest Management (IPM) system to establish accurately the amounts of insecticide necessary to provide effective control of economically important insect pests. Insecticides are applied in various ways such as the application of materials to surfaces on which the pests may be found, to treated baits on which the insects feed, to the actual spraying of insecticide to effect control by direct contact between the chemical and the insect. Accurate data on the quantitative effect of droplet size (of pesticide) on various insect species is unavailable except in the case of mosquitoes. It is intended that this study will produce this kind of information. For the current investigation it is intended that the work involve the cockroach.

IMPORTANCE: The economical use of commercial pesticides is of extreme importance so that environmental effects are minimized while effective control is attained.

APPROACH: A vibrating reed or similar electrically driven device will be used to produce a precisely defined droplet stream of pesticide. The interaction of the droplets will be measured by monitoring physiological responses in the cockroach. Dose response data will be collected and analyzed and the mechanism(s) of interaction will be studied.

ACHIEVEMENTS: None, project never started and finally terminated due to a lack of funds.

RELATIONSHIP TO CORE PROGRAM: In order to use and evaluate pesticide dispersal equipment accurate means of droplet and dose measurement are required.

HEALTH STANDARDS FOR MILITARY POLLUTANTS

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DP&E(AR)636	
3. FUNDING NUMBER	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. DORN SECURITY ^a	7. REGRADING ^a	8. DORN INSTRN ^a	9a. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	ID. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO. CORDS ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	62720A	35162720A335		AA		123 APC F691	
b. CONTRIBUTING							
XXXXXXXXXX	STOG 80-3:17						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Screening of Munitions-Related Chemicals for Toxicity to Aquatic Organisms							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
C05900 Environmental Biology; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7610		CONT		DA		C. In-House	
17. CONTRACT, GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDENCE			
b. NUMBER*				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE				CURRENCY			
d. KIND OF AWARD:				80		1.3	
e. AMOUNT				81		1.5	
f. CUM. AMT						95	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME*: US Army Medical Bioengineering Research & Development Laboratory				NAME*: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS*: Fort Detrick, Frederick, MD 21701				ADDRESS*: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME*: van der Schalie, W.H.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Broich, S.G.			
				NAME:			
				POC: DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Munitions; (U) Aquatic Toxicology; (U) Hazardous Wastes							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To provide aquatic toxicity data required in conjunction with in-house and extramural research related to munitions production.							
24. (U) To conduct aquatic toxicity testing through comparative screening tests and through generation of acute toxicity data; to evaluate state-of-the-art toxicity testing methods to determine applicability to research requirements; to advance the state-of-the-art in toxicity testing methods where research requirements cannot be met with existing methods.							
25. (U) 7910 - 8009. A new toxicity testing facility has been completed. Tests have been initiated to measure the acute toxicity of three munitions-related materials (1,3-dinitrobenzene, 3,5-dinitroaniline, and 1,3,5-trinitrobenzene) to four species of fish and an invertebrate.							

* Available to contractors upon original's approval.

20 APR 1993

KEYWORDS: MUNITIONS, AQUATIC TOXICITY, HAZARDOUS WASTES

DETAIL SHEET

TITLE: Screening of Munitions-Related Chemicals for Acute Toxicity to Aquatic Organisms

FUNDING HISTORY: PY - 71K; CY - 63K; BY - 95K

PROBLEM DEFINITION: This project is designed to provide data on the toxicity of munitions-related materials to aquatic organisms. Short- and longer-term tests with several species of fish and an invertebrate will be conducted under static and dynamic water flow conditions. Effects on mortality and, in certain tests, growth and reproduction will be recorded.

IMPORTANCE: Pollution control facilities at Army ammunition plants are currently being upgraded. The type and extent of treatment required for aqueous effluents will depend greatly on the toxicity of the effluent components to aquatic life. Generation of this toxicity information will aid in assessing the environmental hazard posed by the munitions-related materials found in these effluents.

APPROACH: Preliminary screening tests include static, acute tests with fish and an invertebrate. These are followed by dynamic (flow-through) acute tests. Effects on the sensitive life stages of fish will be evaluated using a 35 day embryo-larval test. Survival, growth, and reproduction of an invertebrate will be determined in a full life cycle test.

ACHIEVEMENTS: Static, acute screening tests have been completed with four species of fish and an invertebrate. Materials tested included 1,3-dinitrobenzene, 1,3,5-trinitrobenzene, and 3,5-dinitroaniline. Of these, 1,3,5-trinitrobenzene was by far the most toxic, with 96-hour LC50's of 1 mg/L or less. Longer term flow-through tests with selected fish species have also been completed and have provided useful information on the level and kinds of effects of these compounds.

RELATIONSHIP TO CORE PROGRAM: This work is based on a request by the US Army Materiel Command for information relating to the design of waste treatment facilities. Measurements of the toxicity to aquatic organisms of various components of a waste effluent are an important part of the data base required for the design of proper waste treatment techniques.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYM NO. ED 100-AP 1616	
3. SUMMARY SYCT*	4. WORK SECURITY*	5. REGRADING*	6. DISSEM INSTR*	7. DA 08 6230	80 10 01	8B. SPECIFIC DATA CONTRACTOR ACCESS:	9. LEVEL OF SUM
U	U		NL			☒ YES ☐ NO	A. WORK UNIT
10. NO. OF STAFF*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
11. PRIMARY	62720A	3E162720A835	AA	127 APC F696			
12. CONTRIBUTING							
13. XXXXXXXXXXXX	STOG 80-8:14						
14. PREcede with Security Classification Code: (U) Evaluation of Filtration Techniques for Disposal of Operational Wastes from Army Pest Management Programs							
15. SCIENTIFIC AND TECHNOLOGICAL AREAS*							
007400 Hygiene and Sanitation; 003300 Chemical Engineering; 003400 Civil Engineering							
16. START DATE		17. ESTIMATED COMPLETION DATE		18. FUNDING AGENCY		19. PERFORMANCE METHOD	
7/70		8/09		DA		C. In-House	
20. CONTRACT GRANT				21. RESOURCES ESTIMATE		22. PROFESSIONAL MAN YRS	
23. DA EFFECTIVE:				PRECEDING		24. FUNDS (In thousands)	
25. EXPIRATION				FISCAL YEAR		26. CURRENT	
27. NEW				80		0.5	
28. TYPE				81		0.7	
29. KIND OF AWARD				30. CUM. AMT.		31. 67	
32. RESPONSIBLE (DOO) ORGANIZATION				33. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
34. RESPONSIBLE INDIVIDUAL				35. PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: Dennis, W.H.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
36. GENERAL USE				37. ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Kobylinski, E.A.			
				NAME: POC:UA			
38. KEYWORDS (Precede EACH with Security Classification Code) (U) Hazardous Wastes; (U) Filtration; (U) Pesticide Wastes; (U) Waste Treatment; (U) Water Treatment							
39. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To evaluate the use of filtration/adsorption techniques for treatment of wastes generated by Army installation pest control facilities.							
24. (U) The filtration/adsorption system will be taken to Fort Eustis, VA and set up within the new Fort Eustis Pest Control Facility for on-site testing. Wastewater from the Fort Eustis Facility will be collected, stored and treated by the carbon adsorption system. Effluent samples from each carbon column will be collected on-site and analyzed at Fort Detrick's Environmental Protection Research Division Laboratory. From this data we will evaluate the performance of the absorption system.							
25. (U) 7910 - 8009. Laboratory tests of the carbon filtration system are complete. A recipe wastewater containing diazinon, dursban, malathion, baygon and chlordane at a level of 1200 mg/L total pesticide has been tested. Five-hundred gallons of such a wastewater may be treated and the effluent will show no diazinon, dursban, malathion, or baygon (below 1 ppm). Chlordane was found in the effluent at concentration near that of the input concentration. Aeration of the wastewater to remove volatile chlorinated solvents from wastewater did not improve performance of the adsorption system. Preliminary leaching tests of spent carbon indicate a very slow rate of pesticide leaching at pH 7.5. The wastewater being generated at Ft. Eustis shows pesticide concentrations much lower than expected. The first test at Ft. Eustis showed removal of all materials except chlordane. The input water contained 16 ppm chlordane while effluent showed 0.2 ppm. Other pesticides present in the input water were kelthane (40 ppm) and dursban (1 ppm); these were absent in the effluent.							

DETAIL SHEET

TITLE: Evaluation of Filtration Techniques for Disposal of Operational Wastes from Army Pest Management Programs

FUNDING HISTORY: PY - 29K; CY - 34K; BY - 67K

PROBLEM DEFINITION: To evaluate the use of carbon adsorption techniques for treatment of wastes generated by Army installation pest control facilities.

IMPORTANCE: The US Army operates pest control facilities at its installations throughout the country. Federal law places the responsibility for safe disposal of pesticides and pesticide wastes on the user - DA. As a result, the Army is responsible for the safe disposal of the pesticide waste it generates.

APPROACH: The filtration/adsorption system was taken to Ft. Eustis, VA and set up within the new Ft. Eustis Pest Control Facility for on-site testing. Wastewater from the Ft. Eustis Facility was collected, stored and treated by the carbon adsorption system. Effluent samples from each carbon column were collected on-site and analyzed at Ft. Detrick's Environmental Protection Research Division Laboratory. From these data we will evaluate the performance of the adsorption system.

ACHIEVEMENTS: Laboratory tests of the carbon filtration system are complete. A recipe wastewater containing diazinon, dursban, malathion, baygon and chlordane at a level of 1200 mg/L total pesticide has been tested. Five-hundred gallons of such a wastewater may be treated and the effluent will show no diazinon, dursban, malathion, or baygon (below 1 ppm). Chlordane was found in the effluent at concentration near that of the input concentration. Sorption of the wastewater to remove volatile chlorinated solvents from wastewater did not improve performance of the adsorption system. Preliminary leaching tests of spent carbon indicate a very slow rate of pesticide leaching at pH 4.0. The wastewater being generated at Ft. Eustis shows pesticide concentrations much lower than expected. The first test at Ft. Eustis showed removal of all materials except chlordane. The input water contained 16 ppm chlordane while effluent showed 0.2 ppm. Other pesticides present in the input water were kelthane (42 ppm) and dursban (1 ppm), these were absent in the effluent. During the second field test, the Ft. Eustis input wastewater contained less than 0.5 ppm of any of the expected pesticides.

RELATIONSHIP TO CORE PROGRAM: This research is a part of the Army's evaluation of health and environmental consequences of the disposal of hazardous wastes and pesticides generated by military activities.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ¹	2. DATE OF SUMMARY ²	3. REPORT CONTROL SYMBOL ³	
				DA DA 6947	80 10 01	DD-DF&E(AR)636	
4. DATE OF PREP. OR KIND OF SUMMARY	5. SUMMARY SEC. CLASS.	6. WORK SECURITY	7. REGRADING	8. DISP. INSTR.	9. SPECIFIC DATA CONTRACTOR ACCESS	10. LEVEL OF SUP.	
78 10 01 U. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT	
11. NO. OF PR.	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER		WORK UNIT NUMBER		
A. PRIMARY	62720A	3E162720A835	AA		137 APC F644		
B. CONTRIBUTING							
XXXXXX STOC 80-8:14							
12. TITLE (Precede with Security Classification Code) (U) Development and Evaluation of Criteria for Advanced Wastewater Treatment Processes at Military Installations							
13. SCIENTIFIC AND TECHNOLOGICAL AREAS							
003300 Chemical Engineering; 003400 Civil Engineering; 010100 Microbiology							
14. START DATE		15. ESTIMATED COMPLETION DATE		16. FUNDING AGENCY		17. PERFORMANCE METHOD	
7205		8105		DA		C. In-House	
18. CONTRACT GRANT				19. RESOURCES ESTIMATE		20. PROFESSIONAL MAN YRS	
A. DATES/EFF. DATE				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER				FISCAL YEAR		30	
C. TYPE				CURRENT		2.2	
D. KIND OF AWARD				E. AMOUNT		1.1	
F. CUM. AMT.				81		67	
21. RESPONSIBLE DOD ORGANIZATION				22. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: Noss, C.I.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2548; AUTOVON 343-2548			
23. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Bartgis, K.A.			
				NAME: POC:DA			
24. KEYWORDS (Precede EACH with Security Classification Code) (U) Sanitary Engineering; (U) Nutrient Removal; (U) Wastewater Treatment; (U) Pollution Abatement							
25. TECHNICAL OBJECTIVE, 26. APPROACH, 27. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Provide Advanced Wastewater Treatment (AWT) technology applicable to US Army wastewater treatment plants so that NPDES permit limitations under PL 92-500 can be met. Design criteria will be established for selected processes with initial emphasis on organic loading rates and nitrogen removal procedures. Evaluation of phosphorus removal techniques and the processing of the resultant chemically treated effluent are considered in relation to upgrading existing waste treatment facilities. The applicability of combining carbon and nitrogen oxidation processes will be evaluated to determine its impact on upgrading US Army wastewater facilities. 24. Pilot-scale studies will be conducted on selected advanced wastewater treatment processes and problems. Emphasis will be placed on upgrading existing facilities, rather than attempting to develop processes and procedures for totally new treatment plants. The goal will be to satisfy NPDES permit limitations for designated pollutants, as opposed to attempting to obtain design criteria for extremely low pollutant levels. Laboratory and bench-scale studies will be conducted in support of pilot scale operations. 25. (U) 7910 - 0009. Two final reports have been completed. "RBC Process for Secondary Treatment and Nitrification Following a Trickling Filter" was completed as of 10/0 1979. "RBC Process for Secondary Treatment and Recarbonation Following Low-Level Lime Addition for Phosphorus Removal" was completed as of April 1980. The last report from this series of projects should be completed in the 2nd Quarter FY81. The title of the next report will be "Combined Carbon and Nitrogen Oxidation Using the RBC."							

DETAIL SHEET

TITLE: Development and Evaluation of Criteria for Advanced Wastewater Treatment Processes at Military Installations

FUNDING HISTORY: PY - 186K; CY - 117K; BY - 67K

PROBLEM DEFINITION: To evaluate phosphorus removal techniques and processing of the resultant chemically treated effluent and chemical sludges produced. The applicability of combining carbon and nitrogen oxidation processes will be evaluated to determine its impact on upgrading US Army wastewater facilities.

IMPORTANCE: The importance of this work lies in optimizing wastewater treatment processes through combining chemical/physical treatment technologies with biological processes. The goal is to improve the overall plant efficiency with minimal construction. Combining low-level lime treatment processes for phosphorus removal followed by biological recarbonation not only allows for phosphorus concentrations to meet effluent limitations, but also enhances nitrification. This research is highly-relevant to current Army problems of compliance with discharge limitations at installations. It may permit compliance by upgrading existing facilities.

APPROACH: Pilot-scale studies will be conducted on selected advanced wastewater treatment processes and problems. Emphasis will be placed on upgrading existing facilities, rather than attempting to develop processes and procedures for totally new treatment plants. The goal will be to satisfy NPDES permit limitations for designated pollutants, as opposed to attempting to obtain design criteria for extremely low pollutant levels. Laboratory and bench-scale studies will be conducted in support of pilot-scale operations.

ACHIEVEMENTS: Three technical reports have been published: (1) "Phosphorus Removal in a Pilot Scale Trickling Filter System by Low-Level Lime Addition to Raw Wastewater," R.D. Miller, R.S. Ryczak, and A. Ostrofsky. Technical Report 7901, AD A065041. (2) "Rotating Biological Contactor Process for Secondary Treatment and Nitrification Following a Trickling Filter," R.D. Miller, C.I. Noss, A. Ostrofsky, and R.S. Ryczak. Technical Report 7905, AD A074172. (3) "Rotating Biological Contactor Process for Secondary Treatment and Recarbonation Following Low-Level Lime Addition for Phosphorus Removal," C.I. Noss and R.D. Miller. Technical Report 8007, AD A084944.

RELATIONSHIP TO CORE PROGRAM: An agreement between USAMBRDL and USACERL has been established such that existing equipment and expertise can be used effectively in solving Army waste treatment problems.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. CATT PREV SUMMARY 79 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DISSEM INSTR ^a NL	9a. SPECIFIC DATA: CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	62720A	3E162720A835	AA	142	APC F644		
b. CONTRIBUTING							
XXXXXXXXXX STOG 80-8:14							
11. TITLE (Precede with Security Classification Code) ^a (U) Anaerobic Digestion of Lime Sludge							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 007800 Hygiene and Sanitation; 003300 Chemical Engineering							
13. START DATE 7910		14. ESTIMATED COMPLETION DATE 8105		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER ^a				FISCAL YEAR		c. CURRENT	
c. TYPE:				80		0.0	
d. KIND OF AWARD:				81		1.1	
e. AMOUNT:						67	
f. CUM. AMT.							
18. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: ^a Kobylinski, E.A.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-7207; AUTOVON 343-7207			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Noss, C.I.			
				NAME: Bell, B.A.			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Anaerobic; (U) Digestion; (U) Lime; (U) Sludge							
23. (U) Research addresses the microbial degradation of biological sludges treated with lime for removal of phosphorus to meet discharge standards at Army wastewater facilities. The technical objectives are as follows: (1) Verify the cause of inhibition experienced in the lime sludge digestors as light metal cation toxicity, (2) establish the concentration of calcium and/or magnesium required to cause inhibition, (3) investigate the possible synergistic relationship between calcium and magnesium, (4) investigate the potential use of sodium and/or potassium as an antagonist to reduce or eliminate the inhibitory effects of calcium and/or magnesium on the anaerobic digestion of lime sludges, and (5) develop a better understanding of the role of light metal cations on anaerobic digestion.							
24. (U) Three fermentors will be run in parallel. One fermentor will be a control unit being fed normal primary sludge. One fermentor will be fed a sludge resulting from commercial lime addition (magnesium impurities) while the third fermentor will be fed sludge resulting from reagent grade lime (no magnesium). Process parameters, pH, gas, solids destruction, COD destruction, CH ₄ and NH ₃ will be monitored. After the inhibition occurs, sodium and/or potassium will be used as an antagonist.							
25. (U) 7910 - 8009. The fermentors are currently in an acclimation period. The last year's work shows that the digestors are being inhibited most probably by light metal cations because a heavy metals scan proved negative.							

DETAIL SHEET

TITLE: Anaerobic Digestion of Lime Sludge

FUNDING HISTORY: PY - OK; CY - OK; BY - 67K

PROBLEM DEFINITION: The purpose of this project is to verify the cause of inhibition experienced in the lime sludge digestors as light metal cation toxicity and to determine the concentration of calcium and/or magnesium required to cause the inhibition. The second half of the study will investigate the possible use of sodium and/or potassium as an antagonist to reduce or eliminate the inhibitory effects of calcium and/or magnesium on the anaerobic digestion process.

IMPORTANCE: The importance of this work lies in the optimization of the anaerobic digestion of lime sludges. If the inhibition process occurring in lime digestors can be decreased, any Army wastewater treatment plant using a lime coagulation and sedimentation process can use existing anaerobic digestors, eliminating the need to construct new facilities for sludge digestion.

APPROACH: The fermentors will be run in parallel. One fermentor will be a control unit being fed normal primary sludge. One fermentor will be fed a sludge resulting from commercial lime addition (magnesium impurities) while the third fermentor will be fed sludge resulting from reagent grade lime (no magnesium). Process parameters, pH, gas, solids destruction, COD destruction, CH_4 and NH_3 will be monitored. After the inhibition occurs, sodium and/or potassium will be used as an antagonist.

ACHIEVEMENTS: A technical report is being prepared on the first year's work.

