AD-A133 129 US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT 1/2
LABORATORY ANNUAL..(U) ARMY MEDICAL BIOENGINEERING
RESEARCH AND DEVELOPMENT LAB FORT.. J N ALBERTSON
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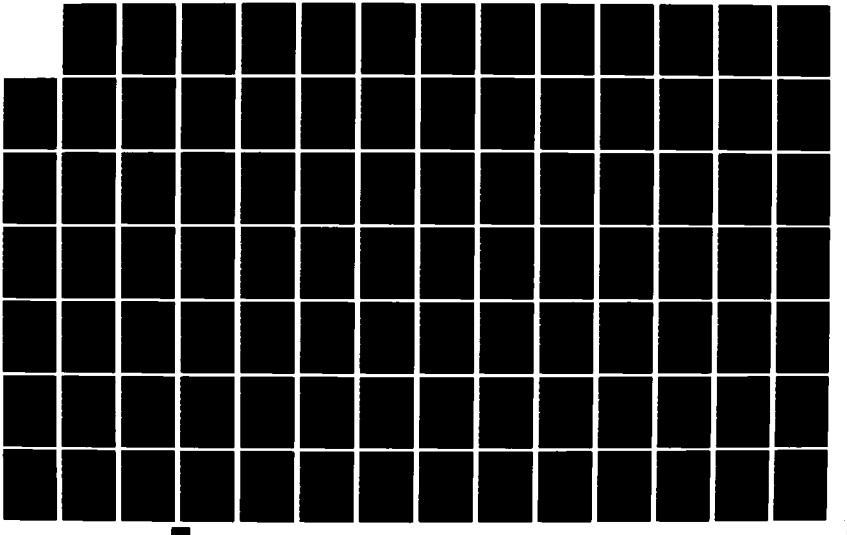

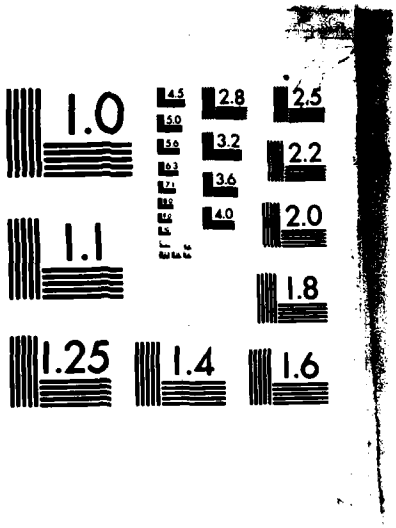

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

REPORT MEDDH-288 (R1)

US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LABORATORY ANNUAL PROGRESS REPORT FY82

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

1 October 1982

Annual Progress Report for Period 1 October 1981 - 30 September 1982

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

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UNCLASSIFIED

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

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)* Aquatic Toxicology, Casualty Evacuation, Chemical Decontamination, 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, 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 1982, summarizes research performed 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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UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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62720A 3M162770A871.CB.266

62777A 3E162777A878.CA.241

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. Current mission is:

> Conducts research and development on 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. Performs research and development on new delivery systems for insecticide dispersal to control arthropods. Constructs prototypes and test models of selected medical equipment and performs developmental testing of them. Performs research and development for Corps of Engineers on militarily unique pollutants from Army industrial operations. Conducts health hazard assessment for materiel developers of smokes, obscurants and synfuels. Conducts research and development of soldier occupational health hazards, e.g., solids, liquids, toxic gases and synfuels; devises strategies to eliminate exposure or define criteria for safe exposure standards.

MANPOWER

	1 Oct 81 Authorized	Actual	30 Sep 82 Authorized	Actual
Officer	20	20	19	21
Enlisted	13	14	15	13
Civilian	102	94	101	99
TOTAL	135	128	135	133

Professional disciplines represented in the organization include:

- Aquatic Biology
- Biostatistics
- Biomedical Maintenance Technology
- Chemistry
  - Analytical
  - Biochemistry
  - Polymer
- Computer Sciences
- Engineering Crafts and Drafting
- Entomology
- Environmental Microbiology
- Engineering
  - Biomedical
  - Chemical
  - Electrical
  - Electronics
  - Mechanical
  - Sanitary/Environmental
- Graphic and Photographic Arts
- Operating and Photographic Arts
- Operating Room Nursing
- Pharmacology
- Toxicology

BUDGET

IN-HOUSE

PROJECT	ALLOTMENT	% Obligation	% Disbursement
91C	$ 100,000	99	99
S04	94,000	98	98
S10	139,000	97	96
835	1,301.000	89	47
875	436,000	98	98
871	300,000	98	98
874	545,000	95	75
878	630,000	98	97
836	190,000	97	97
993	62,000	97	97
832	485,000	98	98
M22	73,000	95	50
TOTAL DIRECT	$4,355,000	95	79
REIMBURSABLES	811,188	83	75
TOTAL FUNDS AVAILABLE	$5,166,188	93	78

COMPARISON FY81 to FY82:

	ALLOTMENT	% Obligation	% Disbursement
FY81	$4,434,328	92	82
FY82	5,166,188	93	78

TABLE OF CONTENTS

IN-HOUSF LABORATORY INDEPENDENT RESEARCH

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0674	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	318 APC F166
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code): (U) Development of an Automated Toxicant Screening Test Based on the Ventilatory Responses of Fish

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 005900 Environmental Biology; 016800 Toxicology; 012900 Physiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7910	8309	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.2	06
FISCAL YEAR CURRENT 83	0.1	07

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Trudeau, T.L., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* van der Schalie, W.H.
TELEPHONE: (301) 663-7627; AUTOVON 343-7627
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME:
NAME:

21. GENERAL USE
Foreign Intelligence Not Applicable

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 (Furnish 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) 8110 - 8209. A preliminary carrier solvent test using acetone was followed by a test using the organochlorine pesticide chlordane (top concentration 8.91 µg/L). After 6 days of exposure, there were no pronounced changes in any ventilatory parameter of fish exposed to either acetone or chlordane, with the possible exception of fish at the high acetone concentration (396 mg/L). These fish showed an increased variability in gill purge rate.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—361-646/8290

DETAIL SHEET

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

FUNDING: PY - 13K; CY - 6K; BY - 7K

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 concentration 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: The number of materials reaching the environment and posing a potential threat to aquatic organisms is continually increasing. Only a very small number 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.

APPROACH: An automated system has 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 new test chamber and electrode arrangement were utilized during FY82 to minimize ventilatory signal deterioration due to certain orientations of the fish in the test chamber. This substantially improved the accuracy of the computerized system. Bluegills were then tested for their responses to chlordane (an organochlorine pesticide) and acetone (the carrier solvent used for the chlordane). Apparent changes in ventilatory parameters were evident only at the highest concentration of acetone tested (396 mg/L); half this concentration was therefore used in the subsequent chlordane test. Bluegills exposed at up to 8.91 µg/L chlordane for 6 days showed no evidence of response in any ventilatory parameter. Bluegill ventilatory changes are therefore not good predictors of chlordane chronic toxicity, since the chronic "no effect" chlordane concentration is between 0.54 and 1.22 µg/L.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 8691	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K.COMPLETION	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	011 APC F167
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Interaction of Army-Relevant Pesticide Compounds with Trickling Filter Microorganisms in vitro

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
8110	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

	18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING	82	0.3	05
FISCAL YEAR CURRENT	83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Bausum, H.T.

TELEPHONE: (301) 663-7207; AUTOVON 343-7207

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Pesticides; (U) Sewage Treatment; (U) Microorganisms; (U) Trickling Filter

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

23. (U) To determine the effect of pesticide compounds on oxygen uptake and nitrification by the microbiota of trickling filter influent and trickling filter effluent. To determine the persistence/disappearance of each compound over short time intervals in the presence of these organisms. Assessment of the fate and effects of low-level pesticides reaching sewage treatment plants forms part of the evaluation of the activated carbon adsorption/filtration system for pesticide removal developed by this Laboratory and the US Army Training and Doctrine Command.

24. (U) Approximately seven pesticides will be separately tested, both as pure compounds and as practical formulations to assess their effect, at various concentrations, on oxygen uptake and nitrification. Primary settled sewage and trickling filter effluent from the Frederick municipal treatment plant will be tested in modifications of the standard biochemical O_2 demand test. Effluent will be included because of its content of sloughed biomass from the filter medium. Prolonged incubation will be used to observe effects on nitrification. For determination of rate of O_2 uptake over short time intervals, wastewater at very; low dilution levels will be used.

25. (U) 8109 - 8209. Shift in emphasis from O_2 uptake to pesticide sedimentation, to complete the latter and effect technology transfer. Factorial series of experiments designed, initiated, and now nearing completion, to determine partition of seven Army-relevant pesticides in both primary and secondary sewage sedimentation. Wastewater obtained from two treatment plants, Frederick and Fort Detrick for use in laboratory jar-test determination, with and without addition of flocculating agents. Abstract of paper for ACS presentation, Sep 82, Kansas City, MO, approved.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Interaction of Army-Relevant Pesticide Compounds with Trickling Filter Microorganisms in vitro

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

PROBLEM DEFINITION: To determine the effect of pesticide compounds on oxygen uptake and nitrification by the microbiota of trickling filter influent and trickling filter effluent. To determine the persistence or disappearance of each compound over short time intervals in the presence of these organisms.

IMPORTANCE: Little is known of the fate or effects of pesticide compounds at low level reaching domestic sewage treatment plants. This has been identified as a research need, particularly in connection with the evaluation of the activated carbon adsorption/filtration system for pesticide removal developed by this Laboratory and the US Army Training and Doctrine Command. The proposed work will explore one avenue leading toward laboratory-based prediction of no-effects levels and other facets of the effects and fate of low-level hazardous wastes in biological aerobic treatment processes.

APPROACH: The pesticide compounds will be studied individually, both as pure compounds and as formulations, to determine their effects on O_2 consumption and on nitrification in both trickling filter influent and trickling filter effluent. Effluent will be included because it is expected to contain sloughed biomass from the filter medium. For these studies, replicate BOD bottles will be used, and pesticide concentration will be varied. Prolonged incubation will be used to observe effects on nitrification. For determination of rate of O_2 uptake over short time intervals, wastewater at very low dilution levels, or undiluted, will be used. Pesticides studied will be baygon, diazinon, dimethoate, dursban, malathion, ronnel and 2,4-D low volatile ester.

ACHIEVEMENTS: Shift in emphasis from O_2 uptake to pesticide sedimentation, to complete the latter and effect technology transfer. Factorial series of experiments designed, initiated, and now nearing completion, to determine partition of seven Army-relevant pesticides in both primary and secondary sewage sedimentation. Wastewater obtained from two treatment plants, Frederick and Fort Detrick, for use in laboratory jar test determination, with and without added flocculating agent. Partition to sediments reached 90 to 96 percent for dursban, ronnel, and 2,4-D ester, and 80 to 90 percent for diazinon, using either lime or $FeCl_3$ as flocculant. Dimethoate and baygon showed very little tendency to sediment but underwent extensive hydrolysis at pH >10. Malathion also underwent alkaline hydrolysis above pH 9.5, while with $FeCL_3$ as flocculant at pH 4 to 5.5, about 60 percent appeared in sediments.

PRESENTATION: Bausum, H.T. and W.H. Dennis, Jr. Persistence and Partition of Pesticides in Primary Sewage Sedimentation. Abstract for Oral Presentation at Division of Pesticide Chem., American Chemical Society, Kansas City, MO, Sep 82, and for publication in Division of Pesticide Chemistry, ACS, Proceedings.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OG 8690	2. DATE OF SUMMARY* 82 09 30	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY K. COMPLETION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8a. DISS'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☐ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	012 APC F168
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Oxidation of Phenols and Amines under Wastewater Treatment Conditions

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

007800 Hygiene and Sanitation; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY		16. PERFORMANCE METHOD
8110	8209	DA		C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.2	08
	CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Burrows, E.P.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Rosenblatt, D.H.

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Chlorine Dioxide; (U) Wastewater; (U) Detoxification; (U) Organic Chemistry

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

23. (U) To further our understanding of the mechanisms of oxidation of phenols and amines under conditions relevant to wastewater treatment and chemical detoxification processes.

24. (U) The approach, involving kinetic and product studies of oxidation of chlorophenols by ClO_2, and kinetic studies of oxidation of amines by alkaline ferricyanide, is detailed in the accompanying proposal.

25. (U) 8110 - 8209. Results of the ferricyanide oxidation study were unexpected, and the scope of the reaction was broader than anticipated. Thus, virtually the entire period was spent pursuing the study to completion. Rates of oxidation of three amines were determined over the pH range 3.7-13.4, and a retarding effect of ferrocyanide was observed over this entire range. These results showed that two different mechanisms are operative: reversible rate-determining electron transfer from amine at high pH, and reversible rate-determining hydrogen transfer from ammonium cation at intermediate and low pH. These findings are a substantial contribution to our understanding of the action of one electron oxidants in chemical disinfection and detoxification processes, and have been submitted for publication in Journal of Organic Chemistry. With this phase of the oxidation study complete, the work unit is terminated.

*Available to contractors upon originator's approval

DETAIL SHEET

TITLE: Oxidation of Phenols and Amines under Wastewater Treatment Conditions

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

PROBLEM DEFINITION: Chlorophenols are formed slowly on treatment of phenol with excess chlorine dioxide (ClO_2) in dilute aqueous solutions. They are important environmental pollutants, and their fate on treatment with ClO_2 has not been investigated. Ferricyanide, like ClO_2, is a one-electron oxidant which reacts with amines to give products similar to those of ClO_2. The results of two earlier investigations suggested a ClO_2-like mechanism for ferricyanide at pH 8.8 and a different mechanism at pH >11. Thus, the mechanisms of ferricyanide oxidation remain to be investigated.

IMPORTANCE: Reactions of ClO_2 with certain classes of compounds, notably amines, phenols, and olefins have been investigated in some detail, but until very recently such studies were not carried out under water treatment conditions. Thus, in order to facilitate assessments of relative safety, further knowledge of the aqueous organic chemistry of ClO_2 is essential. Similarly, further study of other oxidants chemically similar to ClO_2 in aqueous solutions may be relevant to their use in detoxification of chemical agents.

APPROACH: Kinetic studies of the oxidations of 2- and 4-chlorophenol will be done in a stopped-flow spectrophotometer measuring disappearance of ClO_2 under pseudo-first order conditions and utilizing a Wylbur program Wajon 2 to determine rate constants. Organic product analyses will be made by HPLC. Stoichiometry of the oxidations will be determined through quantitative analysis of the inorganic products by ion chromatography. Kinetic studies of the oxidation of amines by ferricyanide at pH's between 8.8 and 11 will be made, and the effect of added ferrocyanide determined. Unlike that of ClO_2, this reaction is sufficiently slow to measure by repetitive scans in a UV-visible spectrophotometer.

ACHIEVEMENTS: The results of the ferricyanide oxidation study were unexpected, and the scope of the reaction broader than anticipated initially. Virtually the entire period was spent pursuing this study to completion. Thus, rates of oxidation of three amines were determined over the pH range 3.7-13.4, and a retarding effect of ferrocyanide was observed over this entire range. Two different mechanisms were indeed found operative; however, the ClO_2-like mechanism (reversible rate-determining electron transfer from amine) was predominant at pH >11, while in the lower pH range the mechanism involved reversible rate-determining hydrogen transfer from ammonium cation. A manuscript detailing these findings has been submitted for publication in Journal of the American Chemical Society.

PUBLICATIONS: Burrows, E.P. and D.H. Rosenblatt. Competitive Pathways in Chlorine Dioxide Oxidation of Amines: Amide Formation from Cyclic Amines. Technical Report 8109.

Burrows, E.P. and D.H. Rosenblatt. Mechanism of Oxidation of Trialkylamines by Ferricyanide in Aqueous Solution. For publication in Journal of the American Chemical Society.

Brueggemann, E.E., J.E. Wajon, C.W.R. Wade, and E.P. Burrows. Analysis of Unquenched Reaction Mixtures of Chlorine Dioxide and Phenols by Reversed Phase High Performance Liquid Chromatography. For publication in Journal of Chromatography.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0658	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	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	321 APC F169
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Procede with Security Classification Code): (U) Development of Thin-Layer Chromatographic Procedures (TLC) for the Rapid Analysis of Traces of Pesticides in Wastewater

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 012100 Organic Chemistry; 012700 Physical Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7910	8209	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.2	10
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
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20. PERFORMING ORGANIZATION
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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Trybus, T.M.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Procede EACH with Security Classification Code)
(U) Thin-Layer Chromatography; (U) Mixed Pesticides; (U) Analysis; (U) Wastewater

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

23. (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.

24. (U) Results of literature searches and newly developed methods will be combined to give a thin-layer chromatographic procedure in which a single adsorbent and a solvent system can be used to separate mixtures of organophosphorus and carbamate pesticides. In addition, a technique will be developed for quantitation of the results at the time of analysis.

25. (U) 8110 - 8209. The thin-layer chromatographic (TLC) procedure, using silica gel and hexane/acetone (V/V, 8/3) to separate and identify aqueous mixtures of the pesticides, baygon, diazinon, dursban, dimethoate, malathion, and vapona, has been successfully developed and is now being used by pest control operators at Ft. Eustis, VA. Ft. Eustis has purchased its own TLC equipment and is using the technique to monitor its untreated and treated wastewater. Presentations on the TLC method were given at the September National Meeting of the American Chemical Society and at the June Mid-Atlantic Reginal Meeting of the American Chemical Society.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-846/8290

DETAIL SHEET

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

FUNDING: PY - 11K; CY - 10K; BY - 0K

PROBLEM DEFINITION: The disposal of treated wastewater at Army pest control facilities requires on-the-spot chemical analyses. Laboratory equipment and highly trained personnel will not be available at these stations. The objective of this work is to develop the simplest thin-layer chromatographic system that one can use in the field to detect pesticides in the treated water. A second objective is to quantitate the concentration of pesticide.

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 storages of hazardous wastes, operators at Army pesticide waste treatment facilities need a simple reliable system for determining the level of pesticides in treated wastewater and for selecting the procedure for wastewater disposal.

APPROACH: Thin-layer chromatographic procedures found in the literature for specific pesticides and new methods will be evaluated and adapted to identify single solvent system and absorbent with potential for separation of mixture of pesticides.

ACHIEVEMENTS: In FY82, the TLC method of field analysis of pesticides in aqueous waste was continued at Ft. Eustis, VA. The procedure and results were presented at the April National Meeting of the American Chemical Society and as part of the presentation on the adsorption/filtration system at the Middle Atlantic Regional Meeting of the American Chemical Society. Technical assistance was given to Ft. Eustis, VA, in the selection and purchase of TLC equipment for field use by pest control operators. The method is now operational.