RELATIONSHIP TO CORE PROGRAM: This research is part of the Army's efforts in water pollution source reduction, control, and treatment technology.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY		2. REPORT CONTROL SYMBOL	
				DA OG 0647		80 10 01	
				DD-DR&E(AR)636			
3. DATE PREP SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8. DIS. INSTR.	9. SPECIFIC DATA: CONTRACTOR ACCESS	10. LEVEL OF SUM
79 10 01	TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
11. NO. CODES		12. PROGRAM F. E. E. N.		13. PROJECT NUMBER		14. TASK AREA	
A. PRIMARY		62720A		3E162720A835		AA	
B. CONTRIBUTING						143	
XXXXXX		ST04 80-8:14				APC F610	
15. TITLE (Precede with Security Classification Code) (U) Plastic Media for Upgrading Existing US Army Trickling Filter Wastewater Treatment Plants							
16. SCIENTIFIC AND TECHNOLOGICAL AREAS							
003300 Chemical Engineering; 003400 Civil Engineering							
17. START DATE		18. ESTIMATED COMPLETION DATE		19. FUNDING AGENCY		20. PERFORMANCE METHOD	
7910		8009		DA		C. In-House	
21. C. FACT/GRANT		22. DATES/EFFECTIVE:		23. EXPIRATION:		24. PRECEDENCE	
A. NUMBER:		B. TYPE:		C. AMOUNT:		D. FUNDS (In thousands)	
A. KIND OF AWARD:		F. CUM. AMT.		E. FISCAL YEAR		F. CURRENCY	
19. RESPONSIBLE DOD ORGANIZATION		20. PERFORMING ORGANIZATION:		21. RESOURCES ESTIMATED		22. PERSONAL MAN YRS	
NAME: US Army Medical Bioengineering Research & Development Laboratory		NAME: US Army Medical Bioengineering Research & Development Laboratory		80		2.4	
ADDRESS: Fort Detrick, Frederick, MD 21701		ADDRESS: Fort Detrick, Frederick, MD 21701		81		0.0	
RESPONSIBLE INDIVIDUAL		PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)		81		0.0	
NAME: Gensler, J.D., LTC (P)		NAME: Kobylinski, E.A.		81		0.0	
TELEPHONE: (301) 663-2014; AUTOVON 343-2014		TELEPHONE: (301) 663-7207; AUTOVON 343-7207		81		0.0	
21. GENERAL USE		22. SOCIAL SECURITY ACCOUNT NUMBER:		81		0.0	
Foreign Intelligence Not Applicable				81		0.0	
23. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Trickling Filter; (U) Upgrade; (U) Plastic Media							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To compare rock plastic trickling filter media demonstrating the possibility of using the plastic media for trickling filter upgrade. Plastic media could be used to replace the existing rock media to upgrade existing trickling filter plants and thereby eliminate the need to build or add on to existing Army treatment facilities.							
24. (U) Three filters will be run in parallel. One filter filled with plastic media will be run at the same loading rate during the whole study as a control unit. One filter will be filled with rock media and the last filter will contain plastic media. Several loading rates will be compared. Two experiments will be run to compare filter depth effects and surface loading effects on filters of comparable media surface area.							
25. (U) 7910 - 8009. Problems were encountered with trickling filter flies. The flies could not be controlled with pyrethrin aerosol sprays. The study was terminated and the trickling filter system is being redesigned.							

DETAIL SHEET

TITLE: Plastic Media for Upgrading Existing US Army Trickling Filter Wastewater Treatment Plants

FUNDING HISTORY: PY - OK; CY - 38K; BY - OK

PROBLEM DEFINITION: The purpose of this study is to determine the possibility of using plastic media to upgrade existing trickling filters.

IMPORTANCE: Plastic media may be able to be used in place of regular rock media for trickling filter. Since plastic media has a higher surface area to volume ratio than rock media, it is possible to increase the efficiency of a trickling filter plant simply by changing the media. The Army has trickling filter plants that need upgrading. Replacing the trickling filter media is economically more attractive than building additional trickling filters or alternative treatment processes.

APPROACH: Three filters will be run in parallel. One filter filled with plastic media will be run at the same loading rate during the whole study as a control unit. One filter will be filled with rock media and the last filter will contain plastic media. Several loading rates will be compared. Two experiments will be run to compare filter depth effects and surface loading effects on filters of comparable media surface area.

ACHIEVEMENTS: A technical report is being written on the results of this work.

RELATIONSHIP TO CORE PROGRAM: This research is part of the Army's efforts in water pollution source reduction, control, and treatment technology.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION	2 DATE OF SUMMARY	REPORT CONTROL SYMBOL	
				DA CG 0078	80 10 01	DD-DR&E(AR)636	
3 DATE PREPARED	4 KIND OF SUMMARY	5 SUMMARY SECY	6 WORK SECURITY	7 REGRADING	8A DESIGNATION	8B SPECIFIC DATA CONTRACTOR ACCESS	9 LEVEL OF SUMMARY
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10 NO. OF DES.	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
	6272CA	3E162720A835		AA		144 APC F639	
11. TITLE (Precede with Security Classification Code) (U) Evaluation of Wastewater Treatment Processes for Disposal of Army Generated Pesticide Wastes							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS							
007800 Hygiene and Sanitation; 010100 Microbiology; 003300 Chemical Engineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8110		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
D. NUMBER				FISCAL YEAR		80	
C. TYPE				CURRENT		0.1	
E. KIND OF AWARD:				81		1.0	
I. CUM. AMT.				82			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS:				ADDRESS:			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: Duncan, J.B.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Pesticides; (U) Disposal; (U) Degradation; (U) Wastewater							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To evaluate the applicability of wastewater treatment processes for degradation of waste pesticides and rinsates generated by Army pest control facilities. Federal legislation has established that the disposal of pesticide wastes be the responsibility of the user. As a result, many Army pest control facilities do not have the capability to meet the present storage or disposal requirements. The variety of pesticides and pesticide wastes generated by the Army make this a unique effort in waste disposal. 24. (U) Initial work will involve laboratory studies to determine pesticide concentrations which can be recovered from sewage effluents and sludges. Development and modification of extraction procedures are necessary to recover the seeded pesticide and possible degradation products. Pure bacterial cultures and organisms from waste treatment processes will be used in batch degradation studies, followed by the operation of pilot-scale processes. The goal will be to demonstrate the biodegradability, inertness, or accumulation of pesticides in the wastewater treatment processes. 25. (U) 7910 - 8009. Literature review by A.D. Little will be completed by 1 Dec 80.							

DETAIL SHEET

TITLE: Evaluation of Wastewater Treatment Processes for Disposal of Army Generated Pesticide Wastes

FUNDING HISTORY: PY - 0K; CY - 12K; BY - 88K

PROBLEM DEFINITION: One objective is to determine the fate of pesticide compounds in sewage treatment processes in common use at military installations. Also, the effect of these compounds on the performance of an experimental trickling filter unit will be assessed.

IMPORTANCE: The Federal Insecticide, Fungicide and Rodenticide Act and the Resource Conservation and Recovery Act apply, respectively, to the use and later discharge of pesticidal substances by the Army. Such substances may reach sewage treatment plants through either intentional discharge or surface runoff. Thus, it is to the advantage of the Army to investigate the fate of these compounds in treatment processes and their possible toxic effect upon these processes.

APPROACH: Seven pesticide compounds, chosen for their widespread use at military installations, will be studied. These are baygon, cygon, chlordane, diazinon, dursban, malathion, and ronnel. Bench-scale settling experiments with and without flocculant will be performed using untreated wastewater and trickling filter effluent from local sources. The persistence of each compound during settling and its partition into aqueous and sediment phases will be determined. Pesticide persistence in bench-scale anaerobic sludge digestion and trickling filter processes will be studied. Pesticide effect on trickling filter performance will be assessed by measuring reductions in important wastewater parameters, in the presence and absence of the pesticides.

ACHIEVEMENTS: A research plan and research protocol for this work are in preparation.

RELATIONSHIP TO CORE PROGRAM: This research is part of the Army's evaluation of the environmental consequences of the use and discharge of pesticidal substances at military installations. Studies in this area have been requested by TRADOC and have included the development of an activated carbon system for adsorption of pesticides from contaminated wash waters.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a		3. DATE OF SUMMARY ^a		REPORT CONTROL SYMBOL	
				DA (X-0680		80 10 01		DD-DR&E(AR)636	
2. DATA PRELIMINARY		4. RING		5. SUMMARY		6. SUMMARY SCY		7. WORK SECURITY	
79 10 01		H. TERMINATION		U		U			
10. NO. OF COPIES		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY		62720A		3E162720A835		AA		145 APC F605	
D. CONTINUING									
XXXXXX		STOG 80-8:14							
11. TITLE (Precede with Security Classification Code) ^a									
(U) Evaluation of Fixation Processes for Army Hazardous Wastes									
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a									
097800 Hygiene and Sanitation; 012700 Physical Chemistry									
13. START DATE			14. ESTIMATED COMPLETION DATE			15. FUNDING AGENCY			16. PERFORMANCE METHOD
7910			8009			DA			C. In-House
17. CONTRACT GRANT									
A. DATES, EFFECTIVE:				B. EXPIRATION				18. RESOURCES ESTIMATE	
A. MONTHS				C. TYPE				FISCAL YEAR	
A. KIND OF AWARD:				F. CUM. AMT.				G. FUNDS (in thousands)	
								PRECEDING	
								CURRENT	
								80	
								81	
								1.0	
								53	
								0.0	
								00	
19. RESPONSIBLE DOD ORGANIZATION					20. PERFORMING ORGANIZATION				
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701					NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				
ADDRESS:					ADDRESS:				
RESPONSIBLE INDIVIDUAL					PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)				
NAME: Gensler, J.D., LTC (P)					NAME: Kulkarni, R.K.				
TELEPHONE: (301) 663-2014; AUTOVON 343-2014					TELEPHONE: (301) 663-2036; AUTOVON 343-2036				
21. GENERAL USE					SOCIAL SECURITY ACCOUNT NUMBER:				
Foreign Intelligence Not Applicable					ASSOCIATE INVESTIGATORS				
					NAME: Rosencrance, A.B.				
					NAME:				
22. KEYWORDS (Precede EACH with Security Classification Code)									
(U) Waste Disposal; (U) Hazardous Wastes; (U) Electroplating Wastes; (U) Heavy Metals									
23. TECHNICAL OBJECTIVE. 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)									
23. (U) To evaluate the fixation methods for the treatment and disposal of Army hazardous wastes. Sludges from Army electroplating and paint removal operations, excess laboratory chemicals and excess inorganic pesticides are examples of wastes requiring treatment to fix pollutants prior to disposal. The processes of solidification of sludges by cementation, or by microencapsulation by organic binders such as asphalt, are under consideration for detailed study.									
24. (U) The Tobyhanna Army Depot electroplating wastes are to be tested to eliminate hexavalent chromium and cyanides, and then fixed by using two processes: Solidification by portland cement and sodium silicate and; microencapsulation by asphalt, by Werner Pflaiderer volume-reduction and solidification process. The samples fixed by the two processes are to be evaluated by the toxicant extraction process developed and proposed by Environmental Protection Agency and by analysis of the heavy metals hexavalent chromium and cyanides in the leachate generated using Atomic Absorption Spectroscopy and Autoanalyzer. The results are to be compared with maximum levels indicated by Environmental Protection Agency for safe disposal in the sanitary landfill sites.									
25. (U) 7910 - 8009. Preliminary work on asphalt-fixation was carried out under the project. The data indicates that the fixation method failed to bind the materials sufficiently to meet regulatory requirements.									

DETAIL SHEET

TITLE: Evaluation of Fixation Processes for Army Hazardous Wastes

FUNDING HISTORY: PY - OK; CY - 53K; BY - OK

PROBLEM DEFINITION: This study involves the comparison of the relative merits of the two general fixation processes for electroplating wastes prior to disposal in sanitary landfill sites. One process is the solidification of waste sludged by cementation, and the other is the microencapsulation by an asphalt process. The prior work in this area is the microencapsulation of electroplating sludges with asphalt without any pretreatment to remove cyanides or hexavalent chromium as reported in Technical Report 7992.

IMPORTANCE: This study is of importance in determining whether the heavy metal hydroxides form insoluble silicates in the cementation process; and in the elucidation of the mechanism of the asphalt process in prevention of leachate production. Both processes are relevant to solving problems the Army presently has in disposing of hazardous wastes from industrial operations (e.g., electroplating, paint removal).

APPROACH: The experimental work consists in the pretreatment of two or more randomly selected electroplating waste sludges from Tobyhanna Army Depot, to remove cyanides and chromium, and then fix them by "Chem Fix" process and asphalt process separately. The fixed samples are then subjected to EPA leaching tests to find the conformity with the regulations to qualify as nonhazardous waste for disposal in sanitary landfill sites.

ACHIEVEMENTS: Preliminary work on asphalt-fixation was carried out under the project. The data indicates that the fixation method failed to bind the materials sufficiently to meet regulatory requirements. No comparison of the asphalt and cement methods, which was the objective of the investigation could therefore be made. Therefore, the project was terminated and the interim report of partial results was prepared.

RELATIONSHIP TO CORE PROGRAM: Research on the fixation of hazardous wastes supports this Laboratory's Hazard Assessment Research Area in studying ways to render toxic heavy metal wastes nonhazardous according to new EPA hazardous waste regulations.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				AGENCY ASSIGNMENT		DATE OF SUMMARY		REPORT CONTROL SYMBOL	
				DA AG 0098		80 10 01		DD DR&E(AR)636	
1. DATE PREPARED	2. KIND OF SUMMARY	3. SUMMARY TYPE	4. WORK SET	5. REGARDING	6. DISSEMINATION	7. SPECIFIC DATA CONTRACTOR ACCESS		8. LEVEL OF WORK	
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO		A. WORK UNIT	
10. NO. 000 5*		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
		62720A		3E162720A835		AA		146 APC F636	
11. PRIMARY									
12. CONTRIBUTING									
13. TITLE (Precede with Security Classification Code)									
(U) Environmental Fate of Munitions Compounds									
14. SCIENTIFIC AND TECHNOLOGICAL AREAS									
007800 Hygiene and Sanitation; 010100 Microbiology; 012700 Physical Chemistry									
15. ESTIMATE		16. ESTIMATED COMPLETION DATE		17. FUNDING AGENCY		18. PERFORMANCE METHOD			
7910		CONT		DA		C. In-House			
19. A. DATES/EFFECTIVE:		B. EXPIRATION		19. A. RESOURCES ESTIMATE		B. PROFESSIONAL MAN YRS		C. FUNDS (In thousands)	
D. NUMBER*				PRECEDING		1.6		102	
E. TYPE		F. AMOUNT		FISCAL YEAR		CURRENT			
A. KIND OF FUND:		F. CUM. AMT.		81		2.5		211	
20. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION					
NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701					
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)					
NAME: Gensler, J.C., LTC (P)				NAME: Dennis, W.H.					
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-2036; AUTOVON 343-2036					
				SOCIAL SECURITY ACCOUNT NUMBER:					
21. GENERAL USE				ASSOCIATE INVESTIGATORS					
Foreign Intelligence Not Applicable				NAME: Mitchell, W.R.					
				NAME:					
22. KEYWORDS (Precede EACH with Security Classification Code)									
(U) Munitions; (U) Environmental Fate; (U) Biodegradation; (U) Hydrolysis; (U) Protolysis									
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)									
23. (U) The objective is to determine the chemical degradation and biodegradation rate constants for use in a mathematical model for prediction of the environmental fate of chemical pollutants of importance to Army munitions production.									
24. (U) The rate of chemical degradation of selected compounds via photolytic, hydrolytic and oxidative pathways will be determined. The rate of microbial degradation will be determined. The rate of microbial degradation will be determined by using microorganisms endogenous to the site of pollution. Identification of transformation products will be attempted. Adsorption to sediments and biosorption to selected microorganisms will be measured.									
25. (U) 7910 - 8009. 1,3-Dinitrobenzene; 1,3,5-trinitrobenzene and 3,5-dinitroaniline were synthesized, purified and methods developed for their analysis. The two former compounds are very slow to photodegrade in water and all three are stable to hydrolysis. A new method to measure the volatility of these substances was developed and volatility of 1,3-dinitrobenzene was determined. A culture was developed which would use 1,3-dinitrobenzene as a sole carbon source, and the second order rate constant for its biodegradation was determined. 1,3,5-trinitrobenzene and 3,5-dinitroaniline would not act as sole carbon sources and appeared to be cometabolized in the presence of exogenous metabolizable nutrients. One product was recovered after the microbiological transformation of 1,3,5-trinitrobenzene and at least resulted from the transformation of the aniline compounds.									

DETAIL SHEET

TITLE: Environmental Fate of Munitions Compounds

FUNDING HISTORY: PY - OK; CY - 102K; BY - 211K

PROBLEM DEFINITION: The objective is to determine the chemical degradation and biodegradation rate constants for use in a mathematical model for prediction of the environmental fate of chemical pollutants of importance to Army munitions production.

IMPORTANCE: Like other chemicals, the wastes resulting from the munitions manufacturing and loading processes could be subjected to federal discharge regulations. TNT (2,4,6-trinitrotoluene) and RDX (1,2,5-trinitrohexahydro 1,3,5-triazine) are manufactured at Army munitions facilities and are discharged with associated waste chemicals without significant treatment. Since wastewaters from munitions manufacturing facilities are released to the environment and since the chemical compounds contained in the wastes have the potential to affect health, it is important to define the overall environmental fate of these chemicals.

APPROACH: The rate of chemical degradation of selected compounds via photolytic, hydrolytic and oxidative pathways will be determined. The rate of microbial degradation will be determined by using microorganisms endogenous to the site of pollution. Identification of transformation products will be attempted. Adsorption to sediments and biosorption to selected microorganism will be measured.

ACHIEVEMENTS: 1,3-Dinitrobenzene; 1,3,5-trinitrobenzene and 3,5-dinitroaniline were synthesized, purified and methods developed for their analysis. The two former compounds are very slow to photodegrade in water and all three are stable to hydrolysis. A new method to measure the volatility of these substances was developed and volatility of 1,3-dinitrobenzene was determined. A culture was developed which would use 1,3-dinitrobenzene as a sole carbon source, and the second order rate constant for its biodegradation was determined. 1,3,5-trinitrobenzene and 3,5-dinitroaniline would not act as sole carbon sources and appeared to be cometabolized in the presence of exogenous metabolizable nutrients. One product was recovered after the microbiological transformation of 1,3,5-trinitrobenzene and at least resulted from the transformation of the aniline compound.

RELATIONSHIP TO CORE PROGRAM: This research is a part of the Army's evaluation of the health and environmental consequences of munitions manufacture carried out by military activities.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY AL ESSION ²	2. DATE OF SUMMARY ²	REPORT CONTROL SYMBOL	
				DA OG 0699	80 10 01	DD-DR&E(AR)636	
3. DATA TO BE MONITORED	4. KIND OF SUMMARY	5. SUMMARY SCY ²	6. WORK SECURITY ²	7. REGRADING ²	8. ORIGIN INSTN ²	9a. SPECIFIC DATA: CONTRACTOR ACCESS	9. LEVEL OF SUP
71 30 01	TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. TO FILE	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER		WORK UNIT NUMBER		
	F2720A	3E162720A835	AA		147 APC F608		
11. TITLE (Precede with Security Classification Code)							
(U) Screening of Treated Pesticide Waste Materials for Toxicity to Aquatic Organisms							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ²							
005900 Environmental Biology; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8009		DA		C. In-House	
17. BUDGET GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES EFFECTIVE:				PRECEDING			
B. NUMBER				FISCAL YEAR		C. FUNDS (in thousands)	
C. TYPE				80		0.1	
D. KIND OF AWARD				81		0.0	
E. CUM. AMT.						07	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS:				ADDRESS:			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Gensler, J.D., LTC (P)				NAME: van der Schalie, W.H.			
TELEPHONE: (301) 663-2014; AUTOVON 343-2014				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Broich, S.G.			
				NAME:			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Pesticides; (U) Aquatic Toxicology; (U) Toxicology; (U) Aquatic Organisms							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To provide data on the toxicity to aquatic organisms of treated pesticide waste materials from an Army pest control facility.							
24. (U) The acute toxicity of the pesticide wastes to the water flea (<u>Daphnia magna</u>) before and after treatment will be determined. The efficiency of the treatment process in reducing the toxicity of the waste to this sensitive aquatic invertebrate will be evaluated.							
25. (U) 7910 - 8009. Tests on pesticide wastewater were conducted before, during, and after passage through a series of six carbon columns. Overall, acute toxicity to the water flea was reduced eighteenfold by the columns, but the final effluent was slightly toxic, with a 1.34% solution killing 50% of the water fleas after 48 hours of exposure.							

DETAIL SHEET

TITLE: Screening of Treated Pesticide Waste Materials for Toxicity to Aquatic Organisms

FUNDING HISTORY: PY - OK; CY - 7K; BY - OK

PROBLEM DEFINITION: Pesticide wastes are generated at Army pest control facilities. Full evaluation of an experimental carbon adsorption treatment method developed for these wastes requires both chemical analysis toxicity information on the treated wastes. Aquatic organisms receive the primary impact from the discharge of these waste materials and are protected by federal and state laws.

IMPORTANCE: Army pest control facilities around the country generate complex pesticide wastes which, under current regulatory requirements, must be treated prior to their discharge. Protection of aquatic life in bodies of water receiving such discharges is frequently a goal of both federal and state regulatory agencies. Assessment of the toxicity to aquatic organisms of these wastes is an important addition to the chemical analysis, since organisms may be affected by interactions between multiple toxicants or by the presence of a pesticide material not detected analytically.

APPROACH: The acute toxicity of the pesticide wastes to the water flea (*Daphnia magna*) before and after carbon adsorption will be determined. The efficiency of the treatment process in reducing the toxicity of the waste to this sensitive aquatic invertebrate will be evaluated.

ACHIEVEMENTS: Tests on pesticide wastewater were conducted before, during, and after passage through a series of six carbon columns. Overall, acute toxicity to the water flea was reduced eighteenfold by the columns. The final effluent was still highly toxic; 50% of the animals were killed by a 1.34% dilution after 48 hours of exposure.

RELATIONSHIP TO THE CORE PROGRAM: The Army is responsible for determining the health and environmental effects associated with the disposal of hazardous wastes associated with its activities. This project is related to the potential environmental effects of pesticide wastes generated at Army facilities.

CARE OF COMBAT CASUALTY

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTRN	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		62772A		35162772A874		BA 221 APC F718	
XXXXXXXXXX		62778A		35162778A838		00 058	
XXXXXXXXXX		STOG 80-7.2:6					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Refrigerator, Medical, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8008		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (In House &)	
B. NUMBER: ^a				FISCAL		80 0.1 11	
C. TYPE:				YEAR		CURRENT	
D. KIND OF AWARD:				81 0.9 57			
E. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a O'Connor, R.J.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Biological Refrigerator (U) Medical Refrigerator (U) Biological Storage (U) Blood Storage							
23. TECHNICAL OBJECT * 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify a replacement item for the biological refrigerator currently in the inventory (NSN 4110-00-707-2550) which is no longer supportable.							
24. (U) An effort will be made to locate a suitable commercially produced item that will satisfy requirements or that can be made to do so with minor modification. Should that effort fail, which is unlikely, a new development effort will be undertaken - probably on contract.							
25. (U) 7910 - 8009. A market survey has been conducted in depth. One commercial candidate has been selected for evaluation and a specimen procured. Manufacturer's specifications indicate that the performance of this item meets the essential characteristics of the LR. Some modification will probably be required, however, to ruggedize the item for field use.							

DETAIL SHEET

TITLE: Refrigerator, Medical, Field

FUNDING HISTORY: PY - OK; CY - 11K; BY - 57K

PROBLEM DEFINITION: The biological refrigerator currently in the inventory (NSN 4110-00-707-2550) is said to be no longer supportable, primarily due to high acquisition cost.

IMPORTANCE: A refrigerator for the storage of perishable medical supplies is a necessity for field military units. The special requirements brought about by the need to store such things as whole blood and the rugged operating environment eliminate a great many commercially available units from consideration.

APPROACH: To canvas the commercial market for a machine that meets the required performance characteristics and which can be ruggedized to meet environmental and handling requirements. At the same time, consideration is to be given to reengineering of the current design to modernize it and make it more easily and cheaply procurable.

ACHIEVEMENTS: Two commercial units have been identified as possibly meeting the performance requirements although both would have to be ruggedized for field service. Specimens of these are being procured. In addition one of the currently stocked military models is being procured for evaluation of its modernization potential.

RELATIONSHIP TO CORE PROGRAM: This task is consistent with the Laboratory's mission to develop equipment specific to field medical requirements.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)556	
3. DATE PREV SUMMARY 79 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTRUM NL	8B. SPECIFIC DATA: CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	62772A	3S162772A874	BA	222	APC F719		
XXXXXXXXXX	62778A	3S162778A838	00	059			
XXXXXXXXXX	STOG 80-7.2:6						
11. TITLE (Precede with Security Classification Code) ^a (U) Sterilizer, Surgical Instrument and Dressing							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 003800 Medical and Hospital Equipment							
13. START DATE 7910		14. ESTIMATED COMPLETION DATE 8109		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT GRANT A. DATES/EFFECTIVE: B. NUMBER: C. TYPE D. KIND OF AWARD:				18. RESOURCES ESTIMATE PRECEDING FISCAL YEAR CURRENT 80 81			
EXPIRATION: E. AMOUNT: F. CUM. AMT.				A. PROFESSIONAL MAN YRS 0.2 0.8		D. FUNDS (In thousands) 14 51	
19. RESPONSIBLE DOD ORGANIZATION NAME: ADDRESS: RESPONSIBLE INDIVIDUAL NAME: TELEPHONE:				20. PERFORMING ORGANIZATION NAME: ADDRESS: PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution) NAME: TELEPHONE: SOCIAL SECURITY ACCOUNT NUMBER: ASSOCIATE INVESTIGATORS NAME:			
US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701 Boyer, K.H., COL (301) 663-7277; AUTOVON 343-7277				US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701 Prensky, W. (301) 663-7237; AUTOVON 343-7237 CONWAY, W.H. POC:DA			
21. GENERAL USE Foreign Intelligence Not Applicable							
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilizer, Field; (U) Sterilizer, Dental; (U) Sterilizer, Veterinary; (U) Sterilizer, Small							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with security classification code.) 23. (U) To identify a small table-top sterilizer to replace NSN 6530-00-782-6503, NSN 6530-00-926-4857 and NSN 6530-00-926-2022 which are no longer supportable. 24. (U) To canvass the market for a commercial item that is suitable or that can be made so by minor modification. If this approach should fail, a new development is contemplated. 25. (U) 7909 - 8009. One commercial electrically powered sterilizer unit was evaluated and found effective. The task has been placed in a holding status, however, due to a reevaluation of Battalion Aid Station requirements being performed by the Combat Developer.							

DETAIL SHEET

TITLE: Sterilizer, Surgical Instrument and Dressing

FUNDING HISTORY: PY - OK; CY - 14K; BY - 51K

PROBLEM DEFINITION: Three small table-top sterilizers for field use (NSN 6530-00-782-6503, 653-00-926-4857 and 6530-00-926-2022) are of aging designs and are no longer supportable. These units serve aid stations, field dental facilities, field laboratories and the like. A need exists for a single small sterilizer, supportable in a field environment, to replace these obsolete units.

IMPORTANCE: A sterilization capability in small field medical elements such as those mentioned above is an evident necessity. The substitution of a single satisfactory item for the three separate units currently in stock will greatly improve the logistical support situation relative to this class of equipment while simultaneously allowing a move up to current technology.

APPROACH: To canvas the commercial market for item that is suitable or can be made so by minor modification. Failing this, a new development would be undertaken.

ACHIEVEMENTS: A preliminary evaluation was conducted on one commercial electrically powered unit and the results were promising. The Combat Developer advises, however, that sterilizer requirements relative to the Battalion Aid Station are undergoing study and probable revision. Since that application is of paramount importance in selection of a design, this task is now being held in abeyance pending the outcome of that review process.

RELATIONSHIP TO CORE PROGRAM: This task falls in the realm of the Laboratory's mission to provide equipment to support the practice of medicine and dentistry in a field environment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)536	
3. DATE PREPARED ^a 79 10 01		4. KIND OF SUMMARY ^a D. CHANGE		5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a A	8A. DISSEM INSTRN ^a NL
9. NO. CODES ^a		10. PROGRAM ELEMENT		11. PROJECT NUMBER		12. TASK AREA NUMBER	
13. PRIMARY		62772A		3S162772A874		225 APC F762	
13. CONTINUING		62778A		3S162778A838		00 016	
13. OTHER		SI0G 80-7.2:6					
11. TITLE (Precede with Security Classification Code) ^a (U) Whole Body Diagnostic X-Ray Scanner							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 003500 Clinical Medicine; 009800 Medical and Hospital Equipment							
13. START DATE 7602		14. ESTIMATED COMPLETION DATE 8309		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-house	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (In thousands)	
A. NUMBER:				FISCAL YEAR		C. FUNDS (In thousands)	
C. TYPE:				CURRENCY		D. FUNDS (In thousands)	
A. KIND OF AWARD:				81		1.9 142	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Salisbury, L.L.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC: DA			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Whole Body; (U) Diagnostic; (U) X-Ray; (U) Scanner; (U) Flying Spot; (U) Field Medicine; (U) Field Equipment							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede rest of each with Security Classification Code.) 23. (U) To provide engineering assistance in evaluating new diagnostic X-ray scanners being evolved for military field use. 24. (U) Professionally evaluate and assess new equipment as required. 25. (U) 7910 - 8009. A contract has been let for the development of an electronic flying spot X-ray source. Several tubes have been fabricated with an electron beam deflection system externally providing vertical and horizontal scanning of the anode. Heat and gas problems have limited the life of these early models.							

DETAIL SHEET

TITLE: Whole Body Diagnostic X-Ray Scanner

FUNDING HISTORY: PY - 9K; CY - 32K; BY - 142K

PROBLEM DEFINITION: Currently available radiographic equipment requires high radiation exposure to obtain diagnostic quality radiographs. In addition, these systems require a large amount of support, (chemicals, film, water, processors, etc.) as well as operator and patient shielding.

The technology exists which would permit diagnostic quality radiographs to be made with a reduction of the radiation exposure by a factor of 100.

IMPORTANCE: The importance of reducing patient and operator exposure to ionizing radiation is well documented. The elimination of the requirements for the ancillary support items (water, film, film processors, etc.) have a direct impact on support of field medicine.

APPROACH: Evaluation of a low-dose X-ray unit in a clinical environment to determine the adequacy of the image and its applicability to a mass casualty situation.

ACHIEVEMENTS: A low-dose unit was installed and evaluated at the Maryland Shock/Trauma Unit in Baltimore. The results indicate that the low-dose technique with electronic imaging would have application in a field situation. Other methods have been investigated and one approach, which appears promising, has been funded. This is a technique which uses electron beam deflection and a pin-hole columnator to provide the scanning X-ray beam. A bench model of the scanning source is scheduled for demonstration during the 2nd QTR FY81.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission of developing field medical equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL #FW87L DD-DR&E(AR)636	
3. DATE PREP. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUB A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	62772A	3S162772A874		BA		226 APC F780	
B. SECONDARY	62778A	3S162778A838		00		001	
C. TERTIARY	STOG 80-7.2:6						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Sink Unit, Surgical, Field (NSN 6545-00-935-4056), Engineering Evaluation of							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7612		8012		DA		C. In-house	
17. CONTRACT, GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL YEAR		80	
C. TYPE:				CURRENCY		0.5	
D. KIND OF AWARD:						0.4	
E. AMOUNT:						24	
F. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Conway, W.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Crampton, K.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Surgical Sink; (U) Scrub; (U) Field Equipment; (U) Surgical Scrub							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To conduct an engineering evaluation of the field surgical sink to determine feasibility of conducting a product improvement program or a need for a new product design to eliminate field complaints.							
24. (U) Prepare a testing protocol based on accrued field complaints, conduct an in-house evaluation and prepare an engineering evaluation report so that a proper course of future action can be determined.							
25. (U) 7909 - 8009. A trial modification of 40 sink units has been undertaken for the purpose of evaluating the effectiveness of the "quick-fix" approach and gathering statistical and cost data on the effort required to modify all units currently in stock. This effort is expected to be completed in CY80.							

DETAIL SHEET

TITLE: Sink Unit, Surgical, Field, Engineering Evaluation of

FUNDING HISTORY: PY - 15K; CY - 41K; BY - 24K

PROBLEM DEFINITION: Numerous complaints from field medical units have been received citing problems with the Surgical Field Sink (NSN 6545-00-935-4056). The complaints deal with heater burn-out and other problems. This task was undertaken to conduct an engineering evaluation of the item and determine whether a modification or a new development is necessary to correct the deficiencies.

IMPORTANCE: These sinks are used for surgical scrubbing in forward area medical units. Their high failure rate makes logistical support difficult and jeopardizes the mission of these medical units.

APPROACH: To identify the root causes of the high failure rate through extensive testing and analysis and to determine appropriate corrective action.

ACHIEVEMENTS: The principal cause of heater burn-out has been identified along with a number of other less catastrophic design and manufacturing defects. Due to the large number of these devices still in the inventory, a depot level modification has been developed which will improve the reliability of existing units. Additionally, the performance of these units, in terms of flow rate and water temperature, has been found to be less critical than originally thought. Thus, the modification of the items now in stock seems feasible if the cost can be held to a reasonable level. Forty sink units have been modified to provide statistical data on cost and time to modify those units in stock. A final report of this effort will be forwarded to OTSG for a decision.

RELATIONSHIP TO CORE PROGRAM: This task is consistent with the Laboratory's mission of providing development engineering on field medical equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a		2. DATE OF SUMMARY ^a		REPORT CONTROL SYMBOL		
				DA OA 6296		80 10 01		DD-DR&E(AR,6)6		
3. DTDIC REF. COUNTRY		4. KIND OF SUMMARY		5. SUMMARY SCTY ^a		6. WORK SECURITY ^a		7. REGRADING ^a		
79 10 01		D. CHANGE		U		U		NL		
8. DISSEM INSTR ^a		9. SPECIFIC DATA CONTRACTOR ACCESS		10. LEVEL OF SUM		11. A. WORK UNIT				
		☒ YES ☐ NO								
12. SCIENTIFIC AND TECHNOLOGICAL AREA ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER		
A. PRIMARY		62772A		3S162772A874		BA		227 APC F742		
B. SECONDARY		62778A		3S162778A838		00		027		
C. TERTIARY		STOG 80-7,2:6								
(U) Technical Feasibility Testing (TFT) of Pesticide Dispersal Equipment										
009200 Medical and Hospital Equipment; 002400 Bioengineering										
13. START DATE			14. ESTIMATED COMPLETION DATE			15. FUNDING AGENCY			16. PERFORMANCE METHOD	
80 10 01			CONT			DA			C. In-House	
17. CONTRACT GRANT			18. RESOURCES ESTIMATE			A. PROFESSIONAL MAN YRS			B. FUNDS (In thousands)	
A. DATES/EFFECTIVE			C. PRECEDING							
B. NUMBER ^a			FISCAL YEAR			80			1.3	
C. TYPE			CURRENCY			81			0.8	
D. KIND OF AWARD			E. CUM. AMT						32	
19. RESPONSIBLE DOD ORGANIZATION					20. PERFORMING ORGANIZATION					
NAME: US Army Medical Bioengineering Research & Development Laboratory					NAME: US Army Medical Bioengineering Research & Development Laboratory					
ADDRESS: Fort Detrick, Frederick, MD 21701					ADDRESS: Fort Detrick, Frederick, MD 21701					
RESPONSIBLE INDIVIDUAL					PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)					
NAME: Boyer, K.H., COL					NAME: Kardatzke, J.T.					
TELEPHONE: (301) 663-7277; AUTOVON 343-7277					TELEPHONE: (301) 663-7237; AUTOVON 343-7237					
21. GENERAL USE					ASSOCIATE INVESTIGATORS					
Foreign Intelligence Not Applicable					NAME: Anderson, L.M.					
					NAME: Thayer, G.W. POC:DA					
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Insect Control; (U) Pesticide Dispersal; (U) Engineer Tests; (U) Ultra Low Volume (ULV)										
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRAM (Furnish individual paragraphs identified by number. Precede rest of each with Security Classification Code.)										
23. (U) To determine the durability of commercially available Ultra Low Volume (ULV) pesticide dispersal equipment by comparative type engineering tests. Units will be used by military medical and engineer personnel for controlling mosquito and other flying insects. Results will provide the user agencies with comparative durability data for purchase through military channels.										
24. (U) To determine the operational capabilities of skid mounted and special purpose ULV pesticide dispersal equipment by quantitative and qualitative methods. Measurable quantitative parameters include: particle size determination and maintenance of desired pressure and flow rate. General engineering design observations will include: corrosive effect of pesticide used during tests, verification of manufacturers' claim of performance specifications, general durability definitions as applied to mean time between breakdown, maintenance time, gas and oil consumption and definition of high mortality repair parts.										
25. (U) 7910 - 8009. Evaluation of Micro-Gen Models CCG-1, M-16, and S-4 completed. Evaluation of Balt Model E-10 completed. Evaluation of London Aire Model AE is in progress.										

DETAIL SHEET

TITLE: Technical Feasibility Testing (TFT) of Pesticide Dispersal Equipment

FUNDING HISTORY: PY - 48K; CY - 64K; BY - 32K

PROBLEM DEFINITION: Continuous evaluation of the basic engineering design and durability and operational effectiveness of commercial pest control equipment.

IMPORTANCE: Yearly, new and improved commercial items are presented to DoD as potential standard items. Most of these are suitable for DoD use. Others are unfit and should not be procured. Centralized, uniform testing of these items, on a request basis, is essential to maintain state-of-the-art technology in pest control and to keep from wasting tax dollars on unacceptable equipment.

APPROACH: At the request of other DoD agencies and developing needs of military vector control programs, conduct extensive engineering and operational evaluations of designated items. These evaluations will include items such as specification design, quality assurance testings as required by specification and procurement, and individual item evaluation.

ACHIEVEMENTS: During FY80, evaluation of the following items were completed: Micro-Gen (San Antonio, TX) models CCG-1, M-16, and S-4; the Bolt (Johnson Wax Corp) E-10; and two B&G (Plumsteadville, PA) manual dusters. Initial production testing of the Londonaire, Long Lake, MN) Model XKA continued with several problem areas being uncovered. Input was provided for revision of the military specifications.