PRESENTATION: Wade, C.W.R., W.H. Dennis, Jr., and T.M. Trybus. Quantitative Analyses of Pesticides by TLC under Field Conditions. Oral presentation at American Chemical Society Meeting at Las Vegas, Nevada.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9548	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	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	013 APC F170
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code): (U) Investigation of the Formation of Trichloroacetic Acid During Water Chlorination

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 005900 Environmental Biology; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.1	03
	CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
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20. PERFORMING ORGANIZATION
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NAME:* Dennis, W.H., Jr.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME:
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)
(U) Chlorination; (U) Water; (U) Trichloroacetic Acid; (U) Formation

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

23. (U) During FY77, trichloroacetic acid (TCA) was discovered by accident in Fort Detrick tapwater at the level of ~50 ppb. This may or may not be a function of water chlorination as practiced at the Fort Detrick water plant. It is our objective to look carefully at the chlorination of natural water, determine the effect of Cl_2 dose, rate of TCA formation and seasonal variations. This is a basic research study that retains the proficiency of chemistry staff and will, in the long run, aid in solving more practical Army environmental or chemical problems.

24. (U) The present method of analysis will be modified in order to cut down on amount of time for GC analysis. Raw water will be taken to the Frederick treatment plant and dosed with HOCl at various levels. The amount and rate of formation of trichloroacetic acid will be measured.

25. (U) 8110 - 8209. A rapid and sensitive method has been devised for analysis of trichloroacetic acid (TCA) in water based on extraction of 10 mL of acidified sample with 1 mL diisopropyl ether, treating the ether extract with gaseous CH_2N_2 and analyzing the resulting extract by GC/EC. Sensitive to 5 µg/L TCA in water. When settled Monocacy river water is chlorinated to 4 mg/L FAC, TCA is formed gradually, reaching a maximum of 35 µg/L after 6 hours. The same water dosed with FAC from 2 to 20 mg/L Cl showed increasing concentrations of TCA with increasing dose of Cl after 16 hours. The highest dose yielded 130 µg/L TCA. TCA was found in tapwater of Fort Detrick, Frederick City, and Baltimore City.

*Available to contractors upon originator's approval

DETAIL SHEET

TITLE: Investigation of the Formation of Trichloroacetic Acid during Water Chlorination

FUNDING: PY - 0K; CY - 3K; BY - 0K

PROBLEM DEFINITION: To quantitatively determine the level of trichloroacetic acid in Monocacy River water before and after chlorination, determine the effect of chlorine dose on amount produced, determine the rate of formation and assess possible adverse effects by a survey of chemical and biological literature.

IMPORTANCE: During FY77, trichloroacetic acid was discovered by accident in laboratory tapwater at the 50 ppb level. Subsequent informal investigations showed this substance to be present in Frederick City and Baltimore City tapwaters as well, but not in unchlorinated well water. To the best of our knowledge, trichloroacetic acid heretofore has never been observed nor suspected in tapwater.

APPROACH: A gas chromatographic method using electron capture has been devised to analyze waters containing as low as 1 ppb of trichloroacetic acid. The level of trichloroacetic acid will be monitored in raw water before and after chlorination to various levels from 0.2 to 10 ppm Cl. Parameters will be Cl dose and time. Concurrent with lab studies, a literature survey will be made.

ACHIEVEMENTS: A rapid and sensitive method has been devised for analysis of trichloroacetic acid (TCA) in water based on extraction of 10 mL of acidified sample with 1 mL diisopropylether, treating the ether extract with gaseous CH_2N_2 and analyzing the resulting extract by GC/EC. Sensitive to 5 µg/L TCA in water. When settled Monocacy river water is chlorinated to 4 mg/L FAC, TCA is formed gradually, reaching a maximum of 35 µg/L after 6 hours. The same water dosed with FAC from 2 to 20 mg/L Cl showed increasing concentrations of TCA with increasing dose of Cl after 16 hours. The highest dose yielded 130 µg/L TCA. TCA was found in tapwater of Ft. Detrick, Frederick City and Baltimore City.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9549	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	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	014 APC F171
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code): (U) Development of Chromatographic Method for Separation and Quantitative Analysis of HOCl, NH_2Cl, $NHCl_2$, and NCl_3

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 008300 Inorganic Chemistry; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR — PRECEDING 82	0.1	03
FISCAL YEAR — CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Brueggemann, E.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)
(U) Water; (U) Analysis; (U) FAC; (U) Combined Chlorine; (U) HPLC

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

23. (U) Various colorimetric methods have been developed to measure free chlorine in water ($HOCl/OCl^-$). Only one method (syringaldazine) can reliably distinguish HOCl from NH_2Cl and $NHCl_2$. It would be useful to have an analytical method that would qualitatively and quantitatively distinguish all chlorine species (HOCl, NH_2Cl, $NHCl_2$ and NCl_3) in water.

24. (U) Various active chlorine (free and combined) species will be subjected to analysis by high pressure liquid chromatography (HPLC). Conditions will be sought for their separation.

25. (U) 8110 - 8209. Reverse phase high performance liquid chromatography (RP-HPLC) employing UV-detection was able to identify monochloramine (NH_2Cl) in glass distilled/deionized water at moderate to high concentrations (> 150 ppm). We were unable to detect aqueous solutions of hypochlorous acid (HOCl) and dichloramine ($NHCl_2$) by this method at concentrations of 260 and 170 ppm, respectively. Aqueous solutions of HOCl (260 ppm), NH_2Cl (189 ppm) and $NHCl_2$ (170 ppm) were UV scanned from 350 to 200 nanometers (1 A.U.F.S.). NH_2Cl showed modest absorption of UV light at 243 nm. HOCl (260 ppm) and $NHCl_2$ (170 ppm) showed no absorption of UV light (350 to 200 nm) at 1 A.U.F.S.

*Available to contractors upon originator's approval

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Development of Chromatographic Method for Separation and Quantitative Analysis of HOCl, NH_2Cl, $NHCl_2$, and NCl_3

FUNDING: PY - 0K; CY - 3K; BY - 0K

PROBLEM DEFINITION: Various colorimetric methods have been developed to determine free chlorine (HOCl or OCl^-) in water. Only one method can reliably distinguish HOCl from NH_2Cl and $NHCl_2$ (syringaldazine method). All methods developed are for field use and there has been little effort to accurately characterize the free and combined chlorine species present in chlorinated raw water.

IMPORTANCE: It would be useful to develop an analytical method that would qualitatively and quantitatively distinguish HOCl (OCl^-) and all species of combined chlorine (NH_2Cl, $NHCl_2$, and NCl_3). This would be too sophisticated for field use, but valuable in research studies.

APPROACH: Solutions of various free and combined chlorine species will be prepared and subjected to analysis by high pressure liquid chromatography (HPLC). Present HPLC columns should be sufficiently inert to allow passage of active-Cl species without interaction of column packings (reverse-phase C_{18} type) and yet allow partitioning between the packing and mobile phase.

ACHIEVEMENTS: Aqueous monochloramine (NH_2Cl) was detected at moderate to high concentrations (> 150 ppm) by reverse phase high performance liquid chromatography (RP-HPLC). Aqueous solutions of HOCl (260 ppm) and $NHCl_2$ (170 ppm) could not be detected by this method at this time.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0654	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	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	8309	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING FISCAL YEAR 82	0.1	01
CURRENT FISCAL YEAR 83	0.1	01

19. RESPONSIBLE DOD ORGANIZATION
NAME: US Army Medical Bioengineering Research & Development Laboratory
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20. PERFORMING ORGANIZATION
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ASSOCIATE INVESTIGATORS
NAME:
NAME:

21. GENERAL USE
Foreign Intelligence Not Applicable

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 (Furnish 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. This work will provide improved capability for virus assay in current microbiological evaluations of the Army's new technology field water treatment systems (reverse osmosis water purification units).

24. (U) The Bentonite system for virus recovery will be compared with the new charge-modified (AMF-CUNO) filters. Attempts will be made to locate the actual site of the antifoam B enhancing activity.

25. (U) 8110 - 8209. Preliminary replicate results with the AMF-CUNO charged filters (IMDS) gave excellent recovery of poliovirus from tapwater when compared to the Bentonite Virus Concentration System. Approximately 10% of the virus was recovered in the filtrates. The IMDS filter apparently removed the virus enhancing activity of antifoam B.

*Available to contractors upon originator's approval.

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: PY - 5K; CY - 1K; BY - 1K

PROBLEM DEFINITION: All methods used to concentrate viruses from various water environments employ filters to trap these viruses. The viruses are then recovered using high pH, organic eluents which foam considerably during elution from the filters.

IMPORTANCE: To improve the ability to detect viruses in environmental waters, and to reduce the physical and aerosol hazards during elution from these filters.

APPROACH: The Bentonite virus-recovery system will be compared with the new charge-modified (AMF-CUNO) filters in the presence or absence of 0.18% antifoam B in the beef extract eluent. An attempt will be made to determine the actual site of antifoam B virus enhancing activity.

ACHIEVEMENTS: Preliminary replicate results with the AMF-CUNO charge-modified filters (IMDS) gave excellent recovery of poliovirus from tapwater when compared to the Bentonite virus-concentration system. However, ca. 10% of the seeded virus was recovered in the IMDS filtrates. The charged filters apparently removed the virus enhancing activity of antifoam B.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 8689	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	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	015 APC F173
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Procede with Security Classification Code)*

(U) Trihalomethane (THM) Degradation

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

008300 Inorganic Chemistry; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.2	13
	CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Baxter, L.J.

NAME:

POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Trihalomethanes; (U) Catalytic Degradation (U) Photocatalytic Degradation; (U) Organic Chemistry

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

23. (U) The Army treats most of its drinking water and effluent from wastewater treatment plants with Cl_2 to kill bacteria. This process produced THMs which are suspected carcinogens. The objective of this project is to develop a method for the photocatalytic degradation of THMs in chlorinated Army drinking water and effluents.

24. (U) Trihalomethanes will be exposed to UV light in the presence of various metal catalysts and photosensitizing dyes. By varying the time of exposure to light and catalyst concentrations, we can evaluate the various methods for THM degradation.

25. (U) 8110 - 8209. It was found that Zn metal effectively degrades THMS in the absence of UV light. The degration of THMs with time and the formation and degradtion of several reaction intermediates were studied. Results of this study will be reported in the near future.

*Available to contractors upon originator's approval

DD, FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Trihalomethane (THM) Degradation

FUNDING: PY - 0K; CY - 13K; BY - 0K

PROBLEM DEFINITION: We will attempt to develop a method for the photocatalytic degradation of THMs in chlorinated Army drinking waters and wastewater effluents.

IMPORTANCE: The Army treats most of its drinking water and effluents from wastewater treatment plants with Cl_2 to kill bacteria. This process produces THMs which are suspected carcinogens. If we can develop a method for degrading THMs, the hazards of carcinogens in Army drinking water will be greatly reduced and discharge water will be safer for the environment. These advantages would apply to the private sector as well.

APPROACH: A mixture of THMs will be exposed to UV light in the presence of various metal catalysts and photosensitizing dyes. Parameters such as UV light intensity, time of exposure, and amount of catalyst will be varied to determine the optimum conditions for THM degradation for each catalyst.

ACHIEVEMENTS: It was found that Zn metal effectively degrades THMs in the absence of UV light. The degradation of THMs with time and the formation and degradation of several reaction intermediates were studied. A rough draft of these findings for journal publication is 95% complete.

PUBLICATION: Burns, M. (Summer Student), L. Baxter, and S.H. Bake. Catalytic Degradation of Trihalomethanes, Abstract for presentation at Middle Atlantic Regional ACS Meeting, Newark, DE.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA: OG 3111	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DOD'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	066 APC F174
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Procede with Security Classification Code)*

(U) Silver Chloride Photovoltaic Cell

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

000450 Conversion Techniques; 008300 Inorganic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8007	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In Thousands)
PRECEDING FISCAL YEAR 82	0.1	05
CURRENT FISCAL YEAR 83	0.1	01

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Hoke, S.H.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Photocell; (U) Solar Cell; (U) Photovoltaic

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Procede 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. This photovoltaic cell could provide a "silent" source of power to operate electronic monitoring instrumentation at remote military sites.

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) 8109 - 8209. A literature search conducted during FY81 indicated no research activity on this type of photocell. Materials and chemicals have been ordered and assembled. A preliminary cell has been designed. This cell has demonstrated that electricity can be produced from sunlight using AgCl. A new cell has been designed and constructed in order to optimize its efficiency.

*Available to contractors upon originator's approval

DETAIL SHEET

TITLE: Silver Chloride Photovoltaic Cell

FUNDING: PY - 7K; CY - 5K; BY - 1K

PROBLEM DEFINITION: To design a photovoltaic cell from silver chloride and determine the optimum conditions for operation.

IMPORTANCE: The Army is a leader in developing new techniques. This photocell could provide an economical source of electrical energy to remote installations and would prove valuable, therefore, to both the military and private sectors.

APPROACH: Using various cell designs, several parameters such as pH, chlorine concentration, light intensity, and wavelength are being studied.

ACHIEVEMENTS: A literature search has indicated no research activity in this area. The optimum pH for operating this cell is approximately 2. The cell does produce electrical power when Cl_2 is added. The present cell has been modified in order to increase the Cl_2 production of the Ag/AgCl electrode. An offshoot of this project has given rise to another study on what happens to Cl_2 in the presence of UV light.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 3146	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	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	067 APC F175
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)

(U) Formation and Evaluation of Specific Adsorbent Surfaces

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

007800 Hygiene and Sanitation; 008000 Industrial Process; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8008	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.4	10
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)

NAME: Kulkarni, R.K.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Adsorption; (U) Pesticides; (U) Dyes; (U) Mechanism; (U) Wastewater; (U) Hazardous Waste

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

23. (U) The claims were made by Dicky and Associates that hydrophilic silica gels can be made to form specific adsorbent surfaces for organic molecules like dye stuffs. The objective of the present investigation was to test the hypothesis and prepare high potency adsorbent surfaces on silica gel for pesticides and other toxic pollutants in wastewater.

24. (U) It was planned to prepare specific silica gel adsorbents for methyl orange, ethyl orange, p-chlorophenyl methyl sulfone, malathion, and chlordane and evaluate their properties as adsorbents for the specific substances.

25. (U) 8110 - 8209. The study of the adsorption isotherms clearly showed that silica gels do form definite specific surfaces for the compounds mentioned in 24 above. It is found that the specific adsorption property of the silica gels is enhanced by further modifications of the specific surfaces by the suitable adjustment of the hydrophilicity, porocity, and affinity of the gels by using the techniques of partial phase-reversion in the course of formation of the gels by polymerization. Actually the specific silica gels prepared for α-chlordane and malathion had high specificity and selectivity after phase reversion by treatment with trimethyl-chlor-silane. The abstract has been submitted for publication in Research News Letter (USAMRDC) and an article has been prepared for publication in Environ. Sci. & Tech.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Formation and Evaluation of Specific Adsorbent Surfaces

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

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 homo and block copolymers for dyes and pesticides.

IMPORTANCE: In basic chemistry, this study is important in elucidation of the behavior of Si and Al gels as template-like specific adsorbents for any organic molecules. This may lead to the preparation of high potency adsorbents for the pollutants in wastewater, facilitating the treatment of wastewater for removal of toxic substances.

APPROACH: The preparation and evaluation of silica gels in the presence of methyl or ethyl orange, and also chlorophenyl methyl sulfone, in order to reproduce and establish the data available in literature. Then the same techniques 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: It was found that many toxic pollutants in wastewater could be specifically adsorbed by silica gels prepared in the presence of these pollutants. The specific silica gel adsorbents, prepared for ethyl orange, p-chlorophenyl methyl sulfone, malathion, and chlordane, exhibited this property. The detailed study of the adsorption isotherms of these adsorbents for specific adsorbates demonstrated that the specific template-like surfaces were really formed by the polymerizing orthosolicic acid in the acid phase in the presence of these substances. The p-chlorophenyl methyl sulfone, α-chlordane, and malathion showed extra specificity even after treatment with trimethyl-chloro-silane to cause phase reversion.

PUBLICATION: Kulkarni, R.K. and T. Trybus. Preparation of Specific Selection Adsorbents for Pollutants in Wastewater. Article for publication in MRDC Research Newsletter.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9314	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	065 APC F176
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)

(U) Fate of Cl_2 in the Presence of UV Light

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

008300 Inorganic Chemistry; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.1	12
	CURRENT 83	0.1	02

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Hoke, S.H.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Chlorine; (U) Degradation; (U) Photolysis

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

23. (U) Most of the water the Army consumes is chlorinated. Also, the water from Army wastewater treatment plants is chlorinated before it is returned to the environment. Because chlorinated Army water is exposed to UV light, we need to know the fate of Cl_2.

24. (U) We will conduct a literature search and consult with knowledgeable researchers in this area of interest. Then we will study the photodegradation of Cl_2 at different pH and attempt to identify the reaction products and intermediates. The ion chromatograph will be used to identify some of the reaction products.

25. (U) 8110 - 8209. Degradation curves of Cl_2 and formation curves of O_2 have been constructed. From these curves and from indications in the literature, additional reaction products besides O_2 and Cl^- are formed.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE

☆U.S. GPO: 1981—341-048/8200

DETAIL SHEET

TITLE: Fate of Cl_2 in the Presence of UV Light

FUNDING: PY - 0K; CY - 12K; BY - 2K

PROBLEM DEFINITION: We will study the photodegradation of Cl_2 at different pH and attempt to identify the reaction products and intermediates.

IMPORTANCE: Most of the water the Army consumes is chlorinated. Also, the water from Army wastewater treatment plants is chlorinated before it is returned to the environment. Because chlorinated Army water is exposed to UV light, we need to know the fate of Cl_2.

APPROACH: Bottles containing dissolved Cl_2 in H_2O at different pH will be placed under a UV light. The bottles will be removed periodically and analyzed for possible oxygenated chlorine intermediates and products such as Cl^- and O_2. The ion chromatograph, chlorine titrator, ion selective electrodes and associated equipment will be used to conduct the analyses.

ACHIEVEMENTS: Degradation curves of Cl_2 and formation curves of O_2 have been constructed. From these curves and from indications in the literature, additional reaction products besides O_2 and Cl^- are formed.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 6380	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	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	326 APC F177
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)

(U) Bacteriological Mechanism of 1,3-Dinitrobenzene Biodegradation

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

007800 Hygiene and Sanitation; 012100 Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8010	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.2	03
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Mitchell, W.R.

TELEPHONE: (301) 663-2538; AUTOVON 343-2538

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) 1,3-Dinitrobenzene; (U) Biodegradation; (U) Bacterial

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

23. (U) To investigate the mechanism of 1,3-dinitrobenzene biodegradation. The compound is a major by-product of munitions manufacture, and, as such, is a major component of environmental discharges from munitions manufacture and loading and processing operations.

24. (U) A mixed culture growing on 1,3-dinitrobenzene as a sole carbon source will be plated, purified, and reinoculated into medium containing the compound. Organisms growing on the compound as pure cultures, or in combinations will be identified. Major intermediates in the pathway leading to benzene ring cleavage will be identified, as will the oxygenase functioning to cleave the ring.

25. (U) 8010 - 8209. Three organisms have been isolated from the 1,3-dinitrobenzene mixed culture on standard bacteriological medium which will degrade the test compound. All of the isolates have major toxonomic properties most similar to those of the genus Pseudomonas. Following repeated passage of the organisms on Standard Methods Agar with or without the test compound, the capability to degrade 1,3-dinitrobenzene was lost. Organisms comprising the 1,3-dinitrobenzene mixed culture are highly specific for the degradation of that compound and neither structural analogues nor other munitions pollutants could be substituted as carbon sources.

Individual microorganisms from the mixed culture would not grow on 1,3-dinitrobenzene as a sole carbon source following serial passage. An isolate was obtained which would grow on 100 µg/mL test compound in the presence of 10 µg/mL yeast extract. Cell free preparations of these organisms were not active in modifying or degrading 1,3-dinitrobenzene even in the presence of reduced cofactors. The same preparations appeared to modify but not degrade the aromatic metabolic intermediate catechol.

* Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Bacteriological Mechanism of 1,3-Dinitrobenzene Biodegradation

FUNDING: PY - 9K; CY - 3K; BY - 0K

PROBLEM DEFINITION: The purpose is to identify the microorganism or microorganisms responsible for the biodegradation of 1,3-dinitrobenzene.

IMPORTANCE: Previous studies indicate that 1,3-dinitrobenzene compound is only partially biodegraded and will not serve as a sole source for microbial growth, but a mixed culture has been developed at USAMBRDL which will grow on and completely degrade the compound. An understanding of the organisms and enzyme systems involved could serve as a starting point for the development of strains of microbes capable of degrading a variety of nitro-substituted benzene derivatives.

APPROACH: Mixed culture microorganisms growing in 1,3-dinitrobenzene as a sole carbon source will be plated, purified, and reinoculated into medium containing the compound. Organisms growing on the compound as pure cultures, or in known combinations, will be identified by standard bacteriological techniques.

ACHIEVEMENTS: Three organisms have been isolated from the 1,3-dinitrobenzene mixed culture on Standard Methods agar which will degrade the test compound upon reinoculation. All of the isolates have major taxonomic properties most similar to those of the genus Pseudomonas: Gram negative rods, polar flagella oxidase positive (weak), catalase positive. Following repeated passage on the medium with or without the test compound, the capability to degrade 1,3-dinitrobenzene was lost. Results of studies designed to evaluate the adaption of the microorganisms to other aromatic compounds as carbon sources indicated that the degradation of 1,3-dinitrobenzene by the microorganisms was highly specific. Neither structural analogues nor other munitions pollutants could be substituted for 1,3-dinitrobenzene. Compounds tested included phenol, m-aminophenol, aniline, m-nitroaniline, o-dinitrobenzene, p-dinitrobenzene, nitrobenzene, trinitrobenzene, dinitroaniline, resorcinol, cresol, benzoate, protocatechuate, catechol, and m-nitrophenol.

An isolate was obtained which would grow on 100 µg/mL 1,3-dinitrobenzene test compound in the presence of 10 µg/mL yeast extract. Cell-free preparations of this organism were not active in modifying or degrading 1,3-dinitrobenzene even in the presence of reduced cofactors; nor did the preparations modify or degrade the analogues m-nitrophenol, m-nitroaniline, m-aminophenol, or resorcinol as judged by lack of oxygen uptake or decrease in substrate following incubation. The same preparations appeared to modify the aromatic metabolic intermediate catechol, but not protocatechuate.

PUBLICATIONS: Mitchell, W.R. and W.H. Dennis. Biodegradation of 1,3-Dinitrobenzene. Environmental Science and Engineering.

Mitchell, W.R., W.H. Dennis, and E.P. Burrows. Microbial Interactions with Several Munitions Compounds: 1,3-Dinitrobenzene, 1,3,5-Trinitrobenzene, and 3,5-Dinitroaniline. Technical Report 8201.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 7061	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISS'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	K. COMPLETION	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	068 APC F179
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Procede with Security Classification Code)* (U) Feasibility of Using Adsorption Cartridges to Trap Traces of G-Agents from Water

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
012100 Organic Chemistry; 012700 Physical Chemistry; 002300 Biochemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.0	00
	CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Trudeau, T.L., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Dennis, W.H.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Wade, C.W.R.
NAME: Rosencrance, A.B. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Procede EACH with Security Classification Code)
(U) Water; (U) G-Agents; (U) Adsorption Cartridges; (U) Nerve Agents; (U) Detection Limits

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

23. (U) The XM272 water test kit, used by the Army, was developed to detect chemical nerve agents in water at a level of 0.02 to 0.005 mg/L. Presently, detection at such low levels cannot be achieved. Adsorption cartridges could be used to concentrate such agents from water in order to detect low-level concentrations of agents with the XM272 test kit. We will determine the feasibility of this approach.

24. (U) Aqueous solutions of G-agents (5 and 20 ppb) will be passed through SEP PAK C_{18} absorption cartridges (a product of Waters Associates, Inc.). The absorbed agents will be eluted from the cartridges with methanol and onto an acetylcholinesterase test ticket. Enzyme inhibition will be determined.

25. (U) 8107 - 8209. No progress was made because we were unable to bring the needed G-agents into this Laboratory or unable to carryout this plan at a secured laboratory.

*Available to contractors upon originator's approval

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 66 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Feasibility of Using Absorption Cartridges to Trap Traces of G-Agents from Water

FUNDING: PY - 15K; CY - OK; BY - OK

PROBLEM DEFINITION: To adsorb G-agents from water (at the 0.005 mg/L level) onto SEP PAK C_{18} cartridges and elute the agents from the cartridges. The eluates will be applied to the acetycholinesterase test tickets and the presence or absence of enzyme inhibition determined.

IMPORTANCE: The XM272 water test kit was developed by the Army to detect chemical agents in water. At present, it is required that nerve agents be detected in water at the 0.005 mg/L level. The acetylcholinesterase test ticket, which is a component of the XM272 kit, cannot detect G-agents at this level. FY81 work showed that organophosphorus pesticides could be absorbed from water at the 0.005 mg/L level by using SEP PAK C_{18} absorption cartridges. Furthermore, the pesticides could be eluted from the SEP PAK cartridges with methanol. This technique may work with G-agents.

APPROACH: Solutions of G-agents at the 0.005 mg/L level will be made. An aliquot of 100 mL will be pushed through a SEP PAK C_{18} cartridge with a glass Luer-tip syringe. The absorbed agent will be eluted from the SEP PAK C_{18} cartridge with 1 mL of methanol. This eluate will be tested for acetylcholinesterase inhibition.

ACHIEVEMENTS: No progress was made because we were unable to bring the needed G-agents into this Laboratory or unable to carry out this plan at a secured laboratory.

PUBLICATION: Dennis, W.H., Jr., C.W.R. Wade, A.B. Rosencrance, T.M. Trybus, and E.E. Bruggemann. Concentration of Trace Amounts of Organophosphorus Pesticides from Water by Sep Pak C_{18} Cartridges. Technical Report 8107.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OG 9315	2. DATE OF SUMMARY* 82 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY D. Change	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8A. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	069 APC F180
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Procode with Security Classification Code)* (U) Feasibility of Using NMR-^{31}P and Flow Injection Analyses to Characterize Chemistry of Phosphorus Smokes

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 012100 Organic Chemistry; 008300 Inorganic Chemistry; 012700 Physical Chemistry; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8309	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.1	07
	CURRENT 83	0.1	07

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Trudeau, T.L., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Wade, C.W.R.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Hoke, S.H.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Procode EACH with Security Classification Code) (U) Smokes; (U) Phosphorus; (U) Characterization; (U) NMR-^{31}P; (U) Flow Injection Analysis

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

23. (U) The objective of this work is to determine the feasibility of using flow injection analysis/high performance liquid chromatography (FIA/HPLC) and nuclear magnetic resonance spectroscopy-phosphorus-31 (NMR-^{31}P) for rapid analyses of phosphorus aerosols, Army smokes used to screen soldiers and equipment. Current analytical procedures require several hours to days to complete chemical characterization.

24. (U) The primary combustion product of white and red phosphorus is phosphorus pentoxide. Vapors of the pentoxide will be hydrolyzed and examined with NMR-^{31}P and flow injection analyses. The data will be compared with data collected from TLC, HPLC, ion chromatography, and GC/MS studies. Similarly, combustion products from white phosphorus felt and red phosphorus/butyl rubber will be hydrolyzed in the vapor phase and analyzed. Attention will focus on trace levels of detection, difficulty of analyses, quality of collected data, and total characterization. Findings will be provided to in-house, extramural, and other inhalation and toxicological studies.

25. (U) 8110-8209. The NMR spectrometer was modified to measure ^{31}P, and flow injection analyses (FIA) instrumentation was evaluated and found to be useful for rapid analyses. Acquisition of FIA capability is being investigated. Ion chromatography is being explored as a useful complement. Analyses of standard solutions and combustion mixtures is planned for FY83.

*Available to contractors upon originator's approval

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A 1 NOV 65 AND 1498-1 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: Feasibility of Using NMR-^{31}P and Flow Injection Analyses to Characterize Chemistry of Phosphorus Smokes

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

PROBLEM DEFINITION: White phosphorus (white phosphorus/felt) is used and red phosphorus (red phosphorus/butyl rubber) is being studied by the Army as smoke screens for troops and equipment. Evaluation of the hazardous nature of these smokes is contingent upon chemical analyses during inhalation exposure of animals. Currently, the analyses are so time consuming that the results become available long after the exposure. No time is allowed for readjustments or for determination of the status of the system.

IMPORTANCE: The value of the inhalation studies may be jeopardized because the results of the analyses may show that the actual conditions and the desired programmed conditions are two different to be useful. Rapid analyses should be cost effective and provide data at the most useful time.

APPROACH: Literature data indicate that phosphorus pentoxide is the primary combustion product of red and of white phosphorus and that in a humid atmosphere the oxide is hydrolyzed to phosphoric acids. In this study phosphorus pentoxide vapors will be hydrolyzed with humid air and the resulting products will be characterized by NMR-^{31}P and flow injection analysis. A similar hydrolysis and characterization will be done on the combustion products of white phosphorus/felt and red phosphorus/butyl rubber. A comparative evaluation will be made of the data. Eventually, a comparative evaluation of the NMR-^{31}P and flow injection analyses will be compared to data collected from TLC, HPLC, ion chromatography and GC/MS analyses. The application and usability of NMR-^{31}P and flow injection analyses as separate or complementary methods of characterizing smokes will be established for in-house, extramural and toxicological studies. One can take samples from a chamber and provide characterizations within minutes, if these techniques prove useful.

ACHIEVEMENTS: Preliminary work, acquisition of some chemicals, and the adsorption of the NMR for ^{31}P studies were all that could be done. Efforts were concentrated on quality assurance measurements in chemistry. Completion of the QA requirements should allow more time in FY83.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 9370	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
82 09 10	H.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	010 APC F185
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Procede with Security Classification Code)* (U) Investigation of the Effects of Larval Density and Water Volume on the Susceptibility of Mosquito Larvae to Varying Concentrations of Insecticides

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 Environmental Biology; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.2	13
	CURRENT 83	0.0	0

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Frommer, R.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Larval Density; (U) Susceptibility; (U) Mosquito; (U) Insecticide

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

23. (U) Evaluate the influence of larval density levels in varying volumes of water on the susceptibility of mosquito larvae (four species) to given insecticide treatment concentrations.

24. (U) Refine present methods of performing laboratory bioassay susceptibility tests to establish a set of acceptable standards from which laboratory data can be compared with more precision.

25. (U) 8110 - 8209. Larval density ranging between 0.5 and 0.001 larva/mL did not significantly alter the effect of treatment concentrations calculated to kill half of the exposed population in 24 hours. At very high densities ($\geq$ 1/mL) there were significant deviations from the precalculated LC_{50} values. Within the range of small volumes used in static tests (100-10,000 mL), the variable most useful for explaining observed results was the absolute amount of toxic material rather than the concentration of the toxicant. If this effect is generally applicable to all toxic materials and species used in bioassay testing, major revisions in test procedures and data analysis will be required to assure comparability of results from different laboratories. Project was terminated due to reassignment of principal investigator.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 88 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A 1 NOV 68 AND 1498-1, 1 MAR 88 (FOR ARMY USE) ARE OBSOLETE

*U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Investigation of the Effects of Larval Density and Water Volume on the Susceptibility of Mosquito Larvae to Varying Concentrations of Insecticides

FUNDING: PY - 0; CY - 13K; BY - 0

PROBLEM DEFINITION: To evaluate the influence of larval density levels in varying volumes of water on the susceptibility of mosquito larvae (4 species) to given insecticide treatment concentrations.

IMPORTANCE: At present, no universally accepted standard procedure is used when conducting laboratory bioassay procedures in determining susceptibility threshold levels in mosquito larvae. Standardization through the research conducted at USAMRBDL and with the assistance of the American Society for Testing and Materials (ASTM) will insure greater precision, expecially when projected field requirements are being developed.

APPROACH: Four species of mosquito larvae were used to determine what effects larval density levels (i.e., number of larvae per treatment container) and water volumes (i.e., volume of water per larval density level) would have on susceptibility determinations. Tests were replicated 5-8 times with each replication consisting of one specific volume of water at 5 larval density levels. Insecticide treatments consisted of Abate, Malathion, Developmental Growth Inhibitor (IGR), and Bti. All testing was with 24-hour exposures.

ACHIEVEMENTS: Larval density ranging between 0.5 and 0.001 larva/mL did not significantly alter the effect of treatment concentrations calculated to kill half of the exposed population in 24 hours. At very high densities ($\geq$ 1/mL) there were significant deviations from the precalculated LC_{50} values. Within the range of small volumes used in static tests (100-10,000 mL), the variable most useful for explaining observed results was the absolute amount of toxic material rather than the concentration of the toxicant. If this effect is generally applicable to all toxic materials and species used in bioassay testing, major revisions in test procedures and data analysis will be required to assure comparability of results from different laboratories. The project was terminated due to reassignment of principal investigator.

RELATIONSHIP TO CORE PROGRAM: The proposed work would enhance precision in comparing our Laboratory's data with those of other agencies, as well as aid in projecting field dose and anticipated mortality.

IDENTIFICATION AND HEALTH
EFFECTS OF MILITARY POLLUTANTS

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 8688	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	61102A	3E161102BS04	AA	002 APC F202
b. CONTRIBUTING				
c. CONTRIBUTING	STOG 80-8:14:15:16:17:20:21			

11. TITLE (Procede with Security Classification Code)*

(U) Basic Research in Aquatic Toxicology

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 Environmental Biology; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	1.4	61
	CURRENT 83	0.4	26

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* van der Schalie, W.H.

TELEPHONE: (301) 663-7627; AUTOVON 343-7627

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Aquatic Toxicology; (U) Fish; (U); (U) Histopathology; (U) Daphnia magna

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

23. (U) To improve the predictive capability of screening tests currently used to evaluate the impact of Army-relevant materials on aquatic organisms.

24. (U) The histopathologic response of fish to Army-relevant toxicants during early life stage tests will be compared to known chronic effects to see if the predictive ability of the early life stage test can be improved. Compounds to be tested included Dursban, 2,4-dinitrotoluene, and 2,6-dinitrotoluene. The effects of similar amounts of 1,3,5-trinitrobenzene applied in constant and fluctuating patterns on the invertebrate Daphnia magna will be evaluated to assess the influence of varying toxicant application patterns on toxicity.

25. (U) 8110 - 8209. Monitoring the histopathologic effects of 2,4-DNT on fathead minnows during an early life stage test greatly improved the capability of the test to predict the chronic toxic effects of this compound. Testing with a second compound (Dursban) has been completed and the data are now being analyzed.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) Basic Research in Aquatic Toxicology

FUNDING HISTORY: PY - 0K; CY - 61K; BY - 26K

PROBLEM DEFINITION: There are numerous Army-related materials for which information on toxicity to aquatic organisms is required. This project seeks to improve the efficiency and predictive capability of existing laboratory test methods and to compare the results of tests conducted under constant toxicant exposure with fluctuating exposures more typical of field conditions.

IMPORTANCE: The effects of Army-relevant chemicals on aquatic life can be an important part of the data base from which environmental assessments are made. Such assessments are used by regulatory authorities to develop discharge standards which, in turn, may have great impact on Army waste disposal methods. It is therefore of great importance that the laboratory procedures used to estimate potential toxic effects in the field have high predictive capability while keeping time and manpower expenditure to a minimum.

APPROACH: The fish early life stage (ELS) test is commonly used to estimate the chronic toxicity of a material at the fraction of the cost of a full chronic test. Extension of the predictive capability of this test will be investigated by utilizing histopathologic examination of fish at the end of the ELS test. Comparison will be made between traditional ELS end points (survival and growth, histopathologic effects, and effect levels) in full chronic tests. In addition, the relative toxicity of toxicant application patterns will be evaluated by exposing daphnids to equivalent amounts of toxicants applied in constant and fluctuating patterns.

ACHIEVEMENTS: The addition of histologic monitoring to an ELS test with fathead minnows and 2,4-dinitrotoluene greatly decreased the estimated lowest level of toxic effects and brought the results into correspondence with effect levels found in a full chronic toxicity test with the same compound and fish.

PRESENTATION: Broich, S.G., W.H. van der Schalie, and W.R. Hartley. A Comparison of Early Life Stage Effects and Histopathology with the Chronic Life Cycle Effects of 2,4-Dinitrotoluene on the Fathead Minnow (Pimephales promelas). Abstract for Oral Presentation at the Society of Environmental Toxicology and Chemistry Third Annual Meeting, Arlington, VA, 18 June 1982.

PEST MANAGEMENT SCIENCE BASE

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 5997	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	61102A	3M161102BS10	AS	331 APC F251
b. CONTRIBUTING				
c. XXXXXXXXXXXX	STOG 80-7.2:2			

11. TITLE (Procede with Security Classification Code)

(U) Pest Management Science Base

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

002600 Biology; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8012	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.3	85
FISCAL YEAR CURRENT 83	1.1	58

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Nelson, J.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Vorgetts, L.J.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Pest Management; (U) Integrated Pest Management; (U) Vector Control

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

23. (U) Develop and maintain a pest management science base that will (a) ensure the applied research program is current in new developments in pest management, and (b) develop new militarily unique approaches to integrated pest management.