RELATIONSHIP TO CORE PROGRAM: Project involves continuous evaluation of commercially available pesticide dispersal equipment. Project provides a technology base for pest control equipment evaluation and development.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL ^a DD-DR&E(AR)636	
3. DATE OF SUMMARY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISP. INSTR. ^a	9a. SPECIFIC DATA: CONTRACTOR ACCESS	9. LEVEL OF SUM ^a
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
1. PRIMARY	62772A	3S162772A874		BA		228 APC F713	
2. SECONDARY	62778A	3S162778A838		00		054	
3. TERTIARY	CARDS 1407A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Protective Containers, Field, Medical Devices							
12. SCIENTIFIC AND TECHNOLOGICAL AREA ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7912		8109		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
2. NUMBER:				FISCAL		80	
C. TYPE:				YEAR		2.0	
4. AMOUNT:				CURRENCY		60	
6. KIND OF AWARD:				81		2.2	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Arnold, M.F.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Reams, W.H.			
				NAME:			

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Container; (U) Protective Container

23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To design a family of strong, lightweight containers for fragile medical equipment that is presently authorized to field medical units.

24. (U) Identify physical characteristics of existing items to be protected. Determine similarities and then design a container or containers with various inserts to protect during handling, shipping and storage.

25. (U) 7910 - 8009. Fourteen items have been identified as needing immediate packaging. These have been procured and packaging for each designed. Drawings have been made for 10 items and container fabrication initiated.

DETAIL SHEET

TITLE: Protective Containers, Field, Medical Devices

FUNDING HISTORY: PY - 13K; CY - 60K; BY - 122K

PROBLEM DEFINITION: A requirement exists for a family of strong, lightweight shipping containers for fragile medical equipment issued to field medical units.

IMPORTANCE: The protection of the sensitive medical equipment is essential during loading, transportation and unloading when being deployed in field locations. This equipment, properly protected, must be available for immediate use in patient care. Unprotected, the equipment may be damaged or misaligned requiring extensive repair or recalibration.

APPROACH: Obtain medical equipment which requires packaging. These items will be tested to determine the degree of protection required. Using this information, a family of containers will be designed to protect these and other pieces of equipment. A study will also be made to increase the capacity of the existing medical equipment field chests.

ACHIEVEMENTS: Twelve items of noncontainerized commercial field medical equipment have been obtained for evaluation. Extensions have been designed to increase the capacity of the existing containers and information on packaging materials and containers has been gathered. Seven sizes of containers which will accommodate all 12 items have been designed and fabricated. Protective foam inserts have been designed and fabricated for each item and compatible with the appropriate container. Developmental testing of these containerized items will begin during the 2nd QTR FY81.

RELATIONSHIP TO CORE PROGRAM: In order to provide adequate patient care it is essential to provide equipment in working order to units in the field. This containerization program will also reduce the time spent packaging equipment developed by this Laboratory.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)536	
1. DOD FORM 1001	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTN ^a	8B. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVE. OF SEC A. WORK UNIT
1001	D. CHANGE	U	U		NL	☒ YES ☐ NO	
11. NO. OF ELEM ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
1	62772A	3S162772A874		BA		229 APC F710	
2	62778A	3S162778A838		00		051	
9. COMMENTS CARDS: 1406A							
11. PRELUDE (Precede with Security Classification Code) ^a							
(U) Integrated Pest Management - Black Flies							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7310		8309		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		2.2	
B. NUMBER ^a				FISCAL YEAR		98	
C. TYPE				CURRENT		88	
D. KIND OF AWARD:				E. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Frommer, R.L.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J.H.			
				NAME: Remington, M.P. POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Integrated Pest Management; (U) IPM; (U) Biological Control							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a method of long-term suppression of immature stages of black flies without adverse effect on the environment. Currently, black flies seasonally restrict use of vast military training areas at several CONUS installations. Overseas, they are the primary vector of onchocerciasis or river blindness, a disease of military importance in parts of Africa, Central and South America. Effective vector control strategies will permit increased military training at the affected installations and will reduce the threat of non-combat casualties due to onchocerciasis.							
24. (U) Growth regulator hormones or synthetic chemical analogues will be applied in the aquatic habitat in laboratory and field evaluations in such a manner to attach to specific substrates and with slow release action provide long lasting control. Attention will also be directed to the use of biological control agents including pathogenic protozoa, bacteria, and microsporidia. Insect pathogens on hand will be evaluated against black flies. Further, naturally occurring black fly pathogens will be collected and evaluated. Laboratory and field testing is required to develop methods for manipulation, storage, and application of these agents.							
25. (U) 7910 - 8009. Successful field trials were completed during 1980 using <u>Bacillus thuringiensis israelensis</u> (Bti) for control of black flies. Results clearly demonstrated Bti can effectively reduce larval populations by 80% over a 1/4 mile length of stream for a week or longer. Distribution and dissipation of Bti in the test stream were maintained at acceptable concentration levels during exposure periods thus enabling Bti to be effective over long distances.							

DETAIL SHEET

TITLE: Integrated Pest Management - Black Flies

FUNDING HISTORY: PY - 77K; CY - 98K; BY - 88K

PROBLEM DEFINITION: To develop a program of long-term suppression of black fly populations without adverse effects on the environment.

IMPORTANCE: Black flies are major vectors of onchocerciasis and rank high as military nuisance pests. In areas where onchocerciasis occurs, blindness due to this filarial infection is epidemic. In areas where large populations of black flies occur, training and marshalling areas cannot be used in presence of these pests. There currently is no effective means for control of these insects.

APPROACH: Growth regulator hormones or synthetic chemical analogues and chemical pesticides will be applied in the aquatic habitat in laboratory and field evaluations in such a manner to attach to specific substrates and with slow-release action provide long lasting control. Attention will also be directed to the use of biological control agents including pathogenic protozoa, bacteria, and microsporidia. Insect pathogens on hand will be evaluated against black flies. Further, naturally occurring black fly pathogens will be collected and evaluated. Laboratory and field testing is required to develop methods for manipulation, storage, and application of these agents.

ACHIEVEMENTS: Several successful field trials using a new commercial agent, Bacillus thuringiensis israelensis (Bti) were conducted at Holston Army Ammunition Plant, Kingsport, TN. Trials demonstrated that Bti could be effectively used over significant lengths of a stream with duration of control of 1 week or more. Control effectiveness was found not to be disrupted by stream flow characteristics or dense vegetation. Preliminary studies with nontarget organisms indicate this control strategy will not adversely affect stream fauna.

RELATIONSHIP TO CORE PROGRAM: This project is the first systematic approach to providing a vector control program for management of a medically important insect. Project is in keeping with mission for research in applied military vector control.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE OF SUMMARY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTRN	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUP A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NC CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
1. PRIMARY	62772A	3S162772A874	BA	231 APC F752			
2. SECONDARY	62778A	3S162778A838	00	105			
3. TERTIARY	CARDS 1410A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Evaluation Set							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7504		8509		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER:				FISCAL YEAR		80	
C. TYPE:				CURRENCY		0.2	
D. KIND OF AWARD:				E. AMOUNT:		18	
F. CUM. AMT.				81		0.7	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: O'Connor, R.J.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J.H.			
				NAME: Anderson, L.M.			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Pesticide Dispersal; (U) Droplet Size; (U) Insect Control; (U) EPA Requirements							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a pesticide field evaluation set capable of measuring ULV drop-let size and total pesticide amounts applied by military dispersal equipment utilized in insect control operations at military installations in CONUS and overseas.							
24. (U) Review commercial or military sources and if search is unsuccessful, fabri-cate new equipment and field-evaluate for efficacy of design.							
25. (U) 7910 - 8009. The PMS optical imaging droplet spectrometer (OIDS) was installed in the laboratory area of Building 1054. The ground aspirator was installed and vented to the outside so that the OIDS could be used indoors. A lease of another potential candidate droplet measuring device was negotiated so that comparison between it and the OIDS can be accomplished. The OIDS system was also operated in the field to determine its suitability in that mode. A 2 KW gasoline engine generator provided electrical power adequate for operation of the OIDS, the ground aspirator, and the air purge of the sampling probe.							

DETAIL SHEET

TITLE: Pesticide Dispersal Evaluation Set

FUNDING HISTORY: PY - 28K; CY - 18K; BY - 36K

PROBLEM DEFINITION: The development of instrumentation which can accurately measure droplet size distribution in pesticide aerosols thus providing precise calibration for pesticide dispersal units.

IMPORTANCE: Accurate calibration of dispersal equipment is essential for the effective and economical usage of ULV pesticide formulations to provide protection for the soldier from disease vectors and pest arthropods. The dissemination of droplets which are too large for effective control are capable of adverse environmental effects.

APPROACH: An optical imaging aerosol droplet sizing spectrometer has been secured and has been calibrated. A ground aspirator which produces a constant speed air flow past the sampling region of the spectrometer has been secured. The aspirator will provide isokinetic conditions at the sampling region and will also enable the data processing system of the spectrometer to provide aerosol concentration information. Various nonvolatile droplet aerosols will be dispersed and information on their size distribution and propagation will be gathered.

Additional experiments are planned in which the results of the aerosol spectrometer are compared with other droplet sizing techniques (e.g., slide-wave, settling, hot wire sampler).

ACHIEVEMENTS: The PMS optical imaging droplet spectrometer (OIDS) was installed in the Laboratory. A series of tests were conducted to test correlation of OIDS with current slidewave methodology. After refinement by the manufacturer, an initial correlation coefficient was determined. The OIDS was also successfully operated using field power sources thus demonstrating a potential for field utilization.

RELATIONSHIP TO CORE PROGRAM: An item of medical surveillance equipment which will enable the TOE entomology service units to ensure proper calibration of their ULV dispersal equipment. Program is related to the core program in the areas of medical equipment development and integrated pest management systems.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA: CONTRACTOR ACCESS	9. LEVEL OF SUM ^a
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	62772A	3S162772A874		BA		232 APC F793	
XX XX XX XX XX XX	62778A	3S162778A838		00		009	
XX XX XX XX XX XX	STOG 80-7.2:6						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Tactical Ambulance Adaptation, Feasibility Study of							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7705		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL YEAR		C. CURRENT	
C. TYPE				80		0.7	
D. AMOUNT:				81		0.8	
E. KIND OF AWARD:				51		56	
F. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)			
NAME: Boyer, K.H., COL				NAME: ^a Conway, W.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Ambulance; (U) Tactical Ambulance;							
(U) Emergency Medical Vehicle; (U) Medical Transport							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To conduct a study of the Army's needs in tactical ambulances and their capabilities in preparation for the next major procurement.							
24. (U) Initiate a study program to identify the number and type of vehicles needed, the required medical capabilities of each and the logistical implications. The results of this study will be a comprehensive requirements document.							
25. (U) 7910 - 8009. A West German hard mounted litter rack for the M113 has been procured and has undergone extensive testing at Fort Benning. Also, a medical equipment list for the M113 ambulance vehicle has been developed and its packaging into the vehicle is being investigated.							

DETAIL SHEET

TITLE: Tactical Ambulance Adaptation, Feasibility Study of

FUNDING HISTORY: PY - 19K; CY - 51K; BY - 55K

PROBLEM DEFINITION: To assist the combat developer in determining the level of medical treatment that can practically be provided in tactical ambulances by studying items of equipment and layout of tactical vehicles for compatability.

IMPORTANCE: The "Division 86" study, currently going on, is leaning toward expansion of the level of medical treatment in the forward area including ambulance vehicles. In view of the decision that tactical ambulances will be adaptations of combat vehicles, it becomes important to know what equipment can logically be placed in those vehicles and how well the medical personnel function with it.

APPROACH: To procure specimen tactical vehicles and equip them as medical treatment/evacuation vehicles based on guidance from the combat developer and medical consultants. These trial configurations will then be evaluated for functional practicability and the results transmitted for use in "Division 86" or other studies.

ACHIEVEMENTS: It has been determined that the M113A1 will be the principal front line ambulance for the foreseeable future. A specimen M113A1 hull was procured, equipped with stabilized litter racks and provisioned with the medical equipment specified by the Academy of Health Sciences. The information thus generated is being assembled for presentation to the Academy for their concurrence. Plans are being made to perform the same task relative to a mobile Battalion Aid Station.

RELATIONSHIP TO CORE PROGRAM: Development of ambulance internal configuration comes under the mission of this research area to develop field medical treatment and evacuation equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV. SUMMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING ^a	8A. DISSEM INSTRN	8B. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY	62772A	3S162772A874		BA	234 APC F797		
XXXXXXXXXX	62770A	3M762770A802		00	131		
XXXXXXXXXX	CARDS 1405A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Integrated Pest Management - Mosquitoes							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8509		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
C. NUMBER				FISCAL YEAR		80	
D. TYPE				CURRENT		2.3	
E. KIND OF AWARD:				81		4.0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Van Essen, F.W.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Hembree, S.C.			
				NAME: Nelson, J.H. POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Integrated Pest Management; (U) IPM; (U) Biological Control							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop methods for mosquito control which integrate physical, chemical, and biological control methods, as appropriate to the target, so as to maintain effective control economically without undue damage to the environment.							
24. (U) The mosquito problems at a US Army installation will be defined using previously accumulated data and on-site observations. Proposed strategies for control of the problems will be developed. These strategies will integrate physical, chemical and biological methods as appropriate to the problems and as appropriate to projected resources for pest control. The proposed strategies will be implemented on-site to test the integrated pest management concept as it applies to mosquitoes. Conventional pest management methods will be used as a back-up, if the proposed strategies prove ineffective.							
25. (U) 7910 - 8009. Simulated field trials and a large number of laboratory bioassays have been conducted with four formulations of <u>Bacillus thuringiensis israelensis (Bti)</u> against several species of lab-reared mosquitoes at Ft. Detrick. Field trials with three formulations were conducted at Ft. Eustis, VA against natural mosquito populations. Residual activity and sedimentation rates of the various formulations are being studied. Laboratory experiments on the possibility of resistance to <u>Bti</u> developing in mosquitoes are underway. Data from these studies will substantiate the practicality of <u>Bti</u> as a larvicide for use in integrated mosquito control programs.							

DETAIL SHEET

TITLE: Integrated Pest Management - Mosquitoes

FUNDING HISTORY: PY - OK; CY - 98K; BY - 143K

PROBLEM DEFINITION: Rapid advances are being made in insect pest management technology in the civilian sector. Among those not yet fully capitalized on by military pest management are ultra-low volume pesticide dispersal technology, controlled release and microencapsulation formulations, use of hormone analogues, and the impending availability of effective, economical biological control agents for mosquitoes and black flies. While evaluation and assimilation of some of this technology by the Army is underway, a context is needed in which to tie together conventional and developing technology into an integrated pest management system for use by the military to control mosquitoes efficiently, economically and with minimal environmental insult.

IMPORTANCE: Vector control is the only way to protect the American fighting man from many vector-borne diseases. Military medical history demonstrates that protection of troops from vector-borne diseases may be vital to the outcome of armed conflict in many parts of the world. Therefore, it is of critical importance that insect pest/vector control technology in the military be developed and maintained at the highest state-of-the-art. The requirement that insect pest management be done with minimal environmental insult in CONUS and in host countries where host-country agreements so specify focuses special attention on hormone analogues and candidate biological control agents.

APPROACH: Field study areas will be identified at which developing mosquito control technology can be evaluated for suitability for use by the Army. Of immediate interest are hormone analogues and biological control agents nearing commercial availability.

ACHIEVEMENTS: Simulated field trials and a large number of laboratory bioassays have been conducted with four formulations of Bacillus thuringiensis israelensis (Bti) against several species of lab-reared mosquitoes at Ft. Detrick. Field trials with three formulations were conducted at Ft. Eustis, VA against natural mosquito populations. Residual activity and sedimentation rates of the various formulations are being studied. Laboratory experiments on the possibility of resistance to Bti developing in mosquitoes are underway. Data from these studies will substantiate the practicality of Bti as a larvicide for use in integrated mosquito control programs.

CONTRIBUTION TO CORE PROGRAM: This project is a systematic approach to developing a vector control program for management of mosquitoes. Project accepted with mission for research in applied military vector control.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA CG 2839	80 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
30 05 30	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	62772A	3S162772A874		DA		235 APC F798	
XXXXXXXXXX	62776A	3S162778A838		00		061	
XXXXXXXXXX	STOG 80-7.2:6						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Apparatus, X-Ray, Dental, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
8005		8201		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER ^a				FISCAL YEAR		C. FUNDS (in thousands)	
C. TYPE:				80		0.1	
D. KIND OF AWARD:				81		0.5	
E. CUM. AMT.				07		35	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)			
NAME: Boyer, K.H., COL				NAME: Malek, J.W.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS			
				NAME:			
				POC:DA			

22. KEYWORDS (Precede EACH with Security Classification Code) (U) X-Ray; (U) Field Medicine; (U) Field Equipment; (U) Dental X-Ray; (U) Low Dose X-Ray; (U) Dental Apparatus

23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To obtain a low capacity radiographic apparatus suitable to meet the requirements of portable field dental units.

24. (U) Evaluate commercial sources for a functional device that can be adapted to meet the requirements.

25. (U) 8005 - 8009. Commercial manufacturers were canvassed to determine compatibility with military requirements. Several candidates appear promising. Several prototypes of commercial items have been obtained for packaging and evaluation.

DETAIL SHEET

TITLE: Apparatus, X-Ray, Dental, Field

FUNDING: PY - OK; CY - 7K; BY - 35K

PROBLEM DEFINITION: New FDA regulations preclude use of previous X-ray units in field units, necessitating investigation of new X-ray units which will meet these standards.

IMPORTANCE: Current field dental TOE units do not have an authorized/certified X-ray unit.

APPROACH: Commercial sources will be searched for devices which will meet the requirements.

MEDICAL SYSTEMS IN NONCONVENTIONAL ENVIRONMENTS

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
80 05 30	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	62772A	3S162772A875		CA		222 APC E355	
EXXXXXXXXXX	62780A	3E162780A843		00		086	
EXXXXXXXXXX	STOG 80-7.2:						
11. TITLE (Precede with Security Classification Code) ^a (U) Development of Resuscitative Equipment for Mass Casualties in a Chemical Warfare Environment							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 002400 Bioengineering; 003200 Chemical, Biological and Radiological Warfare; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
8006		8206		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER: ^a				FISCAL YEAR		B. FUNDS (in thousands)	
C. TYPE:				80		0.4	
D. KIND OF AWARD:				81		256	
E. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Malek, J.W.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Resuscitation; (U) Chemical Warfare Casualties; (U) Field; (U) Medical Materiel; (U) Breathing; (U) Ventilation							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a portable, mechanical unit suitable for the ventilation of mass chemical warfare casualties in a contaminated atmosphere under field conditions.							
24. (U) Design, fabricate and evaluate a unit to meet established criteria.							
25. (U) 8006 - 8009. Commercially fabricated items have been ordered while in-house components have been completed. Industry canvassed for a small, lightweight air compressor operating from 24 volt DC and 110 volt AC power sources with small success. Fabrication to continue upon receipt of all component elements.							

DETAIL SHEET

TITLE: Development of Resuscitative Equipment for Mass Casualties in a Chemical Warfare Environment

FUNDING HISTORY: PY - OK; CY - 37K; BY - 256K

PROBLEM DEFINITION: No equipment exists today which can ventilate chemical warfare casualties on a mass basis. Personnel surviving an initial exposure to chemical warfare agents may exhibit failure to breathe properly and will require mechanical assistance.

IMPORTANCE: It is anticipated that chemical warfare casualties will place a heavy burden on medical field personnel. Equipment designed to handle many patients, simply and at the same time, will help both the medical personnel and improve the capability of the patient to survive.

APPROACH: Using a set of fixed parameters established for a prior piece of equipment to aid a single patient, design has been expanded to place anywhere from one to four or eight patients on a single piece of apparatus.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY 80 05 05	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTR ^a NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY		62772A	3S162772A875	CA	223 APC F354		
XXXXXXXXXX		62780A	3E162780A843	00	085		
XXXXXXXXXX		STOG 80-7.2:					
11. TITLE (Precede with Security Classification Code) ^a (U) Technical Feasibility Testing (TFT) of Delivery Systems for Chemical Warfare Medicaments							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 002400 Bioengineering; 003200 Chemical, Biological and Radiological Warfare; 009800 Medical and Hospital Equipment							
13. START DATE 8005		14. ESTIMATED COMPLETION DATE 8109		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		80 0.1 10	
C. TYPE:				CURRENT		81 0.3 19	
D. KIND OF AWARD:				E. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Boyer, K.H., COL TELEPHONE: (301) 663-7277; AUTOVON 343-7277				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: ^a Malek, J.W. TELEPHONE: (301) 663-7277; AUTOVON 343-7277 SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS NAME: NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Delivery Systems; (U) Injectors; (U) Injection Methods; (U) Automatic Injectors; (U) Chemical Warfare Antidotes; (U) Field Medical Materiel; (U) Chemical Casualty				POC:DA			
23. (U) To evaluate any and all kinds of antidote delivery systems to determine the best method/appliance to contain chemical warfare medicaments.							
24. (U) Conduct marked research to determine possible methods/appliances. Obtain prototypes and evaluate for potential use against established military characteristics.							
25. (U) 8005 - 8009. Various commercial injecting methods (manual, semi-automatic and automatic) were accrued and subjected to an initial engineering evaluation to determine the most promising method(s). Report is due by mid-October. A protocol subjecting the recommended method(s) to military type requirements has been prepared.							

DETAIL SHEET

TITLE: Technical Feasibility Testing (TFT) of Delivery Systems for Chemical Warfare Medicaments

FUNDING HISTORY: PY - OK; CY - 10K; BY - 19K

PROBLEM DEFINITION: There are various methods/types of delivery systems to inoculate personnel with liquid medicaments. This task is to review and evaluate the various known types of systems to ascertain the best method/appliance.

IMPORTANCE: FDA regulations preclude use of multiple type drugs which may be administered by individuals. Personnel operating in a contaminated chemical warfare environment will need candidate materiel for immediate use.

APPROACH: All known commercial injecting methods or systems were searched and obtained. A list of major characteristics was prepared and each method/system will be evaluated against those characteristics to determine which method/system is the best to contain medicaments.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
30 02 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	62772A	3S162772A875	CA	224 APC F353			
XXXXXXXXXX	62780A	3E162780A843	00	084			
XXXXXXXXXX	STOG 80-7.2:						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Evaluation of Foreign Medical Materiel for Use in a Contaminated Environment							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 003200 Chemical, Biological, and Radiological Warfare; 002400 Bioengineering; 009800 Medical & Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
8001		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER: ^a				FISCAL YEAR		27	
C. TYPE:				CURRENT		13	
D. KIND OF AWARD:				81		0.1	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)			
NAME: Boyer, K.H., COL				NAME: ^a Malek, J.W.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Chemical; (U) Biological; (U) Nuclear; (U) Field Equipment; (U) Medical Materiel; (U) Evaluation; (U) Casualty Management; (U) Patient Management; (U) Treatment; (U) Handling							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To evaluate foreign medical materiel/technology/doctrine for AMEDD adoption and use in contaminated field environments. Contaminated environments including nuclear, biological and chemical warfare. Evaluation and adoption of selected foreign medical materiel/technology/doctrine can rapidly and effectively improve AMEDD's casualty management capabilities. 24. (U) Start evaluation of the Federal Republic of Germany's foreign medical materiel/technology/doctrine for patient handling in a chemical warfare environment. 25. (U) 8002 - 8009. Reports on equipment and/or procedures emanating from foreign sources are carefully reviewed for potential U.S. use. Contacts with Norway made for a visit during spring of 1981 to view their current chemical warfare medical operations							

DETAIL SHEET

TITLE: Evaluation of Foreign Medical Materiel for Use in a Contaminated Environment

FUNDING HISTORY: PY - OK; CY - 27K; BY - 13K

PROBLEM DEFINITION: Several foreign countries have developed doctrine/technology/materiel for patient handling and treatment in contaminated field environments (nuclear, biological and chemical). To improve AMEDD's casualty management capabilities rapidly and effectively, observance and evaluation of selected foreign medical materiel will be addressed.

IMPORTANCE: AMEDD's doctrine for treatment and handling of field patients is currently being upgraded. Evaluation of foreign materiel would improve, enhance, and speed-up positioning of critical materiel to field elements.

APPROACH: Intelligence documents are constantly reviewed for possible candidate materiel. Contacts initiated for a visit to selected countries by AMEDD/MRDC personnel to observe foreign doctrine/technology/materiel next spring.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTN ^a	8B. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
00 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO./CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		62780A		3S162772A875		CA 225 APC F352	
B. CONTRIBUTING		62770A		3E162780A843		00 082	
C. CONTINUING		STOG 80-7.2					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Technical Feasibility Testing (TFT) of Medical Equipment							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7903		8309		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL		80 0.6 55	
C. TYPE:		D. AMOUNT:		YEAR CURRENCY		81 0.2 20	
E. KIND OF AWARD:		F. CUM. AMT.					
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a : US Army Medical Bioengineering Research & Development Laboratory				NAME ^a : US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS ^a : Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME ^a : Conway, W.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC: DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Medical Equipment; (U) Field Medicine; (U) Testing							
23. TECHNICAL OBJECTIVE ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To technically evaluate medical items and systems developed by another service, a foreign nation, or a commercial firm. Results provide input for requirement documents, development plans, or product improvement proposals.							
24. (U) Specific items are evaluated for military relevancy after initiation by letter request from major commands, Military Intelligence Information Agency, or Department of Defense activities. Test protocols are written for each item evaluated and a final report written outlining specific recommendations.							
25. (U) 7909 - 8012. Preliminary investigation was performed on a vital signs monitor set for high noise, high vibration environments to determine feasibility. This has since been converted to a separate task, supported by LOA, based on preliminary results. Work continues on a traction device for MUST hospital beds which originated as a nurse's suggestion.							

DETAIL SHEET

TITLE: Technical Feasibility Testing of Medical Equipment

FUNDING HISTORY: PY - 0K; CY - 55K; BY - 20K

PROBLEM DEFINITION: To conduct an ongoing program of evaluating promising items of foreign or commercial medical equipment and instrumentation for possible application in the field. This effort also serves to maintain a technology base for the laboratory.

IMPORTANCE: From time to time new and interesting developments come to light in medical equipment having potential importance to the Army. These developments may come from the commercial market or may surface from intelligence sources. A mechanism must exist for conducting preliminary evaluations of such equipment without being driven by specific requirements.

APPROACH: To maintain an open work unit, funded at a modest level, which will permit periodic market surveys, evaluation of intelligence reports on foreign equipment, and the occasional procurement and evaluation of items of interest. The task also allows for the investigation of complaints against existing field equipment to provide a comparison base for evaluating new ideas and equipment.

ACHIEVEMENTS: Activity during the period covered consisted of work on two subtasks. One involved determining the feasibility of coming up with a vital signs monitor that would work in the high-noise, high-vibration environment of an armored vehicle or helicopter. This looked sufficiently promising to warrant moving the effort into a funded development task, which was done. The second effort, still going on, deals with evaluation of a suggestion from the field for a traction set to work with a MUST hospital bed. This item uses commercially available components.

RELATIONSHIP TO CORE PROGRAM: This task is consistent with the Laboratory's mission to develop medical field equipment.

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL ^a	
				DA OB 6273	80 05 23	DD-DR&E(AR)636	
3. DATE PREV. SUMMARY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DES'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS ^a	9. LEVEL OF SUB ^a
79 10 01	H. COMPLETION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		62778A		35162778A838		00	
B. CONTRIBUTING						025 APC F786	
X.XXXXXXXX		CARDS 114f					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Evaluation of Rapid Non-Destructive Insect Detector							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7703		8005		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE			
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER ^a				FISCAL			
C. TYPE:				YEAR			
D. KIND OF AWARD:				CURRENT			
				79			
				1.7			
				53			
				80			
				0.6			
				24			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering				NAME: ^a US Army Medical Bioengineering			
ADDRESS: ^a Research & Development Laboratory				ADDRESS: ^a Research & Development Laboratory			
Fort Detrick, Frederick, MD 21701				Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Anderson, L.M.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
				SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Nelson, J.H.			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pest Control; (U) Insect Detector; (U) Stored Products; (U) Commodities; (U) Insect Surveillance							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To conduct evaluation of the Rapid Non-Destructive Insect Detector System developed at the U.S. Department of Agriculture, Agricultural Research Service, Stored Products Laboratory, Savannah, Georgia. This detector was developed under a research contract awarded by the Headquarters, US Army Medical Research and Development Command, Washington, DC. 24. (U) Test protocols will be developed and actual field evaluations will be conducted in US Army commodity storage warehouses to ensure that the Rapid Non-Destructive Insect Detector will effectively detect stored-products insect infestations in stored commodities. 25. (U) 7910 - 8005. The second prototype has been tested and evaluated. The results of both the first and second prototype evaluations are included in Technical Report 8001. The second prototype showed much improvement over the first prototype, but neither could meet the required performance criteria. The second prototype conceptually was technically usable and could detect three insects per pound of commodity, but other physical and mechanical problems made it operationally unacceptable.							

ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT --ETC F/G 6/8
ANNUAL PROGRESS REPORT FY1980; 1 OCTOBER 1979-30 SEPTEMBER 1980--ETC(U)
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DETAIL SHEET

TITLE: Evaluation of Rapid Non-Destructive Insect Detector

FUNDING HISTORY: PY - 35K; CY - 24K; BY - OK

PROBLEM DEFINITION: To develop an instrument for detection of stored product insect infestations in DoD procured food products.

IMPORTANCE: Infestation of food by insects represents a health hazard to the soldier and results in a major economic loss to DoD. Foods lose both palatability and nutritional quality when infested by insects. An instrument which can rapidly detect insect infestations will ensure an increased nutritional quality of food while reducing economic loss. This instrument can be a survey instrument for a control program for stored product insects.

APPROACH: Test protocols will be developed and actual field evaluations will be conducted in US Army commodity storage warehouses to ensure that the Rapid Non-Destructive Insect Detector will effectively detect stored-products insect infestations in stored commodities.

ACHIEVEMENTS: The second prototype has been tested and evaluated. The results of both the first and second prototype evaluations are included in Technical Report 8001. The second prototype showed much improvement over the first prototype, but neither could meet the required performance criteria. The second prototype conceptually was technically usable and could detect three insects per pound of commodity, but other physical and mechanical problems made it operationally unacceptable.

RELATIONSHIP TO CORE PROGRAM: Survey methods are important components of insect control programs. Through survey procedures control efforts can be accurately targeted. Project provided technical base for control strategies for stored-product insects.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
79 10 01	H. TERMINATION J		U		NL		
10. NO / CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		62778A		3S162778A838		00	
B. CONTRIBUTING						060 APC F720	
C. CONTINUING		STOG 80-7.2:6					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Litter Loading Device, Field Ambulance							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8301		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE			
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER: ^a				FISCAL YEAR			
C. TYPE:				CURRENT			
D. KIND OF AWARD:				FUNDING AGENCY			
E. AMOUNT:				PROFESSIONAL MAN YRS			
F. CUM. AMT.				FUNDS (in thousands)			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Precede SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Patzer, N.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Litter Loading Device; (U) Mechanical Assist Device; (U) Personnel Assist							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Precede individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a device that provides mechanical assistance in the loading and unloading of litter patients in field ambulances. Applies primarily to wheeled vehicles having high ground clearance.							
24. (U) To design a mechanical litter lift device that can be permanently attached to the ambulance vehicle and which employs simple mechanical advantage, hydraulics, vehicle electrical power, or a combination of these, for motive power.							
25. (U) 7909 - 8010. A draft letter requirement for this task was prepared and circulated for approval. The device is intended for use on the M886 ambulance which is due for replacement in 1983. The task is terminated because the combat developer has questioned the need for such a device.							

DETAIL SHEET

TITLE: Litter Loading Device, Field Ambulance

FUNDING HISTORY: PY - OK; CY - 50K; BY - OK

PROBLEM DEFINITION: A need is perceived for a device that will provide mechanical assistance in the loading and unloading of litter patients in wheeled tactical ambulances having high ground clearance.

IMPORTANCE: Loading of litter patients into high ground clearance vehicles provides a physically taxing situation. The existence of a device, attached to the vehicle, that would provide some of the lifting power necessary would enable reduction of the number of personnel required to handle litter patients and would also facilitate greater use of female personnel for such tasks.

APPROACH: To develop a type of platform lift that attaches to a field ambulance and uses either vehicle power or simple mechanical advantage devices to provide lifting assistance. Commercial lift gates are not suitable for this application.

ACHIEVEMENTS: Information has been gathered on the M886 ambulance as a candidate vehicle for this device. The combat developer, however, indicates that the M886 fleet will be replaced in the near future. The replacement vehicle has not yet been identified. For that reason, this task is being terminated for the present. It will be reestablished at a future date if requirements warrant.

RELATIONSHIP TO CORE PROGRAM: This task is ancillary to the Laboratory's basic mission of developing medical and medical-related field equipment.

MEDICAL SYSTEMS IN CHEMICAL DEFENSE

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA OB 6218	80 01 04	DD-DR&E(AR)436	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. ORIGIN INSTR ^a	8b. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUB
79 10 01	K. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	62780A	3E162780A843		00		081 APC F351	
b. CONTRIBUTING	62778A	3S162778A838				018	
XXXXXXXXXX CARDS 114f							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Personnel Decontamination Sets, Design of							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7704		8002		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE:				CURRENT			
d. KIND OF AWARD:				80		0.0	
e. CUM. AMT.						00	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering				NAME: ^a US Army Medical Bioengineering			
ADDRESS: ^a Research & Development Laboratory				ADDRESS: ^a Research & Development Laboratory			
Fort Detrick, Frederick, MD 21701				Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Cranford, H.B.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Salisbury, L.L.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Chemical Decontamination; (U) Field Equipment;							
(U) Personnel Decontamination; (U) Decontamination							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop personnel decontamination sets for use by the US Army Biomedical Laboratory, Edgewood Arsenal, MD; one set for use in a fixed installation with the other unit developed for field use.							
24. (U) Investigate and evaluate current decontamination practices and materials. Design, fabricate and test sets based on the data accrued from the evaluation.							
25. (U) 7910-8002. Terminated for lack of progress.							

DETAIL SHEET

TITLE: Personnel Decontamination Sets, Design of

FUNDING HISTORY: PY - 10K; CY - OK; BY - OK

PROBLEM DEFINITION: Personnel of the Biomedical Laboratory, Aberdeen Proving Ground, MD frequently exposed to chemicals are required chemical decontamination both in the field and in a fixed facility, the Toxic Exposure Aid Station (TEAS).

IMPORTANCE: Current methods of personnel decontamination are time consuming, labor and resource intensive; rendering existing materials and procedures unacceptable for use by the field Army.

APPROACH: Investigate and evaluate current decontamination practices and materials. Design, fabricate and test sets based on the data accrued from evaluation.

ACHIEVEMENTS: No progress due to lack of funding.

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
				DA OB 6223	80 10 01		
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUB A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
4. PRIMARY	63732A	3S263732A836		AA		005 APC F305	
XXXXXXXX	63732A	3S163732A836		00			
XXXXXXXX	CARDS 1400A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Formulations, Controlled Release, Environmentally Compatible							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7710		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE			
A. DATES/EFFECTIVE: EXPIRATION: B. NUMBER: C. TYPE: & AMOUNT: D. KIND OF AWARD: E. CUM. AMT.				PRECEDING			
				FISCAL YEAR			
				CURRENCY			
				A. PROFESSIONAL MAN YRS B. FUNDS (in thousands)			
				80 1.5 87 81 1.0 57			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering ADDRESS: ^a Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering ADDRESS: ^a Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Boyer, K.H., COL TELEPHONE: (301) 663-7277; AUTOVON 343-7277				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution) NAME: ^a Nelson, J.H. TELEPHONE: (301) 663-7237; AUTOVON 343-7237 SOCIAL SECURITY ACCOUNT NUMBER: ASSOCIATE INVESTIGATORS NAME: Anderson, L.M. POC:DA			
21. GENERAL USE							
Foreign Intelligence Not Applicable							
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pesticide Formulations; (U) Controlled-Release; (U) Pest Management; (U) Environmental Compatibility; (U) Vector Control							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify and evaluate environmentally compatible controlled-release pesticide formulations of military relevance for use in support of tactical operations and fixed military installation pest management/vector control programs.							
24. (U) Utilizing commercially prepared controlled-release pesticide formulations and carriers potentially suitable for military use, quantify release rates and degradation rates in the laboratory. Those formulations found to be best in laboratory tests will be evaluated in field tests to verify laboratory results under natural environmental conditions. Determinations both in the laboratory and in the field will be biological effectiveness, environmental compatibility, cost effectiveness, and compatibility with current standard pesticide dispersal equipment.							
25. (U) 7909 - 8009. Field trials have been completed. The 10X Abate silicate formulation was effective for 9 weeks in controlling mosquito larvae in field plots. Due to analytical problems of detecting Abate in water, levels could not be monitored below 100 ppb. The Abate drops below this level within 3 to 4 days after treatment. The LC100 is less than 100 ppb.							

DETAIL SHEET

TITLE: Pesticide Formulations, Controlled Release, Environmentally Compatible

FUNDING HISTORY: PY - 82K; CY - 87K; BY - 57K

PROBLEM DEFINITION: To develop and register long lasting and environmentally compatible pesticide formulations.

IMPORTANCE: Controlled-release environmentally degradable pesticide formulations systems are needed to replace the long-lasting, broad-spectrum pesticides like DDT which have been cancelled or suspended. The current formulations of new compounds are short-lived and have relatively short shelf life, thus are overall militarily less acceptable. These shortcomings can be overcome through application of a controlled-release formulation. This should result in reduced pesticide use, an important aspect of military vector control programs.

APPROACH: The controlled-release pesticide formulation system envisions the formulation of pesticides into carriers having chemical or physical characteristics which release the pesticide at a predetermined rate into the environment so that, after a given time, the pesticide and carrier are completely degraded.

ACHIEVEMENTS: Experimental trials in Arkansas rice fields were successfully completed. Using an Abate formulation, effective control was obtained for 2 months. Data has been correlated to laboratory trials with field trials being similar to expected values as derived from laboratory results.

RELATIONSHIP TO CORE PROGRAM: This project is involved in evaluation and field testing of several new pesticide formulations. Outcome will provide the military with a new series of effective pesticides which are registered for medically important arthropods.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL		
10. NO. / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	63732A	3S263732A836	BA	006	APC F304		
B. CONTINGENT	63732A	3S163732A836	00				
C. CONTINGENT	CARDS 1402A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Field Clinical Analysis System							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 010100 Microbiology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7610		8109		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER:				FISCAL YEAR		B. FUNDS (in thousands)	
C. TYPE:				80		0.3	
D. KIND OF AWARD:				81		121	
E. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Salisbury, L.L.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Reams, W.H.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Laboratory Equipment; (U) Medical Field Devices; (U) Test Kits							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRAM (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop through exploratory studies field medical devices and laboratory equipment for clinical analysis of body fluids within Army field medical units.							
24. (U) A problem definition study will be conducted to determine functional requirements of a field system. Lightweight self-contained, ruggedized and modular components will be developed to satisfy the identified requirements.							
25. (U) 7910 - 8009. A list of test requirements has been developed. A survey of commercial equipment will be conducted to determine which requirements can be satisfied and which items can meet field needs.							