24. (U) Through use of in-house expertise and extensive interrelationships with other government agencies and the private sector, conduct basic research in the area of integrated pest management. The approach will be centered on militarily unique aspects of the program.

25. (U) 8110 - 8209. Through extensive field research the rotary wing aerial dispersal of selective biological insecticides was ascertained to be both technically feasible and economically practical. Although the data from field studies are preliminary, it appears that the ultra-low volume of insecticides with diluents is significantly (> 60%) more effective in causing mortality of adult mosquitoes than the conventional methodology utilizing technical grade insecticides.

*Available to contractors upon originator's approval

DETAIL SHEET

TITLE: (U) Pest Management Science Base

FUNDING HISTORY: PY - 87K; CY - 85K; BY - 58K

PROBLEM DEFINITION: The military historically has adopted particular technologies long after they have been proven in the civil sector. This concept has created a lag that has often resulted in the military acquiring outmoded technology. As the technology advances at an even greater rate, the resultant lag becomes greater so that the problem compounds itself.

IMPORTANCE: The military must have state-of-the-art technology in order to perform its mission to support the combat soldier. Attempting to combat vector-borne diseases with outmoded technology will result in inefficiency, wastefulness, and failure to carry out the mission.

APPROACH: Using in-house expertise and extensive interrelationships with other government agencies and the private sector, basic research will be conducted in the area of integrated pest management. The approach will be centered on militarily unique aspects of the program.

ACHIEVEMENTS: Through extensive field research the rotary wing aerial dispersal of selective biological insecticides was ascertained to be both technically feasible and economically practical. Although the data from field studies are preliminary, it appears that the ultra-low volume of insecticides with diluents is significantly (> 60%) more effective in causing mortality of adult mosquitoes than the conventional methodology utilizing technical grade insecticides.

RELATIONSHIP TO CORE PROGRAM: This project is a vital part of a comprehensive vector control program, ensuring a steady stream of new, innovative, and often novel approaches to effective control of arthropod vector populations.

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6185	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	63732A	3S463732D836	BA	006 APC F304
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1402A			

11. TITLE (Procede with Security Classification Code)

(U) Field Clinical Analysis System

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 010100 Microbiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	11
FISCAL YEAR CURRENT 83	0.7	35

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Salisbury, L.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Reams, W.H.

NAME: POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Laboratory Equipment; (U) Medical Field Devices; (U) Test Kits

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

23. (U) Develop through exploratory studies field medical devices and laboratory equipment for clinical analysis of body fluids within Army field medical units.

24. (U) Conduct a problem definition study 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) 8110 - 8209. A list of test requirements has been developed. A survey of commercial equipment has been conducted to determine which requirements can be satisfied and which items can meet field needs. A dry-slide technology is developing that has promise of meeting field needs. This will reduce the logistic burden of reagent supply and storage. The tests available are expanding.

Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) Field Clinical Analysis System

FUNDING HISTORY: PY - 40K; CY - 11K; BY - 35K

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 that has not been designed to operate in the field. Additionally, the use of different manufacturers' equipment for the same determination increases the logistic, training, and maintenance problems.

APPROACH: Various tests and their location in the medical care chain will be determined. A survey will be made of the procedures available to make the desired tests. Then a system will be developed that will use common procedures for as many tests as possible and that 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 under way. A dry slide technology is developing but, as yet, will not satisfy the stated requirements.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6223	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	63732A	3S463732D836	AA	005 APC F305
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1400A			

11. TITLE (Procede with Security Classification Code)*

(U) Pesticide Formulations, Controlled-Release, Environmentally Compatible

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING FISCAL YEAR 82	1.0	26
CURRENT FISCAL YEAR 83	0.5	44

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Nelson, J.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Anderson, L.M.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code) (U) Pesticide Formulations; (U) Controlled-Release; (U) Pest Management; (U) Environmental Compatibility; (U) Vector Control

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

23. (U) 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) 8110 - 8209. A controlled-release floating granule formulation of a selective biological insecticide (Bacillus thuringiensis var. israelensis) was tested in the laboratory against 3rd instar Aedes aegypti larvae. The floating granules were effective for only 2-3 days at the recommended application rates. Although this represents a 2- to 3-fold increase in duration of effectiveness over the technical material, it is an operationally unacceptable duration. Tests will continue to refine the controlled release concept for this highly effective, environmentally acceptable biological insecticide.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Pesticide Formulations, Controlled-Release, Environmentally Compatible

FUNDING HISTORY: PY - 90K; CY - 26K; BY - 44K

PROBLEM DEFINITION: To develop and register long-lasting and environmentally compatible pesticide formulations for use by the military.

IMPORTANCE: Controlled-release environmentally degradable pesticide formulations systems are needed to replace the long-lasting, broad-spectrum pesticides, like DDT, that have been cancelled or suspended. The current formulations of new compounds are short-lived and have relatively short shelf life; thus, they 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: A controlled-release pesticide formulation system envisions the formulation of pesticides into carriers having chemical or physical characteristics that release the pesticide at a predetermined rate into the environment so that, after a given time, the pesticide and carrier are completely degraded.

ACHIEVEMENTS: A controlled-release floating granule formulation of a selective biological insecticide (Bacillus thuringiensis var. israelensis) was tested in the laboratory against 3rd instar Aedes aegypti larvae. The floating granules were effective for only 2-3 days at the recommended application rates. Although this represents a 2- to 3-fold increase in duration of effectiveness over the technical material, it is an operationally unacceptable duration. Tests will continue to refine the controlled-release concept for this highly effective, environmentally acceptable biological insecticide.

RELATIONSHIP TO CORE PROGRAM: This project involves evaluation and field testing of several new pesticide formulations. The outcome will provide the military with a new series of effective pesticides that are registered for medically important arthropods.

MANUSCRIPT: Evaluation of a Controlled-Release Silicate Formulation of Temephos against Aedes Aegypti Larvae in the Laboratory and Psorophora Columbiae Larvae in Rice field Plots; Anderson, L. M., Nelson, Dr. J. H., Thies, C., and M. V. Meisch. J. Med. Ent. (In press)

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 8686	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	63732A	3S463732D836	BB	004 APC F306
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2:6			

11. TITLE (Procede with Security Classification Code)*

(U) Form/Fit/Function Study for ISO/TEMPER

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8311	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	09
FISCAL YEAR CURRENT 83	0.2	17

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Conway, W.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Hospital, Field; (U) Shelter; (U) Field Medicine; (U) Bioengineering

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

23. (U) Determine a functional arrangement of medical equipment within expandable International Organization for Standardization (ISO) shelters and Tent, Extendable, Modular, Personnel (TEMPER) tents contemplated for use in field hospitals. The study will include such factors as packability/transportability of equipment within the folding shelters, placement of utilities, power requirements, and other pertinent factors.

24. (U) Procure and set up specimen shelters. Different arrangements of the required equipment for various hospital elements will be made within the shelters, and these will be evaluated for the factors defined above under "Objective."

25. (U) 8110 - 8209. Prototype two-for-one and three-for-one shelters were obtained for use in this study. Also, the equipment necessary to set up a two table surgery was identified from Unit Assembly listings and was obtained on loan. Work on the functional arrangement for this equipment has been started.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Form/Fit/Function Study for ISO/TEMPER

FUNDING HISTORY: PY - 0; CY - 9K; BY - 17K

PROBLEM DEFINITION: In constituting the new MASH hospital, it is desirable to eliminate the MUST expandable shelters and replace them with shelters conforming to the International Organization for Standardization (ISO) standards to achieve uniformity with other services and NATO allies. To accomplish this goal, it is necessary to prove that functional arrangements of field medical equipment can be accommodated by the ISO shelters.

IMPORTANCE: The replacement of special purpose equipment with internationally standardized equipment carries obvious benefits in both cost and maintainability. The resurrection of the MASH hospital in revised form affords an excellent opportunity to replace the MUST expandable shelters which have been trouble prone and represent a unique design.

APPROACH: Equipment layouts and packaging plans will be developed within the ISO shelters for laboratory, pharmacy, surgery, sterile preparation, and X-ray functions of the new MASH. The study will also consider placement of utilities and will seek to minimize the number of different ISO models required.

ACHIEVEMENTS: Prototype models of the two-for-one and three-for-one ISO shelters have been obtained for use in this study. Also, cabinetry and medical equipment necessary for a two table surgery have been obtained on loan. Preliminary layouts have been started.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 1514	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	H. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S4637320836	BA	003 APC F307
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2.6			

11. TITLE (Procede with Security Classification Code)*

(U) Radio Paging System

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 009800 Medical and Hospital Equipment; 021000 Radio Communications; 003900 Communications

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8105	8304	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0	0
FISCAL YEAR CURRENT 83	0	0

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Prensky, W.C.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Field Equipment; (U) Medical; (U) Paging, Radio; (U) Engineering Evaluation

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

23. (U) Conduct engineering evaluation of radio paging system for field medical applications. The US Army Medical Department must be prepared to provide immediate and responsive medical treatment at all field medical treatment facilities at all times. The capability for immediate contact with key hospital personnel would ensure maximum effectiveness.

24. (U) Survey commercial source of radio paging systems and select for development testing and operational testing the unit/units most closely satisfying better requirements.

25. (U) 8110 - 8209. This task was terminated by a decision of higher headquarters when it was determined that this equipment could compete with the allocation of combat radio frequencies, already limited on the battlefield, and could provide a beacon to the enemy.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) Radio Paging System

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

PROBLEM DEFINITION: To provide immediate and responsive medical treatment at all field medical treatment facilities.

IMPORTANCE: The capability for immediate contact with key hospital personnel would ensure maximum effectiveness in field medical units.

APPROACH: Commercial radio paging systems will be surveyed. The units most likely to fulfill the requirements will be selected for DT and OT.

ACHIEVEMENTS: This task was terminated by a decision of higher headquarters when it was determined that this equipment could compete with the allocation of combat radio frequencies, already limited on the battlefield, and could provide a beacon to the enemy. Task was terminated prior to any research efforts being expended.

RELATIONSHIP TO CORE PROGRAM: This task is consistent with the Laboratory's mission to provide suitable equipment for field medical treatment facilities.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
				DA OG 5861	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	H.TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S463732D836	AA	002 APC F308
b. CONTRIBUTING				
c. XXXXXXXXXXXX	CARDS NO: 1430R			

11. TITLE (Precede with Security Classification Code)*

(U) Delousing Outfit, Power-Driven

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8010	8509	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0	0
	CURRENT 83	0	0

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Anderson, L.M.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Delouser; (U) Dust; (U) Lice; (U) Insecticide Dispersal Equipment; (U) Insect Control

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

23. (U) Develop a new replacement delousing outfit which is capable of accurately dispensing new delousing agents. Units will be used by medical and quartermaster personnel for control of body lice.

24. (U) Using standard military and commercial components, reengineer the militarily unique delousing outfits. Units will be lighter and less bulky than current items. Dispersal system will be very accurate and capable of adjustment from 1 to 6 gm per treatment point.

25. (U) 8110 - 8209. Natick Research and Development Laboratories initiated the Troop Support and Aviation Materiel Readiness Command (TSARCOM) funded PIP and fabricated an improved gun/nozzle assembly that was designed to dispense the newest pediculicides at the proper rates. The PIP item was tested at USAMBRDL, and recommendations were made for additional modifications including changing the type and position of the handle valve to enable easier engagement and to provide more consistent rates of delivery. These coupled with other recommendations resulted in a modified PIP item that is far superior to the current delouser and enhances combat readiness by adding 15 years to the life expectancy of the delousing unit. The work unit is being terminated under the advanced development program element and, upon advice from TSARCOM, will be reinitiated under the 6.2 program element.

*Available to contractors upon originator's approval.

DD, FORM 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Delousing Outfit, Power-Driven

FUNDING HISTORY: FY - 11K; CY - 0; BY - 0

PROBLEM DEFINITION: The current standard Delousing Outfit, Power-Driven, was initially designed during World War II. The delousing outfit does not apply consistent rates of pesticide. This deficiency has been reported as a potential health hazard in conjunction with several field experiments.

IMPORTANCE: Delousing outfits, power-driven, are utilized during military operations for control of outbreaks of body lice which precede epidemics of typhus. Delousing outfits will be used to prevent devastating outbreaks of typhus which previously have characterized all armed conflicts in the European theater.

APPROACH: Using standard military and commercial components, the militarily unique delousing outfit will be reengineered. It will be lighter and less bulky, and the guns and nozzles will be specifically designed for uniform dust dispersal.

ACHIEVEMENTS: Natick Research and Development Laboratories initiated the Troop Support and Aviation Materiel Readiness Command (TSARCOM) funded PIP and fabricated an improved gun/nozzle assembly that was designed to dispense the newest pediculicides at the proper rates. The PIP item was then tested at USAMBRDL, and recommendations were made for additional modifications including changing the type and position of the handle valve to enable easier engagement and to provide more consistent rates of delivery. These coupled with other recommendations resulted in a modified PIP item that is far superior to the current delouser and enhances combat readiness by adding 15 years to the life expectancy of the delousing unit. The work unit is being terminated under the advanced development program element and, upon advice from TSARCOM, will be reinitiated under the 6.2 program element.

RELATIONSHIP TO CORE PROGRAM: This PIP item will update the current Delousing Outfit, Power-Driven, available for use in the field.

MANUSCRIPT: Delousing Outfit, Power-Driven: 10 Gun; Anderson, Leroy M. Article for publication in the MRDC Newsletter.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9318	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 12 23	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	63732A	3S463732D836	BA	007 APC F310
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1420K			

11. TITLE (Precede with Security Classification Code)

(U) Steam Vacuum Pulse Sterilizer (SVP) System

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 010100 Microbiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8112	8404	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	1.2	74
	CURRENT 83	1.4	65

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Prensky, W.C.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Field Sterilizers; (U) Power Module; (U) Steam Sterilization

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

23. (U) Conduct an engineering evaluation of the steam vacuum pulse sterilizer system.

24. (U) Conduct DT II and OT II testing and evaluation on prototypes of this system.

25. (U) 8112 - 8209. Three sets of prototype hardware have been accepted. After a substantial period of familiarization, debugging, and identification of weak components, DT II effort has begun. Several problems have been solved, and it is believed that all others have been identified.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Steam Vacuum Pulse Sterilizer (SVP) System

FUNDING HISTORY: PY - 0; CY - 74K; BY - 65K

PROBLEM DEFINITION: Two 16-inch diameter, gravity-displacement steam sterilizers (NSN 6530-00-926-21451 and 6530-00-027-5260) are available for field installations. They are of aging design, and their speed and size do not satisfy the expected needs of throughput and pack size. A need exists for a sterilizer of the prevacuum type to repalce these slower and less efficacious units.

IMPORTANCE: A steam sterilization capability in field hospitals is an evident necessity. The substitution of a larger, more capable item for units currently in stock will improve the logistical support situation while providing a move up to current technology.

APPROACH: A suitable item will be provided by a contract closely monitored by the Laboratory's technical staff. Modifications indicated by DT II will be made on OT II results to provide a fully satisfactory item.

ACHIEVEMENTS: Three sets of prototypes have been accepted by the Contracting Officer's Technical Representative. After a substantial period of familiarization, debugging, and identification of weak components, DT II effort has begun. Several problems have been solved, and it is believed that all others have been identified.

RELATIONSHIP TO CORE PROGRAM: This task is part of the Laboratory's mission to develop equipment to support the practice of medicine in a field environment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9320	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 12 23	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S463732D836	BA	008 APC F311
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1419R			

11. TITLE (Precede with Security Classification Code)

(U) Ethylene Oxide Sterilization (EOS) System

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 010100 Microbiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8112	8404	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	1.1	65
	CURRENT 83	1.4	63

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Prensky, W.C.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Gaseous Sterilization; (U) Aeration; (U) Residues; (U) Toxic; (U) Leak Detector

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

23. (U) Conduct an engineering evaluation of the ethylene oxide sterilization system.

24. (U) Conduct DT II and OT II testing and evaluation on prototypes of this system.

25. (U) 8112 - 8209. Three sets of prototype hardware have been accepted. After a substantial period of familiarization, debugging, and identification of weak components, DT II effort has begun. Several problems have been solved, and it is believed that all others have been identified.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Ethylene Oxide Sterilization (EOS) System

FUNDING HISTORY: PY - 0; CY - 65K; BY - 63K

PROBLEM DEFINITION: No reliable field sterilization system exists for the preparation of reusable heat-labile medical equipment. A growing need exists for such a system. Since ethylene oxide is the overwhelming choice in fixed hospitals for the sterilization of heat-labile goods, such a device has been selected to fill this void.

IMPORTANCE: Large amounts of reusable heat-labile medical goods are already in field hospitals. There is also a disturbing but understandable possibility of reusing plastic and rubber goods that were intended for one-time use. To fill this need in the field, complete sterilization is mandatory.

APPROACH: A suitable item will be provided by a contract closely monitored by the Laboratory's technical staff. Modifications indicated by DT II will be made on OT II results to provide a fully satisfactory item.

ACHIEVEMENTS: Three sets of prototypes have been accepted by the Contracting Officer's Technical Representative. After a substantial period of familiarization, debugging, and identification of weak components, DT II effort has begun. Several problems have been solved, and it is believed that all others have been identified.

RELATIONSHIP TO CORE PROGRAM: This task is part of the Laboratory's mission to develop equipment to support the practice of medicine in a field environment.

MEDICAL SYSTEMS IN NONCONVENTIONAL ENVIRONMENTS

17. CONTRACT/GRANT		18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
a. DATES/EFFECTIVE:	EXPIRATION:			
b. NUMBER:*		FISCAL YEAR PRECEDING 82	0.1	08
c. TYPE:	d. AMOUNT:			
e. KIND OF AWARD:	f. CUM. AMT.	CURRENT 83	0.7	84

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: Albertson, John N., Jr.	NAME:* Malek, J.W.
TELEPHONE: (301) 663-2434; AUTOVON 343-2434	TELEPHONE: (301) 663-7277; AUTOVON 343-7277
21. GENERAL USE	SOCIAL SECURITY ACCOUNT NUMBER:
	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,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Evaluate foreign medical materiel/technology/doctrine for AMEDD adoption and use in contaminated field environments. Contaminated environments include 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) 8110 - 8209. Reports on equipment and/or procedures emanating from foreign sources are reviewed for potential US Army use.

*Available to contractors upon originator's approval.