DETAIL SHEET

TITLE: Field Clinical Analysis System

FUNDING HISTORY: PY - 5K; CY - 22K; BY - 121K

PROBLEM DEFINITION: To develop a modular, portable and integrated clinical analysis system for the determination of clinically important body fluid parameters in a field environment.

IMPORTANCE: Currently used equipment is a mixture of various commercial equipment which has not been designed to operate in the field. Additionally, the use of different manufacturer's equipment for the same determination increases the logistic, training and maintenance problems.

APPROACH: A determination of the various tests and location in the medical care chain will be determined. A survey of the procedures available to make the desired test will be made. Then a system will be developed which will use common procedures for as many tests as possible and which will provide a modular and integrated system.

ACHIEVEMENTS: Two lists of tests, one for "sick-call" and one for combat casualties have been obtained and compared for duplication. The tests have been grouped according to the determination method used. A survey of commercial items is underway.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the laboratory mission of developing field medical equipment.

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTRN	8B. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	H. TERMINATION	U	U		NL	☒ YES ☐ NO	
10. NO / CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	00	002 APC F521			
B. CONTRIBUTING							
X. XXXXXXXXXX	CARDS 01490	(26)					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Cold Injury Rapid Rewarm and Treatment System, Prototype Design and Fabrication							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7303		8010		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		79	
C. TYPE:				CURRENT		0.2	
D. KIND OF AWARD:				80		0.2	
E. CUM. AMT.						03	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Conway, W.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC: DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Cold Injury; (U) Frostbite; (U) Arctic Medicine; (U) Tissue Rewarmer							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede last of each with Security Classification Code.)							
23. (U) To locate from commercial sources, or alternatively develop and evaluate, a device for the rapid rewarming of frozen human extremities. The device must operate on the principle of immersion or spray with an aqueous solution at a controlled temperature and must have the capability of producing its own water supply from melting snow or ice by internal or supplementary heating. The item must be suitable for use in the forward areas of arctic field operations. 24. (U) Search the commercial market for a suitable design, contract for the development and fabrication of prototype units and conduct development testing on the items thus obtained. Major technical barriers are to achieve the required capabilities in a unit light enough and small enough for field use and utilize a safe and supportable power source for its operation. 25. (U) 7909 - 8003. Task terminated by IPR. Changing medical doctrine has eliminated the need for this equipment in forward areas. Adequate cold injury treatment equipment already exists at rear area medical facilities.							

DETAIL SHEET

TITLE: Cold Injury Rapid Rewarm and Treatment System, Prototype Design and Fabrication

FUNDING HISTORY: PY - 3K; CY - 7K; BY - OK

PROBLEM DEFINITION: To provide a means of quick-thawing of frozen human tissue in forward areas of arctic and sub-arctic operations. The effort is directed primarily to the treatment of cold injuries to the extremities of field personnel.

IMPORTANCE: Cold region field medical units at the battalion aid and clearing station level are not currently equipped to provide the controlled temperature fluid bath required in the treatment of cold injuries. Thus, treatment cannot be provided below the level of the combat support hospital.

APPROACH: To develop a small controlled temperature bath device that either utilizes available electric power or has a self-contained heat source.

ACHIEVEMENTS: The original requirement called for a device that would accommodate an entire human limb. A prototype was built but was rejected due to the high electric power consumption of such a large bath and the safety consideration whereby an adequate electrical ground is difficult to obtain in the arctic. Requirements were revised to cover treatment of a hand or foot and a propane gas fired unit was developed with fuel supply and regulation circuits self-contained. Two prototype units were built and engineering tests indicated the design was viable. However, medical doctrine has recently been revised to prohibit treatment of cold injuries forward of the combat support hospital and the requirement for these devices has been officially deleted. The task has, accordingly, been terminated.

RELATIONSHIP TO CORE PROGRAM: This device comes under the mission of this Laboratory and research area to develop medical treatment equipment for field use.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD DR&E(AR)636	
3. DATE PREV SUMMARY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUB A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	BB	003	APC F583		
B. CONTRIBUTING	62778A	3S162778A838	00	056			
11. TITLE (Provide with Security Classification Code) ^a							
(U) Sprayer, Powered, ULV, Portable							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009300 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING			
B. NUMBER ^a				FISCAL YEAR		B. FUNDS (in thousands)	
C. TYPE		D. AMOUNT:		80		1.1	
E. KIND OF AWARD:		F. CUM. AMT.		81		0.8	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Provide SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Kardatzke, J.T.			
TELEPHONE: (301) 563-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Nelson, J.H.			
				NAME: Conway, W.H.			
23. KEYWORDS (Provide EACH with Security Classification Code)							
(U) ULV Dispersal; (U) Arthropod Control; (U) Lightweight; (U) Durable; (U) Disease Vectors; (U) Portable							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Provide individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify a commercially available, lightweight, durable, portable unit capable of dispersing ULV pesticide formulations. This unit would be used by preventive medicine personnel in combat zones and CONUS for controlling disease vectors and pest arthropods.							
24. (U) A review of commercially available portable ULV units will be made. Suitable units will be field evaluated. After entomological feasibility has been established, modifications, if necessary, will be made and formal testing coordinated with responsible agencies.							
25. (U) 7910 - 8009. Development testing of gasoline engine driven and battery-powered units completed. A gasoline-engine model made by the Micro-Gen Corporation has been selected as the most promising unit. Operational testing will be conducted during March 1981.							

DETAIL SHEET

TITLE: Sprayer, Powered, ULV, Portable

FUNDING HISTORY: PY - 0K; CY - 66K; BY - 36K

PROBLEM DEFINITION: To evaluate commercial hand-held ULV sprayers for adoption of an acceptable item into TOE units.

IMPORTANCE: Previous experiences in Southeast Asia and the Mideast have demonstrated the devastating effect outbreaks of arthropod-borne diseases can have on field operations. Many outbreaks start from a small localized area, too big for a field sanitation team to handle but too small for efficient treatment using current Corps equipment. To fill this technical gap, a small portable ULV sprayer could be used for local control of flies and mosquitoes.

APPROACH: To evaluate several commercially available hand-held, ULV sprayers which are either gasoline engine driven or battery powered. Units which pass engineering criteria will be subjected to NDI strategy.

ACHIEVEMENTS: Feasibility/Developmental testing of gasoline engine driven and battery-powered units completed. A gasoline engine model made by the MicroGen Corporation (San Antonio, TX) for the Navy has been selected as a more promising item.

RELATIONSHIP TO CORE PROGRAM: Project involves engineering and operational evaluation of insecticide dispersal equipment for inclosure in TOE of field medical units.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY					1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9. SPECIFIC DATA CONTRACTOR ACCESS ☒ YES ☐ NO		10. LEVEL OF SUM A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL			
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER		
6. PRIMARY	64717A	3S464717D832		BB		004 APC F511		
XXXXXX	64717A	3S464717D832		00				
XXXXXX	CARDS 1416R							
11. TITLE (Precede with Security Classification Code) ^a								
(U) Bag, Patient Holding and Evacuation, Prototype Design and Fabrication								
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a								
009800 Medical and Hospital Equipment; 002400 Bioengineering								
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD		
7304		8209		DA		C. In-House		
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS		20. FUNDS (in thousands)
a. DATES/EFFECTIVE:				PRECEDING				
b. NUMBER *				FISCAL YEAR		80		0.3
c. TYPE:				CURRENCY				20
d. KIND OF AWARD:				e. AMOUNT:		81		0.2
f. CUM. AMT.								16
21. RESPONSIBLE DOD ORGANIZATION				22. PERFORMING ORGANIZATION				
NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)				
NAME: Boyer, K.H., COL				NAME: Prenskey, W.C.				
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237				
23. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER				
Foreign Intelligence Considered				ASSOCIATE INVESTIGATORS				
				NAME: Conway, W.H.				
				NAME: POC:DA				
24. KEYWORDS (Precede EACH with Security Classification Code) (U) Evacuation Bag; (U) Arctic Medicine; (U) Cold Climate Medical Material; (U) Patients, Transportation of								
25. TECHNICAL OBJECTIVE, 26. APPROACH, 27. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)								
23. (U) To develop a patient holding and evacuation system capable of maintaining casualties of desired, controlled temperatures in extreme cold climates for prolonged periods. Currently available evacuation bags cannot adequately maintain cold climate patients at required temperatures.								
24. (U) Design and fabricate developmental prototypes based upon previous engineering effort. Existing state-of-the-art materiel will be used. Major technical barrier is to achieve required temperature duration capability with required lightweight characteristics.								
25. (U) 7910 - 8009. Serious functional problems have developed with the prototype units necessitating cancellation of OT. The entire propane/thermoelectric concept is being reevaluated.								

DETAIL SHEET

TITLE: Bag, Patient Holding and Evacuation, Prototype Design and Fabrication

FUNDING HISTORY: PY - 18K; CY - 20K; BY - 16K

PROBLEM DEFINITION: The present means of protecting sick and injured personnel in cold environments from additional complications resulting from exposure to the cold is inadequate from the point of infliction through the evacuation system.

IMPORTANCE: Protection against exposure to cold must be provided through the evacuation organization until the patient can be moved by a temperature-controlled transportation medium or definitive treatment begins.

APPROACH: After problem definition, a number of proposals were evaluated before awarding a contract for prototype propane or propylene-fired heated liners to be placed inside medical evacuation bag. A second contract was awarded for prototypes of smaller, belt-mount versions of this system.

ACHIEVEMENTS: Operational problems have developed with the propane power units and associated plumbing. This has led to a reevaluation of the entire concept and different methods of providing heat to the bag are under study, as is the possibility of salvaging the propane units by means of redesign.

RELATIONSHIP TO CORE PROGRAM: This task is consistent with the Laboratory's mission to develop medical field treatment and evacuation equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DES'N INSTR'M	9. SPECIFIC DATA - CONTRACTOR ACCESS	10. LEVEL OF SUM A. WORK UNIT
79 10 01	K. COMPLETION	U	U		NL	☒ YES ☐ NO	
10. NO /CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	64717A	3S164717D832		00		005 APC F565	
XXXXXXXXXX	63732A	3S163732A836		00		001	
XXXXXXXXXX	CARUS 114f						
11. TITLE (Precede with Security Classification Code) ^a							
(U) U.S. Army Hi-Speed Mini Sterilizer							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
010100 Microbiology; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7607		8003		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING			
B. NUMBER: ^a				FISCAL		0.3	
C. TYPE:		D. AMOUNT:		YEAR		18	
E. KIND OF AWARD:		F. CUM. AMT.		CURRENT		0.5	
				80		38	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS: ^a				ADDRESS: ^a			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Prensky, W.C.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilizing; (U) Field Equipment; (U) Medical; (U) Engineering Evaluation; (U) Field Sterilizers; (U) Emergency Sterilizer							
23. TECHNICAL OBJECTIVE: ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To conduct an engineering evaluation of an improved emergency sterilizer.							
24. (U) Conduct DT II and OT II testing on the second generation Mini Sterilizers.							
25. (U) 7909 - 8007. IPR recommended sterilizer for type classification. Technical Data Package completed and transmitted to OTSG.							

DETAIL SHEET

TITLE: US Army Hi-Speed Mini-Sterilizer

FUNDING HISTORY: PY - 18K; CY - 38K; BY - OK

PROBLEM DEFINITION: A requirement exists for a rapid sterilization capability not existent in US Army field medical treatment facilities.

IMPORTANCE: AMEDD must be prepared to provide material of guaranteed sterility when urgently required at the operating room level of field medical treatment facilities. This requirement applies to items contaminated during a procedure, items having unique value, items in limited supply or items whose need could not be foreseen.

APPROACH: A series of contracts starting with a problem definition study, then first prototype design and finally 12 prototypes intended for ultimate type classification.

ACHIEVEMENTS: Unit has been accepted at IPR for type classification, necessary documentation has gone forward and the task stands completed insofar as this Laboratory's involvement is concerned.

RELATIONSHIP TO CORE PROGRAM: This task relates to the mission of the Laboratory to develop field medical equipment and apparatus.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV. SUMM ^a	4. KIND OF SUMMARY	5. SUMMARY SCT ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	64717A	3S464717D832	BA	012 APC F564			
XXXXXXMM	64717A	3S464717D832	00				
XXXXXXMM	CARDS 1402R						
11. TITLE (Precede with Security Classification Code) ^a (U) Optometry Set, Field, Combat							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE 7 405		14. ESTIMATED COMPLETION DATE 8 109		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PREVIOUS		108	
b. NUMBER:				FISCAL		1.5	
c. TYPE:				YEAR		0.4	
d. KIND OF AWARD:				CURRENT		24	
e. AMOUNT:							
f. CUM. AMT.							
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS:				ADDRESS:			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Arnold, M.F.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Salisbury, L.L.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede Each with Security Classification Code) (U) Field Set; (U) Field Optometry; (U) Combat Set; (U) Optometry Set							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) To modernize and update the field optometry set and to replace components which are no longer available from commercial sources with new designs. 24. (U) Design and fabrication of engineering development prototypes for Developing Test (DT II) and Operational Testing (OT II). 25. (U) 7910 - 8009. All components have been obtained and packaged. A chair was designed around a #3 medical chest with reduced weight and volume. OT II was conducted during 4th Quarter FY80 with no major problems. Awaiting test report.							

DETAIL SHEET

TITLE: Optometry Set, Field, Combat

FUNDING HISTORY: PY - 69K; CY - 108K; BY - 24K

PROBLEM DEFINITION: To modernize and update the Field Optometry Set and to replace components which are no longer available from commercial sources with new designs.

IMPORTANCE: A functional optometry set is required for the use of optometry personnel assigned to the medical battalion providing division level medical support and other teams providing optometry services.

APPROACH: To design and evaluate engineering prototypes for test, technical data packages and type classification.

ACHIEVEMENTS: The basic chair included with the optometry equipment has successfully completed DT II and OT II. The chair has been redesigned to pass OT II. An augmentation set has been combined with the optometry set. The complete optometry set has successfully completed OT III. Final drawings are being produced for type classification.

RELATIONSHIP TO CORE PROGRAM: The Optometry Set is an integral part of the medical materiel program.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	
79 10 01	D. CHANGE	U	U		NL		
10. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		64717A		3S464717D832		AA	
XXXXXXXXXX		64717A		3S462717D832		00	
XXXXXXXXXX		CARDS 1213R					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Unit, Solid, Helicopter Slung							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7610		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL YEAR		80	
C. TYPE:				CURRENCY		0.3	
D. KIND OF AWARD:				81		1.0	
E. CUM. AMT.						26	
57							
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Kardatzke, J.T.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Reams, W.H.			
				NAME: Nelson, J.H.			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Helicopter Rig; (U) Solid Dispersal; (U) Aerial Applications; (U) Mosquito Control; (U) Solid Insecticide							
24. TECHNICAL OBJECTIVE, ^a 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify a suitable commercial, helicopter slung, dispersal unit for applying solid formulations of insecticides, which would: (a) be capable of dispersing insecticides when slung beneath a helicopter; (b) require no modification of the aircraft; (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS.							
24. (U) A Simplex spreader was evaluated with various pesticide formulations under a variety of conditions and was found to be unsatisfactory due largely to the vertically actuated gate system. A Chadwick, Inc. applicator, with horizontally actuated gate system, was procured and modified for remote control operation. Feasibility and military adaptability will be established under field conditions.							
25. (U) 7910 - 8009. Modification of Chadwick unit is in progress. Development Testing II and Operational Testing II will be completed during FY81.							

DETAIL SHEET

TITLE: Pesticide Dispersal Unit, Solid, Helicopter Slung

FUNDING HISTORY: PY - 41K; CY - 26K; BY - 57K

PROBLEM DEFINITION: To adapt a commercial item capable of dispensing solid pesticide formulations for use in the military operation environment.

IMPORTANCE: Medical personnel engaged in field operations need the capacity for aerial dispersal of solid pesticide formulations to ensure rapid treatment of large areas inaccessible by ground equipment but too small for efficient use of larger aerial dispersal equipment. Currently, field units have no item of equipment with the capability although their mission and TOE require it.

APPROACH: A commercially available spreader which is slung beneath a helicopter on the helicopter's cargo hook is being adapted for military use.

ACHIEVEMENTS: A Chadwick (Beaverton, OR) granular spreader has been upgraded to correct problems uncovered during OT I. This item is currently undergoing DT to ensure readiness for OT II.

RELATIONSHIP TO CORE PROGRAM: Project involves evaluation and modification of commercial unit as a military standard item. Item will replace current obsolete standard TOE item. Project is in concert with pest control equipment program.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AH)656	
3. DATE PREV SUMMARY 79 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTR ^a NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
6. PRIMARY	64717A	3S464717D832	BB	015	APC F568		
XXXXXXXX	63732A	3S263732A836	00	003			
XXXXXXXX	CARDS 1604R						
11. TITLE (Precede with Security Classification Code) ^a (U) Environmental Protection Containers for Medical Supplies							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE 7409		14. ESTIMATED COMPLETION DATE 8106		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		80	
C. TYPE				CURRENT		0.7	
D. KIND OF AWARD:				81		0.2	
E. CUM. AMT.						63	
19. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Conway, W.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Patzer, N.H.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Environmental Container; (U) Field Container; (U) Arctic Field Container; (U) Medical Supply Container; (U) Arctic Supplies; (U) Arctic Protection							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a container to protect freezable military medical items in an Arctic environment.							
24. (U) Design, fabricate and evaluate a container to meet the requirements of Arctic use.							
25. (U) 7909 - 8009. New prototype fabricated and development testing completed. Item now meets the "8 hours without power" criterion that was at issue with the first iteration. Prototype is now undergoing a belated maintenance evaluation which may result in some minor modification.							

DETAIL SHEET

TITLE: Environmental Protection Containers for Medical Supplies

FUNDING HISTORY: PY - 43K; CY - 63K; BY - 10K

PROBLEM DEFINITION: To provide a means of storing biologicals which are subject to damage by freezing during field operations in arctic or sub-arctic regions.

IMPORTANCE: The present lack of a dedicated piece of equipment to cope with this problem has led to spoilage of large quantities of biological materials in Alaska. Present methods of preserving freezables are makeshift and totally inadequate.

APPROACH: To develop a light-weight, insulated chest that includes electrical strip heaters and a temperature control circuit. This chest, issued to appropriate field units, would be dedicated to the storage and preservation of freezable medical materials. The chest is also to be designed to protect freezables during several hours of unpowered transport.

ACHIEVEMENTS: Two prototype units have been constructed and have been subjected to DT I and II and OT I and II. Since the previous test sequence, an additional inch of insulation has been added to the design to extend the unpowered survival time. The results of that modification have been presented to an IPR and deemed acceptable. The technical data package is being prepared and a maintenance evaluation is being scheduled for the near future. Any recommendations arising from that evaluation will be incorporated into a final prototype and tested prior to going on to type classification.

RELATIONSHIP TO CORE PROGRAM: This equipment performs an ancillary function related to medical treatment in a field environment. The development of field treatment is a primary function of this research area.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY 78 10 01	4. KIND OF SUMMARY K. COMPLETION	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTRN ^a NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S164717D832	00	016 APC F570			
B. SECONDARY	62773A	3S162773A838	00	014			
C. TERTIARY	CARDS 114f						
11. TITLE (Precede with Security Classification Code) ^a (U) Cabinets, MUST, Redesign of							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 004400 Containers and Packaging							
13. START DATE 7608		14. ESTIMATED COMPLETION DATE 7911		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		FUND (in thousands)	
B. NUMBER:				FISCAL YEAR		79	
C. TYPE:				CURRENT		1.7	
D. KIND OF AWARD:				80		0.0	
E. AMOUNT:						65	
F. CUM. AMT.						00	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Patzer, N.H.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code) (U) Cabinets; (U) Tables; (U) MUST; (U) Field Containers; (U) Combat Support Hospital							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRAM (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) To redesign and develop new cabinets for the MUST Combat Support Hospital to reduce: weight, procurement costs, and number of different sizes. 24. (U) Design and fabricate new cabinets and evaluate for acceptance. 25. (U) 7810 - 7909. All design completed. Drawings are completed for all cabinetry except the pharmacy/narcotics cabinet which is in the works. Some drawings previously submitted to DPSC are being revised, at their request, for the convenience of small vendors not accustomed to the latest drawing format. Task is essentially complete.							

DETAIL SHEET

TITLE: Cabinets, MUST, Redesign of

FUNDING HISTORY: PY - 80K; CY - 102K; BY - OK

PROBLEM DEFINITION: Cabinets and utility tables currently in use with the MUST hospital system are too costly to procure. The intent of this task is to redesign the family of cabinets and tables to reduce fabrication cost and number of different cabinet sizes.

IMPORTANCE: In order to preserve the viability of the MUST concept, it is important to keep the cost of items used in that system to a minimum. The cabinetry in the MUST system represents a substantial cost item.

APPROACH: To perform a value engineering study on the existing cabinetry with emphasis on reducing the number of different types and sizes of cabinets, simplifying construction techniques, and reducing weight where possible. Prototypes of the redesigned items will then be built to demonstrate the techniques involved.

ACHIEVEMENTS: This task has been completed. The family of cabinets were redesigned in structure and some functions were consolidated to eliminate some of the out-sized items. A drawing package has been prepared to reflect the redesign and has been transmitted to DPSC for procurement action.

RELATIONSHIP TO CORE PROGRAM: The cabinetry referred to is medical specific so this task falls within the scope of the Laboratory's mission to develop field medical equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DES'N INSTR'N	9. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	
79 10 01	D. CHANGE	U	U		NL		
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	64717A	3S464717D832		CA		017 APC F567	
XXXXXXXXXX	64717A	3S464717D832		00			
XXXXXXXXXX	CARDS 1423R						
11. TITLE (Precede with Security Classification Code) ^a (U) Chair, Dental Operating, Portable							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 008800 Life Support; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7610		8109		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER:				FISCAL		80	
C. TYPE:				YEAR		1.0	
D. KIND OF AWARD:				CURRENCY		65	
E. AMOUNT:				81		0.3	
F. CUM. AMT.						21	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Malek, J.W.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME: POC:DA			

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Chair; (U) Dental Operating; (U) Portable Chair; (U) Field Dental Chair

23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To design and fabricate a new portable dental operating chair for Army field use, incorporating lightweight materials.

24. (U) Design, fabricate and evaluate a suitable chair.

25. (U) 7910 - 8009. Redesign to eliminate deficiencies were completed and prototype subjected to supplemental DT II evaluation. Prototype successfully completed this evaluation and forwarded to user test site for supplemental OT testing (1 Oct-15 Nov 80).

DETAIL SHEET

TITLE: Chair, Dental Operating, Portable

FUNDING HISTORY: PY - 85K; CY - 65K; BY - 21K

PROBLEM DEFINITION: A need exists to replace the current Chair and Stool Unit, Dental Operating, Portable (NSN 6520-00-181-7349) with an item which will provide essentially the same professional/operational capabilities but which will be less costly, require less maintenance/repair support, be lighter in weight and require less storage/transportation space.

IMPORTANCE: The current standard chair and stool unit has become extremely costly to procure. The current estimated cost (from one response only) has tripled since the standard item was placed into the supply system. In addition, the combat readiness and reliability of the chair is low, primarily due to the high repair rate to correct malfunctions of the hydraulic control systems. Nonportability is difficult because the weight and bulk exceed the transportability for the normal two-person user team.

APPROACH: Review of possible commercial sources revealed that none met the characteristics established by the Letter Requirement (LR). A design and fabrication was accomplished by an in-house effort.

ACHIEVEMENTS: Prototype subjected to additional development testing (DT IIA) and another maintenance evaluation by USAMMA. Both were successfully concluded. In June 1980, prototype forwarded to the 4th Mechanized Infantry Division, Ft. Carson, CO for operational testing (OT IIA). Testing was initiated on 30 Sep 1980.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV. SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DES'N INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	K. COMPLETION	U	U		NL	☒ YES ☐ NO	
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S164717D832	00	020 APC F571			
B. CONTRIBUTING	62773A	3S162778A838	00	104			
XXXXXXXXXX CARDS 1403A							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Light Trap, Portable, Mosquito							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 000800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7504		8003		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING		FUND\$ (in thousands)	
B. NUMBER ^a				FISCAL YEAR		FUND\$	
C. TYPE		4. AMOUNT:		79		1.2	
A. KIND OF AWARD:		F. CUM. AMT.		80		0.3	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Kardatzke, J.T.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: O'Connor, R.J.			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Mosquito Light Trap; (U) Disease Vectors; (U) Pest Mosquitoes; (U) Mosquito Surveys; (U) Population Studies							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a portable battery-operated mosquito light trap for use in disease vector and pest mosquito surveys. This will replace the standard light trap set (NSN: 6545-00-089-3766) which has proven unsatisfactory for field use.							
24. (U) Design and fabricate a suitable portable mosquito light trap and conduct field evaluation in various habitats.							
25. (U) 7910 - 8003. Per results of IPR on 20 Feb 1980 light trap will be standardized under NSN 3740-01-010-8578. Project has been completed.							

DETAIL SHEET

TITLE: Light Trap, Portable, Mosquito

FUNDING HISTORY: PY - 40K; CY - 5K; BY - 0K

PROBLEM DEFINITION: To develop a new DC powered, portable mosquito light trap with associated accessories to replace the current miniature light trap and standard trap set.

IMPORTANCE: Portable, DC powered light traps are used in remote areas to assess mosquito populations, determine control effectiveness, and collect live specimens for arbovirus surveillance. In a fluid, combat situation where locations are both remote and frequently changing, a self-contained trap set using DC power is essential for surveillance. All IPM programs have their fundamental basis in surveillance to determine when and if control is needed and effectiveness of control.

APPROACH: A portable DC powered light trap using solid state circuitry to control operations is the core of this system. Because of the electronic system, the trap need only be visited once a day to operate, unlike current traps which require visits twice a day. By using more efficient motors, fans, and lamps, the total collection of the individual trap will be increased. The traps will be grouped in sets of six with sufficient accessories provided to maintain the system in the field indefinitely assuming availability of either standard D-cell batteries or an AC source for operation of the gel-cell battery charger.

ACHIEVEMENTS: Item was recommended for standardization in March 1980. Trap is currently being assigned an NSN with procurement actions being initiated.

RELATIONSHIP TO CORE PROGRAM: The light trap is a medical item used for vector surveillance. Equipment support of this surveillance relates two-fold with the core program. Primarily the trap is intended for TOE Preventive Medicine Units. Secondly, the trap will become an important item for the surveillance requirements of an integrated pest management program.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	BA	041 APC F573			
XXXXXXXXXX	64717A	3S464717D832	00				
XXXXXXXXXX	CARDS 1415R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Low Capacity Radiographic System, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003500 Clinical Medicine; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7901		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		FUND\$ (in thousands)	
B. NUMBER ^a				FISCAL YEAR		80 0.2 12	
C. TYPE				CURRENT		81 1.1 77	
D. KIND OF AWARD:				I. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering Research & Development Laboratory				NAME ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^a Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME ^a Salisbury, L.L.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) X-Ray; (U) Field Medicine; (U) Field Equipment							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify suitable low capacity radiographic system to include film processor(s) and compatible film(s), cassettes and other operating accessories for AMEDD usage (except dental).							
24. (U) Search existing industrial sources for functional devices that can be adopted. If none are available, modify, design or contract for the design of new devices.							
25. (U) 7910 - 8009. A survey of commercial processing units was made. None would satisfy the letter requirement. A wet processor assembled by a commercial manufacturer and a dry processor using Polaroid type film were evaluated and submitted for operational testing. Test results indicate the wet processor is unsuitable for field use and the dry units will provide usable films. A survey of commercial X-ray devices has been made and a decision matrix constructed. This will be considered at an IPR during 1st Quarter FY81.							

DETAIL SHEET

TITLE: Low Capacity Radiographic System, Field

FUNDING HISTORY: PY - 6K; CY - 12K; BY - 77K

PROBLEM DEFINITION: To identify suitable automatic film processors, compatible film, cassettes and accessories for interfacing with a low capacity radiographic apparatus. To identify a suitable low capacity radiographic system for field medical use.

IMPORTANCE: Currently available wet X-ray film processors and accessories are not suitable for use by small medical units outside of field type hospitals based on weight, complexity and utility requirements. The need is acute and critical for a film processor and a low capacity X-ray apparatus.

APPROACH: A survey of commercially available film processors and low capacity X-ray systems will be made to determine their ability to satisfy the letter requirement.

ACHIEVEMENTS: A market survey uncovered no commercial units which would meet the letter requirement. A wet processor assembled by a commercial manufacturer and a dry processor were evaluated and submitted for operational testing. The results indicate that the current Army dry film processor should be retained. An IPR will be conducted during the 1st QTR FY81 to make this decision. Also to be decided is which of three options to pursue for obtaining a low capacity X-ray generator, (1) modify the requirements to meet commercially available devices; (2) to initiate an in-house development or; (3) to request proposals for a commercial development.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission of developing field medical equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV. SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	64717A	3S464717D832		BA		042 APC F574	
XXXXXXXXXX	64717A	3S464717D832		00			
XXXXXXXXXX	CARDS 1425R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) High Capacity Radiographic System, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003500 Clinical Medicine; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7902		8109		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER:				FISCAL YEAR		B. FUNDS (in thousands)	
C. TYPE:				80		3.0	
D. KIND OF AWARD:				81		1.1	
E. CUM. AMT.						88	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Salisbury, L.L.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME: POC:DA			
22. KEYWORDS (Precede each with Security Classification Code)							
(U) X-Ray; (U) Field Medicine; (U) Field Equipment							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify and evaluate a replacement field X-ray system for the current standard (100 mA and 200 mA) system which is inadequate in reliability, availability and maintainability.							
24. (U) Search existing commercial sources for functional components (X-ray source, table, power supplies, film processors) that can be adopted. If none are available, modify, design or contract for design of new devices.							
25. (U) 7010 - 8009. A survey of the commercial market was made. No commercial unit would satisfy the letter requirements. A commercial X-ray source, controller and power supply has been modified to fit the Army field table. This combination will undergo operational testing I during 4th Quarter FY80 and 1st Quarter FY81.							

DETAIL SHEET

TITLE: High Capacity Radiographic System, Field

FUNDING HISTORY: PY - 31K; CY - 223K; BY - 88K

PROBLEM DEFINITION: The current field radiographic system is inadequate in reliability, availability, maintainability and does not conform to the radiation requirements of 21 CFR.

IMPORTANCE: The lack of a working, reliable, certifiable, high capacity X-ray system to meet the radiological requirements of field medical treatment facilities has a significant impact on the ability of these activities to provide basic health care. The need is acute and critical.

APPROACH: A search of commercial sources will be made for a functional system or components that can be combined into a system which will meet the field requirements.

ACHIEVEMENTS: A survey was made of the commercial market. No commercial system was found which will meet the letter requirement. Commercially available components have been obtained and have been adapted and modified into a radiological system compatible with field requirements. This system is composed of a commercial control unit, transformer, X-ray source and image intensifier system. These items have been matched to the Army 5090 field table. Operational testing is scheduled for 1ST QTR FY81.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission of developing field medical equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	
79 10 01	D. CHANGE	U	U		NL		
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
6. PRIMARY	64717A	3S464717D832	BB	043 APC 575			
XXXXXXXXXX	64717A	3S464717D832	00				
XXXXXXXXXX	CARDS 1427R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Litterboard							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
C09800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7901		8106		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL YEAR			
C. TYPE:				80		0.4	
D. KIND OF AWARD:				81		0.3	
E. CUM. AMT.						26	
						22	
20. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS: ^a				ADDRESS: ^a			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a O'Connor, R.J.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Litter; (U) Patients, Transportation of; (U) Injuries of Spine, Back, Cervical							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) A need exists for a rigid device on which to transport patients with spine and/or cervical spine damage from injury site to a medical facility.							
24. (U) Commercially available spineboards (litterboards) will be evaluated for adoption and/or modification to fit military requirements.							
25. (U) 7910 - 8009. Four commercial boards and two in-house development items have been through development testing. Drawings and a draft specification have been forwarded to the Combat Developer for a decision. Operational testing of this item will probably be waived due to the simplistic nature of the device.							

DETAIL SHEET

TITLE: Litterboard

FUNDING HISTORY: PY - OK; CY - 26K; BY - 22K

PROBLEM DEFINITION: Litters available for use in a field environment are not sufficiently rigid for the proper management of back or cervical spine injuries. There is a need for a rigid litterboard/spineboard in the supply system for proper casualty management. The advice to fabricate locally, given in FM 8-35, has proven inadequate.

IMPORTANCE: The use of spineboards/litterboards in the proper management of back and cervical spine injuries is essential to sound medical treatment in the field to minimize the chance of further injury during transport.

APPROACH: The commercial market for these devices and accessories was searched both by advertisement in Commerce Business Daily and by letter to potential vendors. Characteristics of commercial items as well as in-house development will be evaluated against field requirements. It is hoped that a commercial device will adequately meet this need.

ACHIEVEMENTS: Four commercial boards were procured and two special items were fabricated by this Laboratory to satisfy requirements not met by the commercial boards. All of these designs have been formally tested to determine compliance with essential characteristics. Operational testing being considered unnecessary for this equipment, the data derived from development testing will be presented to an IPR for selection of a final product.

RELATIONSHIP TO CORE PROGRAM: The effective management of back and cervical spine injuries using litterboards/spineboards is consistent with the Laboratory's mission for field medical equipment development, as well as the overall mission of The Surgeon General to provide the best medical treatment consistent with field experiences.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY 79 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCT ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DISSEM INSTR ^a NL	9a. SPECIFIC DATA: CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	AA	044 APC F581			
XXXXXXXXXX	64717A	3S464717D832	00				
XXXXXXXXXX	CARDS 1429R						
11. TITLE (Precede with Security Classification Code) ^a (U) Trap, Mosquito, Light, Collapsible							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology							
13. START DATE 7910		14. ESTIMATED COMPLETION DATE 8209		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER ^a				FISCAL YEAR		c. 80	
c. TYPE				CURRENCY		0.1	
d. AMOUNT:				81		1.0	
e. KIND OF AWARD:				f. CUM. AMT.		44	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Kardatzke, James T.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: O'Connor, R.J.			
				NAME: Frommer, F.			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code) (U) Mosquito Light Trap; (U) Disease Vectors; (U) Pest Mosquitoes; (U) Mosquito Surveys; (U) Population Studies							
24. TECHNICAL OBJECTIVE ^a 25. APPROACH. 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a collapsible mosquito light trap which is powered solely from AC sources. The trap will be used at fixed installations and static deployment in disease vector and pest mosquito surveys. This will replace the standard mosquito light trap (NSN 3740-00-607-0337, LIN X 24251) which has proven bulky and unreliable for field use.							
24. (U) Design and fabricate a suitable collapsible, AC powered, mosquito light trap and conduct field evaluations in various habitats.							
25. (U) 7910 - 8009. Development prototypes have been constructed which are capable of operating on 120 AC power and use a fluorescent bulb as the light source. For storage, the trap is collapsible to less than 2.5 cubic feet.							

DETAIL SHEET

TITLE: Trap, Mosquito, Light, Collapsible

FUNDING HISTORY: PY - 0K; CY - 9K; BY - 44K

PROBLEM DEFINITION: To develop an improved replacement for the Trap, Mosquito, Light, (NSN 3740-00-607-0337) which is collapsible for storage, is capable of using a variety of lamps, and has an extended service life.

IMPORTANCE: The Trap, Mosquito, Light is a bulky, heavy item which is part of the TOE of the Preventive Medicine Detachment, Team LA, Entomology Services (TOE 8-620HOLA). It is an important instrument for surveillance of medically important insects in areas of static troop deployment where surveys are continued for prolonged lengths of time. This trap will provide long-term information on the control efforts of an IPM program.

APPROACH: A new collapsible, AC powered light trap will be fabricated in-house. The primary objectives are to produce a durable trap which can be easily disassembled and collapsed for storage and shipment.

ACHIEVEMENTS: Initial prototypes have been constructed.

RELATIONSHIP TO CORE PROGRAM: Project involves development of a new replacement trap for one currently used by field medical units.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISPN INSTRN	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
79 10 01	D. CHANGE	U	U		HL	☒ YES ☐ NO	
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717U832	AA	045 APC F582			
XXXXXX	64717A	3S464717U832	00				
XXXXXX	CARDS 1428R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Aerosol Generator, ULV, Skid Mounted							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7910		8109		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER *				FISCAL YEAR		0.2	
C. TYPE:				CURRENCY		10	
D. KIND OF AWARD:				81		1.0	
E. AMOUNT:						39	
F. CUM. AMT.							
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Kardatzke, James T.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J.H.			
				NAME: Reams, W.H.			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Aerosol Generator; (U) ULV Dispersal; (U) Mosquito Control; (U) Skid Mounted; (U) Durable; (U) Disease Vector							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify and evaluate a commercially available, skid mounted, ULV aerosol generator capable of dispersing all ULV insecticide formulations registered for mosquitoes. This generator would be used by preventive medicine and engineering personnel in combat zones and CONUS for controlling disease vectors and pest arthropods.							
24. (U) A review of commercially available ULV aerosol generators will be made. Suitable units will be field evaluated. Final selection of specification characteristics will be made after formal testing coordinated with responsible agencies.							
25. (U) 7910 - 8009. After analysis of Development Testing the LECO HD and Microgen ED2-20A were selected for Operational Testing. Both successfully completed operational testing in the summer of 1980. The commercial London Fog was eliminated from testing since its basic design could not comply with Letter Requirement.							

DETAIL SHEET

TITLE: Aerosol Generator, ULV, Skid-Mounted

FUNDING HISTORY: PY - 0K; CY - 10K; BY - 39K

PROBLEM DEFINITION: To evaluate and recommend for adoption into TOE's an ULV aerosol generator to replace current cold fog generators.

IMPORTANCE: Since 1960 commercial pest control has used the environmentally acceptable methods of ULV aerosol generator for adult mosquito control. In this area, the military has not maintained state-of-the-art. Adoption of these generators will provide the TOE units the capabilities to control adult mosquitoes using ultra-low volume techniques.

APPROACH: Commercial units of a high-air volume, low-air pressure design will be evaluated both functionally and operationally. Results will be used as the basis for procurement of aerosol generators.

ACHIEVEMENTS: All DT and OT in these units have been successfully completed.