DETAIL SHEET

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

FUNDING HISTORY: PY - 12K; CY - 8K; BY - 84K

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.

ACHIEVEMENTS: British materiel (MARK III and MARK IV) is being used by NATICK Laboratories to fabricate patient protective evacuation bags. Comparison of chemical protection of British materiel is being conducted by NATICK Laboratories.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission to develop field medical materiel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 2702	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62734A	3M162734A875	BB	223 APC F354
b. CONTRIBUTING				
c. XXXXXXXXXX	STOG 80-7.2:1			

11. TITLE (Precede with Security Classification Code): (U) Technical Feasibility Testing (TFT) of Delivery Systems for Chemical Warfare Medicaments

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 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
8005	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.2	23
	CURRENT 83	0.6	61

19. RESPONSIBLE DOD ORGANIZATION
NAME: US Army Medical Bioengineering Research & Development Laboratory
ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Albertson, John N., Jr.
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION
NAME: US Army Medical Bioengineering Research & Development Laboratory
ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME: Malek, J.W.
TELEPHONE: (301) 663-7277; AUTOVON 343-7277
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME:
NAME:

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code): (U) Delivery Systems; (U) Injectors; (U) Injection Methods; (U) Automatic Injectors; (U) Chemical Warfare Antidotes; (U) Field Medical Materiel; (U) Chemical Casualty

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

23. (U) 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. Prototypes will be obtained and evaluated for potential use against established military characteristics.

25. (U) 8110 - 8209. Purchase specifications for 2-PAM chloride were reviewed. Vibration tests on Mark I coupler were initiated and completed.

*Available to contractors upon originator's approval.

DETAIL SHEET

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

FUNDING HISTORY: PY - 50K; CY - 23K; BY - 61K

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 that 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.

ACHIEVEMENTS: Purchase specifications for 2-PAM Chloride were reviewed and comments were forwarded to task force. Vibration tests on Mark I coupler were initiated and completed during 4th Quarter FY 82.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission to develop field medical materiel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 2840	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	H.TERMINATION	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62734A	3M162734A875	BB	222 APC F355
b. CONTRIBUTING				
c. CONFIGURATION	STOG 80-7.2;1			

11. TITLE (Precede with Security Classification Code)* (U) Development of Resuscitative Equipment for Mass Casualties in a Chemical Warfare Environment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 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	8612	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING FISCAL YEAR 82	0.7	63
CURRENT FISCAL YEAR 83	0.0	0

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Albertson, John N., Jr.
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Malek, J.W.
TELEPHONE: (301) 663-7277; AUTOVON 343-7277
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME:
NAME:

21. GENERAL USE

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

23. (U) 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) 8110 - 8209. Five RFQ solicitations were received. The Source Selection Board terminated the RFQ because technology had advanced beyond the RFQ proposal criteria. No contract was awarded. In-house development continued, and the prototype was completed. Due to lack of interest, the task was terminated.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-846/8290

DETAIL SHEET

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

FUNDING HISTORY: PY - 110K; CY - 63K; BY - 0

PROBLEM DEFINITION: No equipment exists today that 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 fixed parameters established for a prior piece of equipment for a single patient, design has been expanded to place anywhere from one to four or eight patients on a single piece of apparatus.

ACHIEVEMENTS: An initial breadboard model was fabricated but was not evaluated.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission to develop field medical materiel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 5859	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62734A	3M162734A875	BB	221 APC F356
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2;1			

11. TITLE (Procede with Security Classification Code)*

(U) Patient Decontamination Apparatus

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 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
8010	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	1.8	151
	CURRENT 83	2.0	162

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Patzer, N.H.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code) (U) Chemical Warfare; (U) Field Medical Materiel; (U) Patient Decontamination; (U) Decontamination Apparatus

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

23. (U) Develop medical materiel for the decontamination of patients exposed to chemical warfare agents.

24. (U) Conduct an evaluation of all known methods of decontamination for potential candidates.

25. (U) 8110 - 8209. Commercial sources were canvased for materials and equipment suitable for patient decontamination apparatus. Contacts were made with other DOD organizations concerning "concepts of operation" and problems in medical defense against chemical warfare agents. A breadboard patient decontamination set was fabricated and forwarded to field units for evaluation. The technical data base for patient decontamination is being expanded.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 66 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-846/8200

DETAIL SHEET

TITLE: (U) Patient Decontamination Apparatus

FUNDING HISTORY: PY - 82K; CY - 151K; BY - 162K

PROBLEM DEFINITION: The use of toxic chemical agents (TCA) on the integrated battlefield will produce large numbers of chemically contaminated patients. Currently, the US Army does not have any equipment to decontaminate chemically contaminated patients.

IMPORTANCE: It is important to decontaminate patients quickly to save lives, to reduce effects of TCA, and to prevent contamination of medical personnel.

APPROACH: Methods, equipment, and materials used by industry and foreign military organizations are being reviewed. Based on investigations and current doctrine, breadboard models are under development.

ACHIEVEMENTS: A breadboard washing system using a modified Army litter, pump, and water collector was fabricated and sent to field units for evaluation.

RELATIONSHIP TO CORE PROGRAM: The program directly relates to the Laboratory's mission to develop field medical materiel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 1513	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62734A	3M162734A875	BA	227 APC F357
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2	1		

11. TITLE (Procede with Security Classification Code)*

(U) Hardening of Medical Materiel Against Chemical Warfare Agents

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 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
8105	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.9	37
FISCAL YEAR CURRENT 83	0.5	47

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Albertson, John N., Jr.
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Patzer, N.H.
TELEPHONE: (301) 663-7277; AUTOVON 343-7277
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME:
NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code) (U) Chemical Warfare; (U) Field Medical Materiel; (U) Chemical Hardening; (U) Decontamination; (U) Chemical Agent Protection;

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

(U) NBC Contamination Survivability

23. (U) Chemically harden existing and future field medical materiel for resistance to contamination and decontamination agents.

24. (U) Evaluate materials, methods, designs, and equipment for chemical agent resistance in coordination with the Chemical Systems Laboratory, Edgewood, MD; advise materiel developers and procuring activities of the results and proper approach.

25. (U) 8110 - 8209. Commercial sources were contacted regarding availability of rubber gasket materials resistant to chemical warfare agents and military decontaminating solutions. An RFQ is being prepared to investigate commercial compounds that are resistant to chemical agents. Data from this contract will be used to fabricate model gaskets for standard medical supply chests. A study of handles and latches for hardened transport cases is being initiated. The technical data base for agent resistant designs, materials, and processes is being expanded.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-846/8290

DETAIL SHEET

TITLE: (U) Hardening of Medical Materiel Against Chemical Warfare Agents

FUNDING HISTORY: PY - 3K; CY - 37K; BY - 47K

PROBLEM DEFINITION: AMMED capabilities to achieve its mission on the integrated battlefield depend on the contamination survivability of mission essential materiel.

IMPORTANCE: Current AMMED materiel will not survive contamination by toxic chemical agents (TCA) and decontamination solutions without loss of essential and RAM characteristics.

APPROACH: Hardened transport cases that will prevent contamination of medical materiel will be developed. Quick-fix improvements to current medical supply chests will protect most medical materiel for the near term.

ACHIEVEMENTS: A new gasket (seal) for medical supply chests is under development. Handles and latches on medical supply chests are under study to harden for ease of decontamination.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission to develop field medical materiel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OG 1512	2. DATE OF SUMMARY* 82 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS [X] YES [ ] NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62734A	3M162734A875	BB	226 APC F365
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2.1			

11. TITLE (Procede with Security Classification Code)*

(U) Resuscitation Device, Individual, Chemical

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 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
8105	8406	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.3	39
FISCAL YEAR CURRENT 83	0.3	49

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Resuscitation; (U) Chemical Warfare Casualty; (U) Field; (U) Medical Materiel; (U) Ventilation; (U) Breathing

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

23. (U) Develop a lightweight compact manual mechanical device to ventilate chemical warfare casualties, which can be operated by an individual soldier.

24. (U) Design an approach and contract with industry for fabrication of a device; test and evaluate prototypes.

25. (U) 8110 - 8209. An evaluation by the US Army Medical Research Institute of Chemical Defense, Edgewood Area, MD, did not produce desirable results. An improved device was designed and fabricated during 4th Quarter FY 82 for supplemental evaluation. A modified RFP was prepared and is currently being processed. Contract award is anticipated during 2nd Quarter FY 83.

*Available to contractors upon originator's approval.

DD, FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-846/8200

DETAIL SHEET

TITLE: (U) Resuscitation Device, Individual, Chemical

FUNDING HISTORY: PY - 2K; CY - 39K; BY - 49K

PROBLEM DEFINITION: No equipment exists today that can ventilate a chemical warfare casualty using the "Buddy-aid" system. Personnel overcome by a chemical agent attack will require ventilation assistance.

IMPORTANCE: Providing lightweight and mechanical equipment to front-line troops will help a number of chemical agent casualties to be revived and maintained until proper medical assistance can be provided.

APPROACH: Designs that will not expose casualties to further contamination are being investigated. Current efforts are being expended and investigated to develop a system whereby the casualty's mask is not removed and pressurized aid is provided by a mechanical hand-operated device.

ACHIEVEMENTS: Design, fabrication, and evaluation of the first breadboard model have been accomplished with fair results. Improved designs have been initiated for additional evaluation.

RELATIONSHIP TO CORE PROGRAM: The program is directly related to the Laboratory's mission to develop field medical materiel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
				DA OG 9317	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62734A	3M162734A875	BB	232 APC F366
b. CONTRIBUTING				
c. CONTRIBUTING	STOG 80-7.2:1			

11. TITLE (Precede with Security Classification Code)*

(U) Colorimetric Methods for Determining Chemical Agents in Water and on Patients

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

012100 Organic Chemistry; 008300 Inorganic Chemistry; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8310	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	1.1	102
	CURRENT 83	0.6	44

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Wade, C.W.R.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Evelyn McNamee

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Chemical Agents; (U) Organophosphorus; (U) Detection; (U) Colorimetric Methods; (U) Identification; (U) Analytical Methods

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

23. To develop chemical methods that can be used by medical personnel to detect and identify chemical agents in trace quantities in water under battlefield conditions.

24. (U) After the completion and evaluation of a literature search on methods used for the separation and detection of organophosphorus compounds, the most promising procedure will be tested, modified, and combined to give a thin-layer chromatographic and detection system suitable for use in the field.

25. (U) 8110 - 8209. The alkylphosphoric acids, hydrolysis products of the chemical warfare agents, GA, GB, and GD have been separated on thin-layer chromatograms of cellulose in less than 45 minutes. The separation allow each acid to be identified while other tests are being conducted. Strong base anion exchange resin was used to concentrate the phosphonic acids from trace levels to 2 mg/mL, the limit of detection for the chromogenic reagent. Silica gel was used to raise the trace level of chemical agent, GD, to a level detectable with cholinesterase. The success of the method was reported at the 2nd Annual Bioscience Review.

* Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) Colorimetric Methods for Determining Chemical Agents in Water and on Patients

FUNDING HISTORY: PY - 0K; CY - 102K; BY - 44K

PROBLEM DEFINITION: In the combat zone, the soldier may drink from 5 to 20 liters of water per day, depending upon the climate and the assignment. The use of chemical warfare agents would necessitate the treatment of the water to reduce concentrations of the agents to safe drinking. Currently, the safe levels for GA, GB, GD, and VX in water is below 0.02 mg/L. The Army's XM272 Water Test Kit using cholinesterase can detect these agents down to this level but not below. Because the 0.02 mg/L standards were established for 5 L/day, it is necessary that the limit of detection be lowered to values much lower than this.

IMPORTANCE: An analytical method which can accurately detect and identify nerve agents in water below the currently acceptable safe level of 0.02 mg/L will allow water treatment personnel, preventive medicine personnel, and field commanders to know the quality of the water and how it compares with established standards.

APPROACH: The nerve agents will be identified by thin-layer chromatography of the corresponding alkyl phosphoric acids. Standards will be used to verify the relative travel (R_f) of each acid. Chromogenic agents will be used for detection of these colorless compounds. Lower limits of detection will be gotten by use of more sensitive agents and/or by adsorption cartridges to concentrate trace levels to levels detectable with cholinesterase.

ACHIEVEMENTS: Methyl methyl, isopropyl methyl, and pinacolyl methyl phosphoric acids, the corresponding hydrolysis products of GA, GB, and GD have been separated and identified by three relative rates of migration. The analysis requires less than 40 minutes. For trace levels, strong base anion exchange resins have been used to increase concentrations from mg/L to mg/mL. Estimates of concentrations have been made by use of serial dilutions and detection limits.

PRESENTATION: Wade, C.W.R. and E.H. McNamee. Development of Colorimetric Methods for Chemical Agent Detection in Water. For Oral Presentation at Bioscience Review, Aberdeen Proving Ground, MD, 13-14 May 1982.

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OA 6282	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	BB	004 APC F511
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1416R			

11. TITLE (Precede with Security Classification Code)

(U) Bag, Patient Holding and Evacuation, Prototype Design and Fabrication

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.3	19
	CURRENT 83	0.7	47

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Thayer, C.R.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Evacuation Bag; (U) Arctic Medicine; (U) Cold Climate Medical Material; (U) Patients, Transportation of

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

23. (U) Develop a field patient holding and evacuation system capable of maintaining casualties at desired, controlled temperatures in extreme cold climates for prolonged periods. The current field means of protecting injured/sick field personnel in a cold environment from additional complications resulting from exposure to the cold is inadequate from the point of infliction through the evacuation system.

24. (U) Design and fabricate developmental prototypes based upon previous engineering effort. Existing state-of-the-art materiel will be used. The major technical barrier is to achieve required temperature duration capability with required lightweight characteristics.

25. (U) 8110 - 8209. After encountering problems with the propane fueled, liquid circulating system developed on contract for this task, a specimen of the Norwegian charcoal fueled unit was procured for evaluation. Although this unit is attractive from the standpoint of using air as the heat transfer medium, preliminary testing indicates that the system has many drawbacks involving air circulation and fuel instability. Meanwhile, some refinements have come along that make the propane unit appear to be upgradable. Consequently, effort on the propane unit has been restarted.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-846/8200

DETAIL SHEET

TITLE: (U) Bag, Patient Holding and Evacuation, Prototype Design and Fabrication

FUNDING HISTORY: PY - 20K; CY - 19K; BY - 47K

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: A system will be developed for providing heat into the existing insulated casualty evacuation bag that includes a highly portable and reliable power source and the means to distribute that heat within the bag.

ACHIEVEMENTS: The initial development, consisting of a propane-fired system circulating warm ethylene-glycol solution through a tubulated liner, proved unreliable. A Norwegian development using charcoal fuel and circulating warm air was then evaluated. This system suffered from fuel instability, inadequate heat transfer, and other problems. The effort has now been transferred back to the propane/liquid system owing to the fact that certain modifications have come along that show promise of solving the reliability problems initially found with that system.

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*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OA 6230	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S464717D832	BA	012 APC F564
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1402R			

11. TITLE (Precede with Security Classification Code)*

(U) Optometry Set, Field, Combat

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7405	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.4	26
FISCAL YEAR CURRENT 83	0.1	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Arnold, M.F.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME: POC:DA

21. GENERAL USE

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) Modernize and update the field optometry set and replace components that are no longer available from commercial sources with new designs.

24. (U) Design and fabricate engineering development prototypes for DT II and OT II.

25. (U) 8110 - 8209. All components have been obtained and packaged. A chair with reduced weight and volume was designed around a No. 3 medical chest. OT III was completed successfully. The item was recommended for type classification. The technical data package is in the final stages of completion.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-846/8290

DETAIL SHEET

TITLE: (U) Optometry Set, Field, Combat

FUNDING HISTORY: PY - 125K; CY - 26K; BY - 10K

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: Engineering prototypes will be designed and evaluated for testing, technical data packages, and type classification.

ACHIEVEMENTS: The complete optometry set has successfully completed OT III. Final drawings are being produced for type classification. The technical data package is in the final stages of completion. USAMMA is developing specifications for the procurement of nonstandard items.

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	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6190	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISS'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	AA	014 APC F566
b. CONTRIBUTING				
c. XXXXXXXXX	CARDS NO: 1213R			

11. TITLE (Precede with Security Classification Code)

(U) Pesticide Dispersal Unit, Solid, Helicopter Slung

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING	82	0.2	8
FISCAL YEAR CURRENT	83	0.5	34

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER

ASSOCIATE INVESTIGATORS

NAME: Reams, W.H.

NAME: Nelson, J.H. POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Helicopter Rig; (U) Solid Dispersal; (U) Aerial Applications; (U) Mosquito Control; (U) Solid Insecticide

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

23. (U) 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, and (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 a horizontally actuated gate system was procured and modified for remote control operation. Feasibility and military adaptability have been established under field conditions.

25. (U) 8110 - 8209. All testing has been completed. An IPR for type classification will be conducted in 1st Quarter FY 83.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Unit, Solid, Helicopter Slung

FUNDING HISTORY: PY - 125K; CY - 8K; BY - 34K

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: All testing has been completed. An IPR for type classification will be conducted in 1st Quarter FY 83.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OA 6290	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	BB	015 APC F568
b. CONTRIBUTING				
c. XXXXXXXXXX	CARDS NO: 1604R			

11. TITLE (Precede with Security Classification Code)*

(U) Environmental Protection Containers for Medical Supplies

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7409	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.4	28
FISCAL YEAR CURRENT 83	0.2	18

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Albertson, John N., Jr.
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Conway, W.H.
TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Patzer, N.H.
NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U)Environmental Container; (U)Field Container; (U)Arctic Field Container; (U)Medical Supply Container; (U)Arctic Supplies; (U)Arctic Protection

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

23. (U) 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) 8110 - 8209. A new prototype has been fabricated, incorporating changes stemming from the maintenance evaluation, and has been subjected to a supplemental DT to insure that no performance changes resulted from the modification. The data package has been prepared, and the task is awaiting the formulation of a final IPR that is expected to result in approval for type classification.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Environmental Protection Containers for Medical Supplies

FUNDING HISTORY: PY - 22K; CY - 28K; BY - 18K

PROBLEM DEFINITION: To provide a means of storing biologicals that are subject to damage by freezing during field operations in arctic or subarctic 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: A lightweight, insulated chest that includes electrical strip heaters and a temperature control circuit will be developed. 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: A final prototype, incorporating revisions stemming from a maintenance review, has been constructed and tested. The data package has been prepared, and the task is awaiting final IPR approval for 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* DA OB 6249	2. DATE OF SUMMARY* 82 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S464717D832	BA	041 APC F573
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1415R			

11. TITLE (Precede with Security Classification Code)*

(U) Low Capacity Radiographic System, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

003500 Clinical Medicine; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7901	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.2	10
FISCAL YEAR CURRENT 83	1.0	67

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) X-Ray; (U) Field Medicine; (U) Field Equipment; (U) Radiology

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

23. (U) Identify suitable low capacity radiographic system to include film processor(s), 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) 8110 - 8209. A survey of commercial X-ray devices has been made. It was decided at an IPR during 1st Quarter FY 81 that no commercial radiographic system would satisfy the requirements of a field unit, and a development contract should be let. Two contractors have been selected. Two units from each manufacturer will be available for evaluation during 2nd Quarter FY 83.