RELATIONSHIP TO CORE PROGRAM: Project involves modernization of existing military pest control equipment to give field medical units modern, effective equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA OB 6193	80 10 01	DD-DR&E(AR)436	
3. DATE PREV SUMMARY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS ^a	9. LEVEL OF SUM ^a
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	AA	046 F576			
XXXXXXXXXX	64717A	3S464717D832	00				
XXXXXXXXXX	CARDS 1404A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Unit, Portable, Backpack							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7610		8209		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE			
A. DATES/EFFECTIVE:				B. PRECEDING			
B. NUMBER ^a				C. PROFESSIONAL MAN YRS			
C. TYPE:				D. FUNDS (in thousands)			
E. KIND OF AWARD:				F. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Kardatzke, J.T.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Anderson, L.M.			
				NAME: O'Connor, R.J.			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Backpack; (U) Solid/Liquid Dispersal; (U) Arthropod Control; (U) Lightweight; (U) Durable; (U) Disease Vectors; (U) Portable							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify a commercially available, lightweight, durable, backpack unit capable of dispersing solid or liquid pesticide formulations. This unit would be used by preventive medicine personnel in combat zones and CONUS for controlling disease vectors and pest arthropods. 24. (U) A review of commercially available backpack units will be made. Suitable units will be field evaluated. After entomological feasibility has been established, modifications, if necessary, will be made and formal testing coordinated with responsible agencies. 25. (U) 7910 - 8009. Operational Testing I of three candidate units was successfully completed in October 1979. The Echo Model DM-9 has the most promising configuration. Any additional development testing will be completed in FY81.							

DETAIL SHEET

TITLE: Pesticide Dispersal Unit, Portable, Backpack

FUNDING HISTORY: PY - 42K; CY - 20K; BY - 47K

PROBLEM DEFINITION: To evaluate and recommend adoption of a commercial motorized backpack unit which is capable of dispensing both liquid and solid pesticide formulations.

IMPORTANCE: An operational need exists for a motorized backpack unit which can dispense both liquid and solid pesticide formulations. The unit is needed to provide control during field operations in localized and remote areas where vehicular or aerial dispersal equipment cannot be used or is not readily available.

APPROACH: Available commercial backpack units will be evaluated from an engineering aspect to determine the best candidate units for operational evaluation. Selected units will be evaluated by an operational user to determine any unforeseen problems in deployment.

ACHIEVEMENTS: The concept of the backpack sprayer/duster was successfully proven during OT I conducted in October 1979. System is logistically supportable using existing logistic components.

RELATIONSHIP TO CORE PROGRAM: Project involves evaluation of commercial items for adoption as military standard items in medical TOE. Project is part of core program for pest control equipment development.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY 79 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTR ^a NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
11. PRIMARY XXXXXXXXXX	64717A	3S464717D832	AA	047 APC F577			
XXXXXXXXXX	64717A	3S464717D832	00				
XXXXXXXXXX	CARDS 1424R						
11. TITLE (Precede with Security Classification Code) ^a (U) Pesticide Dispersal Unit, Liquid, Helicopter Slung							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE 7610		14. ESTIMATED COMPLETION DATE 8209		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT GRANT A. DATES/EFFECTIVE: B. NUMBER: C. TYPE D. KIND OF AWARD:				18. RESOURCES ESTIMATE A. PROFESSIONAL MAN YRS B. FUNDS (in thousands) PREVIOUS FISCAL YEAR CURRENT			
EXPIRATION: 4. AMOUNT: F. CUM. AMT.				80 0.2 12 81 1.0 61			
19. RESPONSIBLE DOD ORGANIZATION NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701 RESPONSIBLE INDIVIDUAL NAME: Boyer, K.H., COL TELEPHONE: (301) 663-7277; AUTOVON 343-7277				20. PERFORMING ORGANIZATION NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701 PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: ^a Kardatzke, J.T. TELEPHONE: (301) 663-7237; AUTOVON 343-7237 SOCIAL SECURITY ACCOUNT NUMBER: ASSOCIATE INVESTIGATORS NAME: Conway, W.H. NAME: Nelson, J.H.			
21. GENERAL USE Foreign Intelligence Not Applicable				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Helicopter Rig; (U) Liquid Dispersal; (U) Aerial Application; (U) Mosquito Control; (U) Liquid Insecticide							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) To identify a suitable commercial, helicopter slung, dispersal unit for applying liquid formulations of insecticides, which would: (a) be capable of dispensing liquid insecticides when slung beneath a helicopter; (b) require no modification of the aircraft; (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS. 24. (U) A survey of commercially available, helicopter slung rigs will be made. Suitable units will be field evaluated. After entomological feasibility has been established, necessary modifications will be made and flight qualification tests coordinated with USAAVSCOM. 25. (U) 7910 - 8009. The Transland Unit has completed initial Development and Operational Testing. Reconfiguration of unit with the ultra-low volume (ULV) nozzle has proven successful. Final modification and development testing to include training support packages will be completed during FY81.							

DETAIL SHEET

TITLE: Pesticide Dispersal Unit, Liquid, Helicopter Slung

FUNDING HISTORY: PY - 48K; CY - 12K; BY - 61K

PROBLEM DEFINITION: To adapt a commercial aerial sprayer to meet the needs of the military for a slung unit which is capable of liquid dispersal in both high volume and ultra-low volume modes.

IMPORTANCE: Medical personnel engaged in field operations need the capacity for aerial dispersal of liquid pesticide formulations. The unit is needed to ensure rapid treatment of large areas inaccessible by ground equipment but too small for efficient use of larger aerial dispersal equipment. Current standard item represents a health and safety hazard to the helicopter crew since unit is internally mounted instead of slung.

APPROACH: To adapt a readily available commercial sprayer for military use. The commercial sprayer will be modified to include a ULV Beecomist nozzle system and a means for effective control of unit functions from the interior of the helicopter. Unit will be completely independent of the helicopter and easily jettisonable in an emergency.

ACHIEVEMENTS: The Transland (Harbor City, CA) sprayer has completed initial DT and OT with some technical problems being uncovered. System concept has been successfully proven and shown to be logistically supportable.

RELATIONSHIP TO CORE PROGRAM: Project involves evaluation and modification of a commercial unit. Item will replace a current obsolete standard item which is a part of the TOE of the Preventive Medicine Detachment, Team LA. Project is part of the pest control equipment program.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS ^a	9. LEVEL OF SUB A. WORK UNIT
79 10 01	D. CHANGE	U	U		NL	☒ YES ☐ NO	
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	CA	048	APC F580		
EXCLUDED FROM R&D	64717A	3S464717D832	00				
EXCLUDED FROM R&D	STOG 80-7.2:6						
11. TITLE (Precede with Security Classification Code) ^a							
(U) X-Ray Film Processor, Dental, Portable, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003500 Clinical Medicine; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7812		8109		DA		C. In-House	
17. CONTRACT, GRANT				18. RESOURCES ESTIMATE		19. FUNDS (In thousands)	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER: ^a				FISCAL YEAR			
C. TYPE:				CURRENT			
D. KIND OF AWARD:				E. AMOUNT:			
F. CUM. AMT.							
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS: ^a				ADDRESS: ^a			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Precede with SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a Malek, J.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7277; AUTOVON 343-7277			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:UA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) X-Ray; (U) Field Medicine; (U) Field Equipment; (U) Dental Processor; (U) Processor							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Precede individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To identify a suitable X-ray film processing portable field unit to support a low capacity X-ray unit.							
24. (U) Search existing industrial sources for a functional device that can be adopted. If none is available, modify, design or contract for the design of a new device.							
25. (U) 7910 - 8009. OT I test results were good but did recommend some design changes. These were accomplished and the new prototype subjected to DT II and successfully passed this evaluation. Since the basic prototype is a commercial item and reevaluation would not be useful, item will be recommended for type classification at the next IPR.							

DETAIL SHEET

TITLE: X-Ray Film Processor, Dental, Portable, Field

FUNDING HISTORY: PY - 15K; CY - 25K; BY - 27K

PROBLEM DEFINITION: To identify a suitable X-Ray Film Processing Portable Field unit to support a low capacity X-ray unit.

IMPORTANCE: Portable wet X-ray film processors and accessories are not suitable for use by small dental units outside of field type hospitals based on excessive weight, complexity and requirements for electrical power, water and processing chemicals. The need is acute and critical for dental units/sections to complement the low capacity X-ray apparatus recently approved for limited procurement.

APPROACH: Search and obtain an industrially developed functional device that can be adapted to meet the established characteristics.

ACHIEVEMENTS: Operational Testing I (OT I) was initiated on 16 July 1979 and completed on 26 October 1979. Results were good with only minor design changes. Prototype was modified to correct OT I deficiencies and subjected to Development Testing II (DT II). DT II was successfully concluded on 3 March 1980. Item will be presented for Type Classification at the next IPR.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)436	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DIAGN INSTR ^a	9. SPECIFIC DATA- CONTRACTOR ACCESS ☒ YES ☐ NO	
79 10 01	U. CHANGE	U	U		NL		
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	BB	049 APC F578			
B. SECONDARY	64717A	3S464717A832	00				
C. TERTIARY	CARUS 1421R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Bag, Aidman's, Redesign of							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical & Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7705		8106		DA		C. In-House	
17. CONTRACT-GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER: ^a				FISCAL YEAR		FUND (\$ in thousands)	
C. TYPE				CURRENT			
D. KIND OF AWARD:				80		0.2	
E. AMOUNT:				81		0.4	
F. CUM. AMT.						24	
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: ^a O'Connor, R.J.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code) (U) Air Bag; (U) Aidman; (U) Emergency Medical Treatment; (U) Field Medical Equipment; (U) Case, Medical Instrument and Supply							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish full-paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop an improved aid bag for use by the platoon aidman.							
24. (U) Functional criteria for aid bags will be established. Several potential replacements will be designed, fabricated and evaluated. The best features of each model will be incorporated into a final design.							
25. (U) 7909 - 8009. Six prototype units were sent to field units in CONUS and Europe for evaluation. Other prototype units have been demonstrated to OTSG and the combat developer with generally favorable results. The results of all the field trials are now in and are being evaluated. The list of contents is also being finalized.							

DETAIL SHEET

TITLE: Bag, Aidman's, Redesign of

FUNDING HISTORY: PY - 23K, CY - 16K; BY - 24K

PROBLEM DEFINITION: The current case, Medical Instrument and Supply Set (NSN 6545-00-912-9870) has been found inadequate. Because of the small size and configuration of the bag, the aidman is severely limited in his treatment capability in combat. The need exists for a larger bag, which provides easier access to its contents.

IMPORTANCE: The ability of the combat medical corpsman to provide prompt and effective treatment to soldiers in the field will be greatly enhanced by providing him with an aid bag containing a wider variety of medications, dressings, and instruments, which are easily accessible.

APPROACH: Various bags and cases which are already in the supply system were investigated. The bags most suitable for the projected need of the platoon aidman were either too small (M-3), overly compartmented (M-16), or without organizing compartments (M-5).

ACHIEVEMENTS: A compartmented aid bag has been designed and fabricated. The bag has six zippered compartments and is built in three sections which fold together for transport. The bag has an approximate volume of one cubic foot, D rings for the attachment of a shoulder sling, loops for use with shoulder straps or a pack frame, and a carrying handle. Prototype bags have been fabricated and evaluated at Ft. Bragg and by two units in Europe with generally favorable results. The design will be presented to an IPR late in CY81.

RELATIONSHIP TO CORE PROGRAM: The design and development of a more efficient aid bag for use by the platoon aidman is consonant with the mission of The Surgeon General to provide the best in medical treatment for the soldier in the field.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ¹	2. DATE OF SUMMARY ²	REPORT CONTROL SYMBOL	
				DA OB 6246	80 12 01	DD-DR&E(AR)436	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ³	6. WORK SECURITY ⁴	7. REGRADING ⁵	8. DISSEM INSTR ⁶	9. SPECIFIC DATA - CONTRACTOR ACCESS ⁷	10. LEVEL OF RUM ⁸
80 10 01	H. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT
11. NO./CODES ⁹	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	BB	050 APC F579			
XXXXXXXXXX	64717A	3S464717D832	00				
XXXXXXXXXX	STOG 80-7.2:6						
11. TITLE (Precede with Security Classification Code) ¹⁰							
(U) Sanitizer, Portable, Field, Special Forces							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ¹¹							
010100 Microbiology; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
7901		8109		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDENCE		B. FUNDS (in thousands)	
B. NUMBER *				FISCAL YEAR		C. CURRENCY	
C. TYPE				80		0.1	
D. KIND OF AWARD:				81		0.0	
E. AMOUNT:				0.0		00	
F. CUM. AMT.							
20. RESPONSIBLE DOD ORGANIZATION				21. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Boyer, K.H., COL				NAME: Prensky, W.C.			
TELEPHONE: (301) 663-7277; AUTOVON 343-7277				TELEPHONE: (301) 663-7237; AUTOVON 343-7237			
22. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W.H.			
				NAME:			
				POC:DA			
23. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Sterilizing; (U) Field Equipment; (U) Medical; (U) Field Sterilizers							
24. TECHNICAL OBJECTIVE, 25. APPROACH, 26. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To secure a replacement for FSN 6530-00-926-4857 which is no longer procurable.							
24. (U) Search existing industrial sources for a functional substitute. If none is available, design or contract for the design of a new device.							
25. (U) 8010 - 8012. The combat developer advises that the entire issue of sterilization/sanitization at the special forces level is under review and that the requirement for this specific item of equipment no longer exists. A new task may be initiated in this arena if warranted by updated requirements.							

DETAIL SHEET

TITLE: Sanitizer, Portable, Field, Special Forces

FUNDING HISTORY: PY - OK, CY - 8K, BY - OK

PROBLEM DEFINITION: A requirement was defined for a compact, lightweight sanitizer for Special Forces medical personnel. The item currently authorized is no longer procurable.

IMPORTANCE: Medical specialists assigned to Special Forces Operational Detachments "A" are responsible for providing medical support of a guerrilla force. This elevates the importance of lightness, compactness, ruggedness and the ability to operate with a variety of available fuels.

APPROACH: To seek commercially available or easily fabricated components that may be combined to satisfy this requirement.

ACHIEVEMENTS: A pressure vessel was located which could provide steam sterilization rather than sanitization. Prior to completion of evaluation testing, however, the medical requirements of Special Forces came under scrutiny with a substantial revision anticipated. On being advised by the Combat Developer that sterilizer requirements for Special Forces could not be adequately defined in the foreseeable future, the task was terminated. It will be reestablished at some future date if the situation warrants.

RELATIONSHIP TO CORE PROGRAM: This task is consistent with the mission of this Laboratory to develop field medical equipment.

MANUSCRIPTS CLEARED FOR PUBLICATION/PRESENTATION

1 October 1979 - 30 September 1980

1. An Environmental Fate Model Leading to Preliminary Pollutant Limit Values for Human Health Effects. Rosenblatt, David H. and Jack C. Dacre - Abstract for presentation at Army Science Conference, June 1980 at West Point.
2. The Effects of In Vivo Treatment with Trichloroethylene (TCE) on Thioglycollate (TG) Recruited Mouse Peritoneal Exudate Cells (PEC). Carchman, R., Kessler, F., Bradley, R., Laskin, D., and A. Munson, Dept of Pharmacology, Medical College of Virginia, Richmond, VA - Abstract to be presented at Society of Toxicology Annual Meeting, Washington, DC, March 1980.
3. Immunotoxicology of Trichloroethylene. Sanders, V., Kaufman, B., Hallett, P., Stablein, D., and A. Munson, Dept of Pharmacology, VCU/MCV Cancer Center, Medical College of Virginia, Richmond, VA - Abstract to be presented at Society of Toxicology Annual Meeting, Washington, DC, March 1980.
4. Chemical Degradation of Pesticides. William H. Dennis, Jr. - To be presented at Maryland Academy of Sciences, CIPAC Symposium, Baltimore, MD, 7 June 1979, and published in CIPAC Symposium Proceedings.
5. Toxicology of Explosives and Propellants. David H. Rosenblatt - For publication in Encyclopedia of Explosives and Related Items.
6. Effect of Calcium Chloride on Larval Snow-Melt Aedes (Diptera: Culicidae), James T. Kardatzke - For publication in Mosquito News.
7. Recarbonation of Wastewater Using the Rotating Biological Contactor. Noss, Charles I., USAMBRDL, Miller, Roy D., USAEHA-RDN, and Ed D. Smith, USACERL - For presentation at Energy Optimization of Water & Wastewater Management Conference, New Orleans, LA, Dec 79.
8. Guidelines for Acute Toxicological Tests. Highfill, Jerry W. - Technical Report #7907.
9. Statistical Analyses of Fish Chronic Toxicity Test Data. McClave, James T., Sullivan, James H., Water and Air Research, Inc., and J. Gareth Pearson, EPRD - For publication in Proceedings of Fourth Symposium on Aquatic Toxicology.
10. Chemical Degradation of Military Standard Formulations of Organophosphorus and Carbamate Pesticides. II. Degradation of Diazinon by Sodium Hypochlorite. Dennis, William H., Jr., Meier, Eugene P., Rosencrance, Alan B., Randall, William F., Reagan, Morris T., and David H. Rosenblatt - Technical Report #7904.

11. Rotating Biological Contactor Process for Secondary Treatment and Nitrification Following a Trickle Filter. Miller, Roy D., Noss, Charles I., Ostrofsky, Arnold, and Robert S. Ryczak - For presentation at RBC Symposium, Seven Springs, PA, Feb 80, and for publication in RBC Proceedings.
12. Recarbonation of Wastewater Using the Rotating Biological Contactor. Noss, Charles I., Miller, Roy D., and Ed. D. Smith - Oral Presentation for presentation at RBC Symposium.
13. Susceptibility of 1st-Instar Larvae of Antheraea polyphemus to Foliar Applications of Malathion. Miller, Thomas A., Cooper, William J., and Jerry W. Highfill - Journal Publication for publication in Environmental Entomology.
14. The Role of Health Hazard Assessments in the Development of Improved Smokes and Obscurants. Rowlett, Carl D., Shiotsuka, Ronald N., Henry, Mary C., and J. Gareth Pearson - Abstract for Oral Presentation at Smoke/Obscurants Symposium IV, Harry Diamond Laboratory, 22-23 April 1980, and for publication in Symposium Proceedings.
15. Relationships between Pupal Body-Size and Egg Production in Reared Female Antheraea polyphemus. Miller, Thomas A., Cooper, William J., and Jerry W. Highfill - Journal Publication in Annals of the Entomological Society of America.
16. (1) Toxicological Manifestations of p-Chlorophenyl methyl sulfide, p-Chlorophenyl methyl sulfoxide and p-Chlorophenyl methyl sulfone in Rodents. (2) Toxicological Manifestations of p-Chlorophenyl methyl sulfide, p-Chlorophenyl methyl sulfoxide and p-Chlorophenyl methyl sulfone in Rhesus Monkeys. (3) Pharmacokinetic and metabolism Study of p-Chlorophenyl methyl sulfide, p-Chlorophenyl methyl sulfoxide and p-Chlorophenyl methyl sulfone in Rats and Monkeys. Battelle Columbus Laboratories and Dr. Jack C. Dacre - Abstract for Oral Presentation at Second International Congress on Toxicology, Brussels, 6-11 July 1980 and for publication in Congress Abstracts.
17. An Environmental Fate Model for Soil and Water Leading to Preliminary Pollutant Limit Values for Human Health Effects. Dacre, Jack C., Rosenblatt, David H., EPRD, and David R. Cogley, GCA Corp. - Journal publication in Environmental Science and Technology (Feature Article).
18. Factor Evaluation of Commercial Backpack Sprayers/Dusters. Kardatzke, James T., Gula, Philip R., Nelson, James H., and Donald P. Driggers - Presented orally at American Mosquito Control Association, Utah Mosquito Abatement Association, Salt Lake City, Utah, 13-17 Apr 80.
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