*Available to contractors upon originator's approval

DETAIL SHEET

TITLE: (U) Low Capacity Radiographic System, Field

FUNDING HISTORY: PY - 6K; CY - 10K; BY - 67K

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 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 requirements.

ACHIEVEMENTS: A market survey uncovered no commercial X-ray units that would meet the letter requirements. A request for proposals has been advertised, and two contractors were selected. Two units from each manufacturer will be available for evaluation during the 2nd Quarter FY 83.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
				DA OB 6250	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	BA	042 APC F574
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1425R			

11. TITLE (Procede with Security Classification Code)*

(U) High Capacity Radiographic System, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

003500 Clinical Medicine; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7902	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	3.0	184
FISCAL YEAR CURRENT 83	2.4	74

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) X-Ray; (U) Field Medicine; (U) Field Equipment; (U) Radiology

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

23. (U) 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) 8110 - 8209. 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 have been modified to fit the Army field table. This combination underwent OT I during 4th Quarter FY 80 and 1st Quarter FY 81. Of the 16 critical issues, 10 were satisfied and 4 partially satisfied. A redesigned unit will be operationally tested during 3rd Quarter FY 83.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) High Capacity Radiographic System, Field

FUNDING HISTORY: PY - 78K; CY - 184K; BY - 74K

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 critical.

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

ACHIEVEMENTS: A survey was made of the commercial market. No commercial system was found that 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. Film processing is provided by using a commercial wet processor with a daylight loader and a water recycling system. The system underwent operational testing during the 1st Quarter FY 81. Of the 16 critical issues, 10 were satisfied fully and 4 partially. A redesigned unit will be operationally tested during the 3rd Quarter FY 83.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6193	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8B. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	AA	046 APC F576
b. CONTRIBUTING				
c. XXXXXXXXXX	CARDS NO: 1404A			

11. TITLE (Precede with Security Classification Code)

(U) Pesticide Dispersal Unit, Portable, Backpack

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	7
FISCAL YEAR CURRENT 83	0.2	19

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME: POC:DA

21. GENERAL USE

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

23. (U) 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) Review commercially available backpack units. Suitable units will be evaluated. After entomological and operational feasibility has been determined, a suitable item of equipment will be selected for off-the-shelf (OTS) strategy.

25. (U) 8110 - 8209. A market survey was completed. The Material Developer recommends OTS acquisition strategy. Data was sent to the Combat Developer for concurrence in OTS. Type classification is anticipated during FY 83.

Engineering Evaluation of Commercial Backpack Sprayer/Dusters; Kardatzke, James T., Gula, Phillip R., and James H. Nelson. Mosq. News 41:327-330, 1981.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Unit, Portable, Backpack

FUNDING HISTORY: PY - 4K; CY - 7K; BY - 19K

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

IMPORTANCE: An operational need exists for a motorized backpack unit that 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: A market survey was completed. The Material Developer recommends off-the-shelf (OTS) acquisition strategy. Data was sent to Combat Developer for concurrence in OTS. Type classification is anticipated during FY 83.

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

MANUSCRIPT: Engineering Evaluation of Commercial Backpack Sprayer/Dusters; Kardatzke, Dr. James T., Gula, Philip R., and Dr. James H. Nelson. Mosq. News 41:327-330, 1981.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6195	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISP'N INSTR'N	8B. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	AA	047 APC F577
b. CONTRIBUTING				
c. XXXXXXXXXX	CARDS NO: 1424R			

11. TITLE (Procede with Security Classification Code)*

(U) Pesticide Dispersal Unit, Liquid, Helicopter Slung

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.3	107
FISCAL YEAR CURRENT 83	0.4	42

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Reams, W.H.

NAME: Nelson, J.H. POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code) (U) Helicopter Rig; (U) Liquid Dispersal; (U) Aerial Application; (U) Mosquito Control; (U) Liquid Insecticide

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

23. (U) 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, and (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS.

24. (U) A Transland Unit has been selected as the most suitable unit for field feasibility. Modifications will be made prior to further operational testing. The unit has been used successfully in actual field mosquito control operations.

25. (U) 8110 - 8209. The Transland Unit has been modified to satisfy the deficiencies observed in OT II. Further modifications to improve the ultra-low volume capability have been made. OT IIa is under way and will be completed in 1st Quarter FY 83. Type classification is anticipated in late FY 83.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Bag, Aidman's, Redesign of

FUNDING HISTORY: PY - 47K; CY - 59K; BY - 8K

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 that 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, Ft. Lewis, and in Europe with generally favorable results. In response to issues raised by the Combat Developer, a truly waterproof/chemical proof version of the design is being fabricated for further assessment.

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.

MANUSCRIPT: A New Aid Bag for the Combat Medical Corpsman; O'Connor, Richard J., Brewer, Robert R., and Luther T. Geasey, Jr. Technical Report 8103, Feb 81.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6247	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	CA	048 APC F580
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1415R			

11. TITLE (Procede with Security Classification Code)*

(U) X-Ray Film Processor, Dental, Portable, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

003500 Clinical Medicine; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7812	8206	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.3	20
FISCAL YEAR CURRENT 83	0.2	18

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Procede 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 (Furnish individual paragraphs identified by number. Procede text of each with Security Classification Code.)

23. (U) 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) 8110 - 8209. A modified commercial Operations and Maintenance Manual has been revised and forwarded to USAMMA for review and comments.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) X-Ray Film Processor, Dental, Portable, Field

FUNDING HISTORY: PY - 8K; CY - 20K; BY - 18K

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

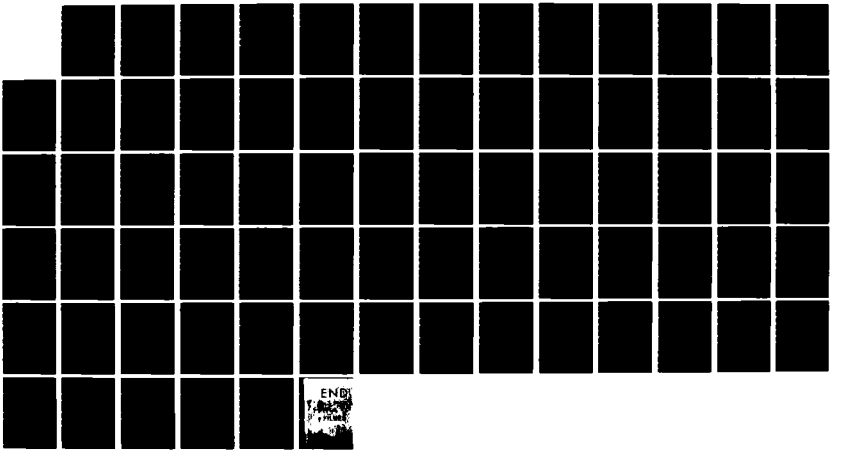
IMPORTANCE: Portable wet X-ray film processors and accessories are not suitable for use by small dental units outside of field type hospitals based on excessive weight, complexity, and requirements for electrical power, water, and processing chemicals. The need is acute for dental units/sections to complement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

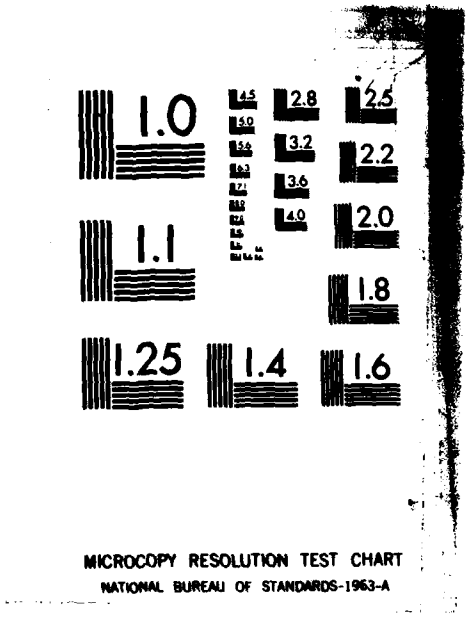
APPROACH: Search and obtain an industrially developed functional device that can be adapted to meet the established characteristics.

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. The prototype was modified to correct OT I deficiencies and then subjected to Development Testing II (DT II). DT II was successfully concluded on 3 March 1980. Maintenance evaluation was accomplished and concluded on 3 March 1981. A modified commercial Operations and Maintenance Manual was forwarded to USAMMA for review and comment.

RELATIONSHIP TO CORE PROGRAM: This program is directly related to the Laboratory's mission to develop field medical materiel.

AD-A133 129 US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT 2/2
LABORATORY ANNUAL..(U) ARMY MEDICAL BIOENGINEERING
RESEARCH AND DEVELOPMENT LAB FORT.. J N ALBERTSON
UNCLASSIFIED 01 OCT 82 F/G 6/5 NL





RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0701	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	AA	044 APC F581
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1429R			

11. TITLE (Precede with Security Classification Code)

(U) Trap, Mosquito, Light, Collapsible

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7910	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	4
FISCAL YEAR CURRENT 83	0.7	74

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)

NAME: Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

21. GENERAL USE

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

23. (U) 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 X24251) which is 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) 8110 - 8209. The prototype system has been fabricated. Developmental testing will begin 1st Quarter FY 83.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Trap, Mosquito, Light, Collapsible

FUNDING HISTORY: PY - 10K; CY - 4K; BY - 74K

PROBLEM DEFINITION: To develop an improved replacement for the Trap, Mosquito, Light (NSN 3740-00-607-0337) that 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 8-620H0LA). 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 objective is to produce a durable trap that can be easily disassembled and collapsed for storage and shipment

ACHIEVEMENTS: A prototype system has been fabricated. Developmental testing will begin 1st Quarter FY 83.

RELATIONSHIP TO CORE PROGRAM: The 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	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0700	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	64717A	3S464717D832	AA	045 APC F582
b. CONTRIBUTING				
c. CONTRIBUTING	CARDS NO: 1428R			

11. TITLE (Precede with Security Classification Code)

(U) Aerosol Generator, ULV, Skid Mounted

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.1	3
	CURRENT 83	0.2	13

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME: Reams, W.H. POC:DA

21. GENERAL USE

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) Identify and evaluate a commercially available, skid mounted, ultra-low volume (ULV) aerosol generator capable of dispersing all ULV insecticide formulations registered for mosquito control. 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 has been made. Suitable units were field evaluated. Final selection of specification characteristics, which was coordinated with responsible agencies, was made after formal testing.

25. (U) 8110 - 8209. An IPR recommended type classification of the aerosol generator. All actions necessary to transition to the readiness command have been completed.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Aerosol Generator, ULV, Skid Mounted

FUNDING HISTORY: PY - 46K; CY - 3K; BY - 13K

PROBLEM DEFINITION: To evaluate and recommend for adoption into TOEs an ultra-low volume (ULV) aerosol generator to replace current cold fog generators.

IMPORTANCE: Since 1960 commercial pest control has used the environmentally acceptable methods of the 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 ULV 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: An IPR recommended type classification of the aerosol generator. All actions necessary to transition to the readiness command have been completed.

RELATIONSHIP TO CORE PROGRAM: The 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: DA OG 0677	2. DATE OF SUMMARY: 82 10 01	REPORT CONTROL SYMBOL: DD-DR&E(AR)636
3. DATE PREV SUM'RY: 81 10 01	4. KIND OF SUMMARY: D. CHANGE	5. SUMMARY SCTY: U	6. WORK SECURITY: U	7. REGRADING:	8A. DISP'N INSTR'N: NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS: ☒ YES ☐ NO	9. LEVEL OF SUM: A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S464717D832	AA	003 APC F583
b. CONTRIBUTING				
c. ~~CONTRIBUTING~~	CARDS NO: 1430R			

11. TITLE (Precede with Security Classification Code)

(U) Sprayer, Powered, ULV, Portable

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	1
FISCAL YEAR CURRENT 83	0.1	14

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) ULV Dispersal; (U) Arthropod Control; (U) Lightweight; (U) Durable; (U) Disease Vectors; (U) Portable

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

23. (U) Identify a commercially available, lightweight, durable, portable unit capable of dispersing ultra-low volume (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) Review commercially available portable ULV units. 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) 8110 - 8209. Evaluations indicate that the gasoline engine unit manufactured by Micro-Gen is the best available. A recommendation to pursue off-the-shelf (OTS) strategy will be made in FY 83.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Sprayer, Powered, ULV, Portable

FUNDING HISTORY: PY - 8K; CY - 1K; BY - 14K

PROBLEM DEFINITION: To evaluate commercial hand-held ultra-low volume (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: Several commercially available hand-held ULV sprayers that are either gasoline engine driven or battery powered will be evaluated. Units that pass engineering criteria will be subjected to off-the-shelf (OTS) strategy.

ACHIEVEMENTS: Evaluations indicate that the gasoline engine unit manufactured by Micro-Gen is the best available. A recommendation to pursue OTS strategy will be made in FY 83.

RELATIONSHIP TO CORE PROGRAM: The project involves engineering and operational evaluation of insecticide dispersal equipment for incorporation into TOE of field medical units.

ENVIRONMENTAL QUALITY TECHNOLOGY

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0698	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8. DISP'N INSTR'N	9. SPECIFIC DATA-CONTRACTOR ACCESS	10. LEVEL OF SUM
81 10 01	K. COMPLETION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

11. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	146 APC F636
b. CONTRIBUTING				
[redacted]	STOG 80-8:18			

12. TITLE (Precede with Security Classification Code)

(U) Chemical Fate of Military Compounds

13. SCIENTIFIC AND TECHNOLOGICAL AREAS

007800 Hygiene and Sanitation; 010100 Microbiology; 012700 Physical Chemistry

14. START DATE	15. ESTIMATED COMPLETION DATE	16. FUNDING AGENCY	17. PERFORMANCE METHOD
7910	8209	DA	C. In-House

18. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

19. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In Thousands)
FISCAL YEAR PRECEDING 82	0.2	44
FISCAL YEAR CURRENT 83	0.0	00

20. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

Foreign Intelligence Not Applicable

22. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Dennis, W.H.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

23. KEYWORDS (Precede EACH with Security Classification Code)

(U) Munitions; (U) Environmental Fate; (U) Biodegration; (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) 8110 - 8209. 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, 1,3,5-trinitrobenzene, and 3,5-dinitroaniline was determined. Biodegradation studies for 1,3-dinitrobenzene, 1,3,5-trinitrobenzene, and 3,5-dinitroaniline have been completed and documentation is beginning.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Chemical Fate of Military Compounds

FUNDING HISTORY: PY -158K; CY - 44K; BY - 0K

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 (1,3,5-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 microorganisms 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.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OG 9203	2. DATE OF SUMMARY* 82 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY H. TERMINATION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	145 APC F637
b. CONTRIBUTING				
[redacted]	STOG 80-8:18			

11. TITLE (Precede with Security Classification Code)*

(U) Microbiological Fate of Military Compounds

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

010100 Microbiology; 008300 Inorganic Chemistry; 012700 Physical Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.5	74
	CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Mitchell, W.R.

TELEPHONE: (301) 663-2340; AUTOVON 343-2340

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Biodegradation; (U) Munitions; (U) Physical Chemistry; (U) Microbiological

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

23. (U) The possible biodegradation of military compounds will be determined. If biodegradation is found, then biotransformation rates will be determined.

24. (U) The susceptibility of military compounds to biodegradation will be determined by screening procedures using sediments and microorganisms indigenous to the pollution site. If screening procedures reveal biodegradation, the rates will be measured and biosorption and biotransformation products will be measured.

25. (U) 8110 - 8209. Documentation of the environmental fate of 1,3-dinitrobenzene, 1,3,5-trinitrobenzene, and 3,5-dinitroaniline is complete. USAMBRDL Technical Report 8201, "Microbial Interactions with Several Munitions Compounds: 1,3-DNB, 1,3,5-TNB and 3,5-DiNA" reviewed, approved, was published. Manuscript "The biodegradation of 1,3-DNB" (data from APC 177 combined with that of APC 637) accepted for future publication in Environmental Science and Technology.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Microbiological Fate of Military Compounds

FUNDING HISTORY: PY - 0K; CY - 74K; BY - 0K

PROBLEM DEFINITION: A determination of the fate in the environment of munitions associated pollutants is essential to the establishment of water quality criteria in a context of hazard assessment. Research was undertaken to define microbiological interactions with three compounds found in discharges from Army munitions plants: 1,3-dinitrobenzene, 1,3,5-trinitrobenzene, and 3,5-dinitroaniline.

IMPORTANCE: As a manufacturer and processor of munitions, the Army is responsible to provide the data necessary to adequately assess the risk associated with the discharge of munitions by-products.

APPROACH: The susceptibility of military compounds to biodegradation will be determined by screening procedures using sediments and microorganisms indigenous to the pollution site. If screening procedures reveal biodegradation, the rates will be measured and biotransformation products will be defined. Biosorption levels will also be measured.

ACHIEVEMENTS: Studies were documented which defined the biodegradable nature of 1,3-dinitrobenzene both in environmental waters and in the laboratory. Results were presented which indicated that 1,3,5-trinitrobenzene and 3,5-dinitroaniline were not ultimately biodegradable but were transformed by indigenous microorganisms. None of the compounds were significantly bioadsorbed. A USAMBRDL Technical Report 8201 entitled "Microbial Interactions with Several Munitions Compounds: 1,3-DNB, 1,3,5-TNB, and 3,5-DiNA" has been published. A manuscript with composite data from this work unit and Agency Accession No. DAOG 6380 in press.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 1297	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	H. TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	152 APC F645
b. CONTRIBUTING				
[redacted]	STOG 80-8:17			

11. TITLE (Procode with Security Classification Code)

(U) Environmental Fate of 2,4,6-Trichloroaniline: Microbial Interactions

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

010100 Microbiology; 008300 Inorganic Chemistry; 012700 Physical Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8106	8203	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.2	129
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Mitchell, W.R.

TELEPHONE: (301) 663-2340; AUTOVON 343-2340

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Procode EACH with Security Classification Code)

(U) Environmental Fate; (U) Biodegradation; (U) Munitions; (U) Physical Chemistry

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

23. (U) The possible biodegradation or transformation of 2,4,6-trichloroaniline, a pollutant of Army interest, will be determined. Should biodegradation or transformation take place, then their rates will be determined.

24. (U) The susceptibility of 2,4,6-trichloroaniline to biodegradation will be determined by screening procedures using sediments and microorganisms indigenous to the pollution site. If screening procedures reveal biodegradation, the rates will be measured. Biosorption levels and transformation products will be determined.

25. (U) 8110 - 8209. The compound 2,4,6-trichloroaniline appears to be susceptible to microbial action in natural water samples. Microorganisms in the samples can be maintained in secondary cultures after serial passage with the compound as a sole carbon source. Following microbial action on the compound, levels of free chloride ion and adenosine triphosphate increase in the cultures. Levels of biosorption are low. The project is unfunded for FY83 and is incomplete. It will be completed pending the identification of a new cost center.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Environmental Fate of 2,4,6-Trichloroaniline: Microbial Interactions

FUNDING HISTORY: PY - 18K; CY - 129K; BY - OK

PROBLEM DEFINITION: Previous studies have indicated that the compound 2,4,6-trichloroaniline (2,4,6-TCA), an Army pollutant, was present in sediments obtained from a diversity of sites at the Aberdeen Proving Ground. The lability of the compound to microbial action is an integral part of assessing the hazard associated with the compound and its persistence.

IMPORTANCE: In the event a risk assessment for 2,4,6-TCA is necessary, it is the responsibility of the Army as a previous manufacturer and processor of the chemical to provide the data base necessary for that assessment.

APPROACH: The susceptibility of 2,4,6-TCA to microbial action will be determined by screening procedures using sediments and microorganisms indigenous to the pollution site. If screening procedures reveal biodegradation, rates will be determined and the extent to which the compound is biodegraded will be measured. Biosorption levels and transformation products will also be determined.

ACHIEVEMENTS: The compound 2,4,6-TCA appears to be susceptible to aerobic microbial action in natural water samples taken from APG but not to anerobic degradation in samples from the same site. Microorganisms in the samples can be maintained in secondary culture using the compound as the sole added carbon source for growth. Concurrent with microbial action levels of free chloride increase in the culture, and preliminary results indicate that cellular adenosine triphosphate levels also increase. Levels of biosorption are low. The project is unfunded for FY83 and will be completed as an ILIR project.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9201	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
82 01 27	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	62720A	3E162720A835	AA	154 APC F647
b. CONTRIBUTING				
c. [redacted]	STOG 80-8:18			

11. TITLE (Procede with Security Classification Code)

(U) Microbial Fate of Military-Relevant Petroleum Oil Fogs

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

005900 Environmental Biology; 010100 Microbiology; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY		16. PERFORMANCE METHOD
8110	8309	DA		C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING FISCAL YEAR 82	1.0	91
CURRENT FISCAL YEAR 83	1.1	95

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)

NAME: Taylor, G.W.

TELEPHONE: (301) 663-2340; AUTOVON 343-2340

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Diesel Fuel; (U) Fog Oil; (U) Biodegradation; (U) Microbial Fate; (U) Soil; (U) Water

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

23. (U) To assess the literature and establish a data base on the biodegradation and environmental fate of oil fog obscurants (SGF-1 and SGF-2) generated by the US Army from diesel fuel and light lubricating oil. To limit the study to C_9 to C_{29} hydrocarbons and their fate in soil and fresh water. To assess the data base and make conclusions and recommendations for further research.

24. (U) The preparation of the data base assessment was divided into three phases. Phase I is a review of the current literature and data bases. Phase II is preparation of an outline of the data base assessment. Phase III is preparation of the final data base assessment document (MR 10-82) with conclusions and recommendations.

25. (U) 8110 - 8209. Phase I was completed April 30, 1982. Phase II was completed June 30, 1982. Phase III was completed September 7, 1982.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Microbial Fate of Military-Relevant Petroleum Oil Fogs

FUNDING HISTORY: PY - OK; CY - 91K; BY - 95K

PROBLEM DEFINITION: To prepare a current literature review on the biodegradation and environmental fate of petroleum fog oils and related substances. To limit the references to petroleum compounds in the 9-29C atom range and to fresh waters and nonestuarine soils. To develop conclusions and recommendations concerning research needs.

IMPORTANCE: The fog oils are a complex mixture of organic compounds some of which are toxic. The oil fog would be xenobiotic to the microbial ecosystems wherever it is deposited. There would be photooxidized compounds formed of which the Surgeon General of the Army should be cognizant. In addition, there are persistent compounds formed during biotransformation of the oils which may be more toxic than the original oils.

APPROACH: An approach to the problem would be to follow EPA guidelines in testing for the fate of compounds covered by TSCA. Rather than a complex petroleum, however, to use a "model oil" preparation containing representative hydrocarbons from the various classes of compounds found in diesel fuel. To photooxidize the model oil and assay for intermediate compounds formed. Next, follow the biotransformation photooxidized model oil in an ecosystem designed with the modeling techniques described in the literature. This approach could lead to a mathematical model which could be used to predict the fate of fog oil wherever the Army is operating.

ACHIEVEMENTS: A current data base has been assembled. A document has been prepared with an assessment of this information. Conclusions and recommendations were made.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OB 6188	2. DATE OF SUMMARY* 82 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	123 APC F691
b. CONTRIBUTING				
[redacted]	STOG 80-8:17			

11. TITLE (Precede with Security Classification Code)*

(U) Screening of Military Chemicals for Toxicity to Aquatic Organisms

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	3.2	264
	CURRENT 83	2.6	172

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)

NAME:* van der Schalie, W.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

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. These data will help assess the hazard to aquatic organisms of Army-relevant materials and aid in the pollution abatement process at Army facilities.

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) 8110 - 8209. Nearly all testing with 1,3-dinitrobenzene, (DNB) 1,3,5-trinitrobenzene, (TNB) and 3,5-dinitroaniline (DiNA) has been completed. The following are the lowest concentrations observed to cause significant effects in any of the tests conducted: TNB-0.21 mg/L; DNB-0.65 mg/L; DiNA-0.42 mg/L. Acute and chronic toxicity tests with Daphnia magna and TNB and DiNA showed that mixtures of TNB and DiNA had additive or greater than additive toxicity during chronic exposures but less than additive toxicity in acute exposures.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Screening of Military Chemicals for Toxicity to Aquatic Organisms

FUNDING HISTORY: PY - 124K; CY - 264 K; BY - 172K

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 invertebrates, and algae. These are followed, if necessary, 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 invertebrates will be determined in full life cycle tests.

ACHIEVEMENTS: Nearly all testing with 1,3-dinitrobenzene, (DNB) 1,3,5-trinitrobenzene, (TNB) and 3,5-dinitroaniline (DiNA) has been completed. The following are the lowest concentrations observed to cause statistically significant effects in any of the tests conducted: TNB - 0.12 mg/L; DNB - 0.65 mg/L; DiNA - 0.42 mg/L. Acute and chronic toxicity tests with Daphnia magna and TNB and DiNA showed that mixtures of TNB and DiNA had additive or greater than additive toxicity during chronic exposures but less than additive toxicity in acute exposures.

PUBLICATIONS/PRESENTATIONS: van der Schalie, W.H. Utilization of Aquatic Organisms for Continuously Monitoring the Toxicity of Industrial Waste Effluents. Oral presentation at Twelfth Conference on Environmental Toxicology, Dayton, Ohio, and for publication in Conference Proceedings.

van der Schalie, W.H., P.H. Gibbs, and T.R. Shedd. Acute and Chronic Toxic Interactions of Two Environmental Transformation Products of 2,4,6-Trinitrotoluene. Abstract for presentation at Society of Environmental Toxicology and Chemistry Third Annual Meeting, Arlington, VA, 14-17 November 1982.

van der Schalie, W.H. and J.G. Pearson. Estimation of the Toxicity of Munitions-Related Materials to Fish and other Aquatic Organisms. For presentation at American Fisheries Society, Northeastern Division, Warm Water Workshop. Environmental Contaminants and Warm Water Fishes, Kearnysville, WV and for publication in Workshop Proceedings.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6230	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	127 APC F696
b. CONTRIBUTING				
c. [redacted]	STOG 80-8:14			

11. TITLE (Procede with Security Classification Code): (U) Evaluation of Filtration Techniques for Disposal of Operational Wastes from Army Pest Management Programs

12. SCIENTIFIC AND TECHNOLOGICAL AREAS: 007800 Hygiene and Sanitation; 003300 Chemical Engineering; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	8209	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.5	81
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
NAME: US Army Medical Bioengineering Research & Development Laboratory
ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Trudeau, T.L., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME: US Army Medical Bioengineering Research & Development Laboratory
ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME: Dennis, W.H.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Kobylinski, E.A.
NAME: POC:DA

21. GENERAL USE: Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code): (U) Hazardous Wastes; (U) Filtration; (U) Pesticide Wastes; (U) Waste Treatment; (U) Water Treatment

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 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) 8110 - 8209. Field testing of the flow-through series of carbon columns at Fort Eustis, VA, is over. This system operated at 0.2 gpm, will reliably remove malathion, baygon, diazinon and dimethoate from water. Dursban and 2,4-D ester are removed with difficulty and chlordane is only partially removed. Breakthrough data are available for some of these substances and a final report is in preparation. Concurrent with this work, we began the evaluation of a new carbon filtration system, the CARBULATOR^{R}. All tests with this system have been successful.

* Available to contractors upon originator's approval.

DETAIL SHEET

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

FUNDING HISTORY: PY - 86K; CY - 81K; BY - 233K

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 1,200 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 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.

PUBLICATION/PRESENTATION: Dennis, W.H., Jr. and E.A. Kobylinski. Pesticide-Laden Wastewater Treatment for Small Waste Generators. For publication in Journal of Environmental Science and Health, Part A.

Dennis, W.H., Jr., C.W.R. Wade, and E.A. Kobylinski. Treatment of Pesticide-Laden Wastewater by Activated Carbon. Abstract for presentation at Middle Atlantic Regional Meeting, ACS, University of Delaware, Newark, DE.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 5852	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8. DISP'N INSTR'N	8A. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	149 APC F851
b. CONTRIBUTING				
c. CONTRIBUTING	STOG 80-8:17, 80-8:18			

11. TITLE (Procede with Security Classification Code)

(U) Environmental Fate Studies of 2,4,6-Trichloroaniline

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

012100 Organic Chemistry; 012700 Physical Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8010	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.6	160
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)

NAME: Rosenblatt, D.H.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Dennis, W.H., Jr.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) 2,4,6-Trichloroaniline; (U) Environmental Fate

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

23. (U) To determine selected physicochemical properties and aspects of microbiological degradation of 2,4,6-trichloroaniline, and to investigate its acute toxicity to daphnids and to one species of fish. This chemical substance has been found as an environmental contaminant in association with past industrial operations at Aberdeen Proving Ground (Edgewood area), Maryland, and is being studied in response to a request from the U.S. Army Toxic and Hazardous Materials Agency.

24. (U) Laboratory tests will be carried out on 2,4,6-trichloroaniline to determine various physicochemical properties, such as volatility, solubility, photodegradability, and octanol-water partition coefficient.

25. (U) 8110 - 8209. 2,4,6-TCA is volatilized rapidly from water. Certain sediments from Aberdeen Proving Ground were believed to contain TCA. However, analysis of these sediments by gas chromatography/mass spectrometry showed two major substances, 2,4,6-trichloroaniline and trichlorophenylisocyanate, in nearly equal concentrations. It was found that these substances arise by pyrolysis of N,N'-bis(2,4,6-trichlorophenyl) urea. This occurs when the urea is injected into the hot (250°C) injection port of the gas chromatograph. The presence of N,N'-bis(2,4,6-trichlorophenyl) urea was also confirmed by high pressure liquid chromatography. This research has been completed.

Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Environmental Fate Studies of 2,4,6-Trichloroaniline

FUNDING HISTORY: PY - 163K; CY - 215K; BY - 0K

PROBLEM DEFINITION: The US Army Toxic and Hazardous Materials Agency had reported the occurrence of 2,4,6-trichloroaniline (TCA) in sediments of a small canal leading to the Gunpowder River, and in the river itself, in the vicinity of Aberdeen Proving Ground (APG). The present study was intended to provide basic information useful in predicting TCA's environmental fate.

IMPORTANCE: TCA was believed to be a major sediment contaminant resulting from past military industrial operations in the Edgewood Arsenal area of APG. As such, information was needed to permit prediction of TCA's impact on the ecology and on the health of humans exposed to TCA through the food chain.

APPROACH: Laboratory tests were to be carried out on TCA to determine physicochemical properties, such as photodegradability, solubility, volatility, octanol-water partition coefficient and soil-water equilibria.

ACHIEVEMENTS: TCA solubility in water (mg/L, $T^{o}C$) is: 22,10; 32,19; 46,32. UV maxima at 245 and 306 μm. Sunlight photolysis gives four or more phenazine derivatives; conversion of 20 mg/L is complete in 48 hours of exposure (July). K_{ow} = 2,400 by HPLC; 3,500 by direct measurement. Sediments contained no TCA, but did contain a TCA precursor (a urea) that decomposed in column. TCA volatilizes rapidly from water.

PUBLICATIONS/PRESENTATIONS: Rosenblatt, D.H. Environmental Risk Assessment for Four Munitions-Related Contaminants at Savanna Army Depot Activity. Technical Report 8110.

Rosenblatt, D.H., M.J. Small, and R.J. Kainz. Application of the "PPLV" Environmental Risk Assessment Approach to Selected Land Uses. Abstract for presentation at 184th National Meeting, American Chemical Society, Kansas City, 12-17 Sep 82.

Rosenblatt, D.H. and R.J. Kainz and Appendix by George F. Fries, US Department of Agriculture, Beltsville, MD. Options and Recommendations for a Polybromobiphenyl Strategy in the Vicinity of the Gratiot County, Michigan Landfill. Technical Report 8204.

Rosenblatt, D.H. Recommended Decisions about Two Environmental Pollutants: o-Chlorobenzalmalononitrile and Diphenylamine. For presentation at Society of Environmental Toxicology and Chemistry, Arlington, VA, and for publication in SETAC Journal.

Rosenblatt, D.H. and R.J. Kainz. Technical Issues Raised during Risk Assessment Case Studies. For Oral Presentation, and Extended Abstract, at American Society of Civil Engineers, National Conference on Environmental Engineering, Minneapolis, MN, July 14-16, 1982, and for publication in Proceedings.

Rosenblatt, D.H. and R.J. Kainz. Solving Environmental Problems Using the PPLV Approach and Guild Theory. For Oral Presentation at The Application of Guilding Workshop Corps of Engineers, Chicago, IL, 19-22 April 1982, and for publication in Proceedings of the Workshop.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9212	82 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	K. COMPLETION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E162720A835	AA	157 APC F869
b. CONTRIBUTING				
XXXXXXXX	STOG 80-8:20:14:18			

11. TITLE (Precede with Security Classification Code)

(U) Reverse Osmosis Systems

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

010100 Microbiology; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING FISCAL YEAR 82	2.5	243
CURRENT FISCAL YEAR 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Duncan, J.B.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Water Treatment; (U) Prechlorination; (U) Pretreatment System; (U) Reverse Osmosis

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

23. (U) To increase the efficacy of the Reverse Osmosis Water Purification Unit (ROWPU) in the pretreatment filtration train for the 600 gph and larger units. The military significance of this is that the ROWPU will be able to operate without the reverse osmosis at a rate of 1,800 gph (fresh water), with approximately 50% energy savings.

24. (U) From a single sample tank of recipe water, consisting of induced turbidity (2 levels), pHs (pH 5.5, 7.5, and 9.5), and total organic carbon (2 levels), prechlorination versus postchlorination will be investigated for the 600 gph ROWPU. The recipe will be used to formulate recipe water for the evaluation of different pre-RO treatment technology for the larger ROWPUs.

25. (U) 8110 - 8209. (U) Project completed. A Letter Report (LR) is drafted. Technical transfer to MERADCOM personnel on 8 Oct 1982.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Reverse Osmosis Systems

FUNDING HISTORY: PY - 6K; CY - 243K; BY - OK

PROBLEM DEFINITION: The exploration of the effects of prechlorination on the Mixed Media Filter (MMF) concerning the reduction of microbial populations across the MMF. This information will be utilized by MERADCOM to determine the feasibility of a fresh water by-pass for the reverse osmosis water purification units (ROWPU).

IMPORTANCE: If a fresh water by-pass becomes a reality, the savings in fuel would be substantial. For example, the intake pumps would operate at 40-50 psi and there would not be a need to operate the high pressure reverse osmosis pumps (400-800 psi).

APPROACH: A factorial design of three pHs (5.5, 7.5, 9.5), two turbidity levels (50 and 120 NUTs), two total organic carbon levels (10 and 100 ppm), and three replications. This yields a 3 x 2 x 2 x 3 - 36 runs.

ACHIEVEMENTS: Project completed - Technical transfer to MERADCOM representatives on 8 October 1982.

PUBLICATION: Small, M.J., J.B. Duncan, and P.H. Gibbs. The ROWPU Prefiltration System: Removal of Microorganisms. Technical Report 8104.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9213	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62720A	3E162720A835	AA	158 APC P877
b. CONTRIBUTING				
XXXXXXXXX	STOG 80-8:18:20:21			

11. TITLE (Precede with Security Classification Code)

(U) Treatment of Nitramines and Nitrobodies

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

007800 Hygiene and Sanitation; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8212	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.0	67
FISCAL YEAR CURRENT 83	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Burrows, W.D.

TELEPHONE: (301) 663-7207; AUTOVON 343-7207

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) RDX; (U) HMX; (U) TNT; (U) TAX; (U) SEX; (U) Ozone

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

23. (U) The purpose of this effort is to investigate methods for destruction of nitramines/nitrobodies in wastewaters from munitions manufacture. This study relates to evaluation of the public health and environmental health hazards associated with discharge of wastewater at Holston Army Ammunition Plant.

24. (U) Water samples containing RDX, HMX, TAX, SEX, or TNT will be treated by means of carbon adsorption, UV-ozone, hydrogen peroxide, or corona discharge.

25. (U) 8110 - 8209. Carbon adsorption studies are complete. Competition for adsorption sites by the various munitions suggests limited applicability of this method for treatment of wastewaters. Corona discharge studies are complete and demonstrate destruction of all munitions, though power requirements may be substantial.

Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Treatment of Nitramines and Nitrobodies

FUNDING HISTORY: PY - 1K; CY - 67K; BY - 8K

PROBLEM DEFINITION: The need exists to evaluate tertiary treatment modes for wastewater emanating from the Industrial Liquid Waste Treatment Facility at Holston AAP. There are no programs currently in progress to develop and/or evaluate technologies for the abatement of nitramine/nitrobody pollution. Programs are in progress to develop alternative technologies for the abatement of nitrobody (TNT, RDX/HMX) pollution at reduced cost, but their applicability for the treatment of nitramines is not known.

IMPORTANCE: Holston Army Ammunition Plant (HSAAP) will produce 125 million gallons of wastewater per day at full mobilization. The current design for the Industrial Liquid Waste Treatment Facility at HSAAP does not provide a tertiary mode of treatment for the removal of pollutant chemicals which survive primary and secondary treatment. There is evidence that RDX, HMX, and TNT, as well as biproduct nitramines will survive secondary biological treatment, and may adversely affect aquatic organisms in receiving waters. A problem is foreseen in complying with proposed ambient criteria.

APPROACH: Water samples containing TNT, RDX, HMX, TAX, and SEX will be subjected, alone and in combination, to treatment by carbon adsorption, corona oxidation, UV-ozone, and UV-hydrogen peroxide.

ACHIEVEMENTS: Final reports for carbon adsorption and corona oxidation studies are in press.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9214	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62720A	3E162720A835	AA	159 APC F878
b. CONTRIBUTING				
XXXXXXXXXX	STOG 80-8:18:20:21			

11. TITLE (Procede with Security Classification Code)

(U) Evaluate Dimethylnitrosamine

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

007800 Hygiene and Sanitation; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8212	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.3	53
FISCAL YEAR CURRENT 83	0.1	04

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Trudeau, T.L., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Burrows, W.D.

TELEPHONE: (301) 663-7207; AUTOVON 343-7207

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) RDX; (U) HMX; (U) TNT; (U) Biodegradation

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

23. (U) The objective is to provide analytical support to contract DAMD17-81-C-1118 (Bell, George Washington University), which concerns munitions wastewater treatment in semi-continuous activated sludge treatment systems. This study relates to evaluation of the public health and environmental health hazards associated with discharge of wastewater at Holston Army Ammunition Plant.

24. (U) Methods will be developed for analysis of RDX, HMX, and TNT in wastewater using HPLC. Samples provided by the contractor will be analyzed. Satisfactory analytical methods have been developed.

25. (U) 8110 - 8209. Methods have been developed for analysis of RDX, HMX, and TNT down to detection levels of 0.29 mg/L, 0.29 mg/L, and 0.25 mg/L, respectively, as well as for the byproduct nitramines TAX and SEX, for which detection levels are 0.33 mg/L.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Evaluate Dimethylnitrosamine

FUNDING HISTORY: PY - 1K; CY - 153K; BY - 4K

PROBLEM DEFINITION: The objective of this effort is to provide analytical support to contract DAMD 17-81-C-1118 (Bell, George Washington University), which concerns munitions wastewater treatment in semicontinuous activated sludge treatment systems for particular use in the manufacture of Composition B.

IMPORTANCE: This study relates to evaluation of the public health and environmental health hazards associated with discharge of wastewater at Holston Army Ammunition Plant.

APPROACH: Methods will be developed for analysis of RDX, HMX, and TNT in wastewater using HPLC. Samples provided by the contractor will be analyzed once satisfactory analytical methods have been developed.

ACHIEVEMENTS: Satisfactory HPLC methods have been developed for RDX, HMX, and TNT, as well as two co-products, TAX, and SEX.

PUBLICATION: Burrows, W.D. Tertiary Treatment of Effluent from Holston AAP Industrial Liquid Waste Treatment Facility I. Batch Carbon Adsorption Studies: TNT, RDX, HMX, TAX, and SEX. Technical Report 8207.

CARE OF COMBAT CASUALTY

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
				DA OB 6248	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62772A	3S162772A874	BA	228 APC F713
b. CONTRIBUTING				
c. [illegible]	STOG 80-7.2	6		

11. TITLE (Precede with Security Classification Code)*

(U) Protective Containers, Field, Medical Devices

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7812	8509	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.5	43
	CURRENT 83	0.3	27

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Arnold, M.F.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Reams, W.H.

NAME:

POC:DA

21. GENERAL USE

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) 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 the items during handling, shipping, and storage.

25. (U) 8110 - 8209. Fourteen items have been identified as needing immediate packaging. These have been procured, and packaging for each has been designed. Drawings have been made for 10 items, and container fabrication has been initiated. The dimensions of 200 items needing containers have been computerized. Ten containers have been designed that will accommodate all items including the original 14. Methods of providing shock and vibration protection are being investigated.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) Protective Containers, Field, Medical Devices

FUNDING HISTORY: PY - 111K; CY - 43K; BY - 27K

PROBLEM DEFINITION: To design 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: Medical equipment that requires packaging will be obtained. 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: Fourteen items of field medical equipment have been obtained. These have been identified as needing immediate packaging. Seven containers that will accommodate all 14 items have been designed and fabricated. The dimensions of 200 items needing containers have been computerized, and 10 containers have been designed that will accommodate all items including the original 14. Methods of providing shock and vibration protection are being investigated.

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*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 0652	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISS'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62772A	3S162772A874	BA	221 APC F718
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2	6		

11. TITLE (Procede with Security Classification Code)*

(U) Refrigerator, Medical, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7910	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE

		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.2	28
	CURRENT 83	0.4	38

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Conway, W.H.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code) (U) Biological Refrigerator; (U) Medical Refrigerator; (U) Biological Storage; (U) Blood Storage

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

23. (U) Identify a replacement item for the biological refrigerator that is currently in the inventory (NSN 4110-00-707-2550) but is no longer supportable.

24. (U) 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) 8110 - 8209. A new refrigerator design surfaced during the year that employs a cascade thermoelectric system and is configured specifically for field application. A specimen prototype unit was procured from the vendor and is currently being evaluated. The device shows promise of satisfying the required characteristics and is designed for low maintenance.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Refrigerator, Medical, Field

FUNDING HISTORY: PY - 31K; CY - 28K; BY - 38K

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

ACHIEVEMENTS: Two commercial units have been identified that could possibly meet requirements with some modifications. Consideration was also given to upgrading the current military model to make it supportable again. A new thermoelectric model has surfaced, however, that is designed specifically for military use. This machine has substantial potential for satisfying the requirements and is being intensively evaluated.

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	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 0651	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62772A	3S162772A874	BA	222 APC F719
b. CONTRIBUTING				
c. [illegible]	STOG 80-7.2.6			

11. TITLE (Precede with Security Classification Code)

(U) Sterilizer, Surgical Instrument and Dressing

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7910	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.9	67
FISCAL YEAR CURRENT 83	0.1	40

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Prensky, W.C.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Sterilizer, Field; (U) Sterilizer, Dental; (U) Sterilizer, Veterinary; (U) Sterilizer, Small

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

23. (U) 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) Canvas 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) 8110 - 8209. No further progress has been made on this task as it has remained in holding status awaiting reevaluation of requirements by the Combat Developer.

Sterilization Equipment in Support of the Army in the Field; Keyser, Collette P., Prensky, William C., Gohara, S. A., and J. H. Young. Proceedings, AAMI 17th Annual Meeting, San Francisco, CA, May 9-12, 1982. p. 60.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Sterilizer, Surgical Instrument and Dressing

FUNDING HISTORY: PY - 25K; CY - 67K; BY - 40K

PROBLEM DEFINITION: Three small tabletop sterilizers for field use (NSN 6530-00-782-6503, 6530-00-926-4857 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: The commercial market will be canvased for an 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 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.

ABSTRACT: Sterilization Equipment in Support of the Army in the Field; Keyser, LTC Collette P., Prensky, William C., Gohara, S. A., and Dr. J. H. Young. Presented at AAMI 17th Annual Meeting, San Francisco, CA, May 9-12, 1982; published in Proceedings, p. 60.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 9210	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62772A	3S162772A874	BA	223 APC F730
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2;6			

11. TITLE (Precede with Security Classification Code)*

(U) System for Medical Gas Generation

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 008800 Life Support; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8201	8512	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	36
FISCAL YEAR CURRENT 83	1.6	209

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Medical Gases; (U) Field Gas Generation; (U) Life Support; (U) Hospital Equipment

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

23. (U) Develop the concept and requirements for generation of medical gases (principally oxygen) in the field, thus negating the need for moving large numbers of high pressure gas bottles through the supply system to forward areas.

24. (U) Assess existing technology and generate the necessary requirements to support the letting of a contract for the development of a gas generating system for field use. Such contract, when let, would be managed under this task.

25. (U) 8110 - 8209. Discussions have been held with manufacturers of oxygen generating equipment for the purpose of determining the state of the art. Field generation of medical oxygen by molecular sieve has been determined to be feasible. Contracting efforts are being held in abeyance, however, since a substantial doctrinal problem exists concerning the most effective level of field operations at which this type of equipment should be introduced. The doctrinal problem is currently under study.

*Available to contractors upon originator's approval

DD, FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) System for Medical Gas Generation

FUNDING HISTORY: PY - 0; CY - 36K; BY - 209K

PROBLEM DEFINITION: The need for medical gasses on an OCONUS battlefield gives rise to a logistical problem of large magnitude. The transport of large numbers of high pressure gas cylinders to a foreign theater of operations and the distribution of those cylinders within the theater directly conflict with the need to move large quantities of ammunition and other combat hardware and may, in fact, not be possible when combat operations are under way.

IMPORTANCE: The ability to produce at least some of the required medical gasses on site in the field could alleviate the logistical conflict between gas cylinders and combat materiel and may, in fact, be the only way to insure an adequate supply of these gasses for treatment of combat casualties.

APPROACH: Oxygen and nitrogen constitute the greatest volume of the medical gasses required, and a ready source for these exists in the atmosphere itself. Thus, the task effort will concentrate on producing these gasses through dissociation of air.

ACHIEVEMENTS: This task is in the planning stage, and requirements are being promulgated in concert with the Combat Developer.

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*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 9206	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62772A	3S162772A874	BA	226 APC F731
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2;6			

11. TITLE (Procede with Security Classification Code)*

(U) Pyrogen-Free Integrated System Support

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 003500 Clinical Medicine

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.4	48
FISCAL YEAR CURRENT 83	1.4	123

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Pyrogen-free Water; (U) Injectables; (U) Reconstitution; (U) Clinical Medicine

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

23. (U) Supply pyrogen-free water for use in injectable, intravenous, and other field medical applications.

24. (U) Investigate various commercial and laboratory methods for the production of sterile pyrogen-free water. Methods of coupling the output of the system to suitable containers for distribution will be examined.

25. (U) 8110 - 8209. A prototype system has been assembled, and components are being optimized. Sterile docking methods are being investigated.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Pyrogen-Free Integrated System Support

FUNDING HISTORY: PY - 0; CY - 48K; BY - 123K

PROBLEM DEFINITION: Currently, pyrogen-free water for reconstituting blood substitutes, injectables, and the lavage of wounds must be obtained from commercial sources and shipped into combat areas. This logistic burden could be eliminated or greatly reduced if pyrogen-free water could be produced where it will be needed.

IMPORTANCE: The availability of pyrogen-free water in a combat area is of extreme importance. The reconstitution of blood substitutes, injectables, and the lavage of wounds all require pyrogen-free water.

APPROACH: Current reverse osmosis technology, coupled with the Limulus Amebocyte Lysate (LAL) test for pyrogenicity, will be investigated. Commercial sources will be surveyed for availability of field compatible equipment.

ACHIEVEMENTS: A prototype system has been assembled, and components are being optimized. Sterile docking methods are being investigated.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 9204	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62772A	3S162772A874	BA	227 APC F732
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2	6		

11. TITLE (Procede with Security Classification Code)

(U) Digital Radiography

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 003500 Clinical Medicine

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.2	40
FISCAL YEAR CURRENT 83	0.8	108

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

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NAME: Salisbury, L.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) X-ray System; (U) Digital Radiography; (U) Imaging, Medical; (U) Teleradiography

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

23. (U) Develop a digital radiographic/fluoroscopic system for field use. The elimination of film, film processor, and chemicals will do much to minimize the logistic burden associated with the use of conventional X-ray systems in a military medical environment.

24. (U) Using commercial, modified commercial, and in-house developed subsystems, develop a detector, digital processor, display, and recording system for the acquisition, display, recording, and transmission of radiographic information.

25. (U) 8110 - 8209. A contract is being let for the development of a solid state detector. Information is being gathered to support the development of an RFP for an integrated system.

* Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Digital Radiography

FUNDING HISTORY: PY - 0; CY - 40K; BY - 108K

PROBLEM DEFINITION: Currently available radiographic equipment requires a large amount of support equipment and supplies (film, processor, water, chemicals, etc.). Technology exists that would permit the elimination of these support items and provide the capability of telemetering the radiographic information from remote locations.

IMPORTANCE: The importance of reducing the logistic burden in a combat area is well documented. In addition, the elimination of shelf life items reduces the problems of stockage during peacetime.

APPROACH: Using solid-state detectors, microprocessor data handling, magnetic storage media, and video display technology, a system concept will be developed. Commercial sources will be investigated, and a system will be implemented.

ACHIEVEMENTS: A contract has been let for the development of a new detector. Information is being gathered to support the development of a Request for Proposal for an integrated system.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6172	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	H.TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62772A	3S162772A874	BA	225 APC F762
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2.6			

11. TITLE (Procede with Security Classification Code)

(U) Whole Body Diagnostic X-Ray Scanner

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

003500 Clinical Medicine; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7602	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	26
FISCAL YEAR CURRENT 83	0.0	0

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Salisbury, L.L.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

22. KEYWORDS (Procede EACH with Security Classification Code) (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. Procede text of each with Security Classification Code.)

23. (U) 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) 8110 - 8209. 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 the early models. The contractor has constructed models with longer life, but low beam current has precluded obtaining a useful radiographic image. The contractor was unable to meet the design requirements, and this effort was terminated.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Whole Body Diagnostic X-Ray Scanner

FUNDING HISTORY: PY - 69K; CY - 26K; BY - 0

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 that would permit diagnostic quality radiographs to be made while reducing 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.) has a direct impact on support of field medicine.

APPROACH: A contract has been let for the development of an electronic flying spot X-ray source.

ACHIEVEMENTS: The contractor has a basic patent on an electronically scanned electron beam and pinhole collimator that should produce a flying spot of X-rays. Several models have been fabricated that do produce X-rays. Gas and heat problems have limited the beam current obtained. The contractor was unable to meet the design requirements, and this effort was terminated.

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* DA OB 6219	2. DATE OF SUMMARY* 82 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8A. DISP'N INSTR'N NL	8B. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62772A	3S162772A874	BA	232 APC F793
b. CONTRIBUTING				
c. XXXXXXXXX	STOG 80-7.2.6			

11. TITLE (Precede with Security Classification Code)*

(U) Tactical Ambulance Adaptation, Feasibility Study of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.6	52
FISCAL YEAR CURRENT 83	0.3	26

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Conway, W.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

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

23. (U) 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) 8110 - 8209. A West German hard mounted litter rack for the M113 has been recommended for adoption with some minor modifications that are currently being discussed with the manufacturer. Also, a number of M113 ambulance equipage schemes have been explored with the information thus generated passed on to the Combat Developer. Work has also been performed on the packaging of a functional mobile aid station in a larger armored, tracked vehicle with the developmental Fighting Vehicle System (FVS) vehicle being used as a model for this work. This Laboratory is now engaged in supporting the Combat Developer in the integration of these developments into the medical system.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8290

DETAIL SHEET

TITLE: (U) Tactical Ambulance Adaptation, Feasibility Study of

FUNDING HISTORY: PY - 84K; CY - 52K; BY - 26K

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 compatibility.

IMPORTANCE: The "Division 86" study has mandated 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: Specimen tactical vehicles will be procured and equipped 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 will be 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 data generated has been presented to the Academy, and this Laboratory is now supporting the Academy in the integration of these concepts into the medical system.

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	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 5856	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62772A	3S162772A874	BA	236 APC F794
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1436R			

11. TITLE (Precede with Security Classification Code)

(U) Field Gurney

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8009	8406	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.5	62
FISCAL YEAR CURRENT 83	0.2	44

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Thayer, C.R.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Conway, W.H.

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Mobile Litter; (U) Litter Carrier; (U) Wheeled Litter

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

23. (U) Develop a device that enables a standard Army litter to be converted into a wheeled "Gurney" type of patient conveyance that can be moved over field terrain by one or, at worst, two litter bearers. The purpose is to reduce the number of personnel required in field hospitals to move patients and to facilitate the use of female soldiers in the role of litter bearer.

24. (U) Procure and evaluate specimens of foreign equipment that address this need and are known to exist. Failing that, a new development effort will be undertaken.

25. (U) 8110 - 8209. A West German litter cart has been procured and evaluated from an engineering standpoint. This unit shows promise with incorporation of a few modifications, and these are being made on an experimental basis. An aluminum version of the West German device has been fabricated in an effort to lighten the weight, and a set of snap-on wheel cleats are being developed to provide a soft terrain capability.

* Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Field Gurney

FUNDING HISTORY: PY - 56; CY - 62K; BY - 44K

PROBLEM DEFINITION: In a mass-casualty situation, the need to move litter patients between the dispersed elements of a field hospital or clearing station would put a severe strain on the available manpower. A conveyance is needed to reduce the number of litter bearers required per carry from four to not more than two, and preferably one.

IMPORTANCE: The intense combat predicted by current European scenarios indicates that mass-casualty situations at field hospitals will be a more common occurrence. This fact, coupled with increased use of female soldiers in roles such as litter bearer, makes it necessary that manpower required for the movement of litter patients in and around field treatment facilities be reduced to a minimum and that the physical demands made on litter bearers be lessened.

APPROACH: A wheeled litter carrier will be developed, after the fashion of a hospital Gurney, that is capable of being operated over moderately rough terrain by one, or not more than two, litter bearers of unremarkable physical stature.

ACHIEVEMENTS: A test bed was constructed to evaluate various wheel configurations operating on different types of terrain. Also, a West German wheeled litter carrier was procured and evaluated for this application. The West German device, which was designed for field military use, has a number of excellent features but is made of steel and uses Moped wheels. Studies are under way to lighten the device and to provide a wheel configuration having greater surface contact.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 5858	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8. DISP'N INSTR'N	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	H.TERMINATION	U	U		NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62772A	3S162772A874	BA	224 APC F795
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2:6			

11. TITLE (Precede with Security Classification Code)

(U) Vital Signs Monitor for High Noise/Vibration Environment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8010	8510	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 82	0.4	39
	CURRENT 83	0.0	0

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Thayer, C.R.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Conway, W.H.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Vital Signs; (U) Blood Pressure; (U) Pulse; (U) Respiration Rate; (U) Body Temperature

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

23. (U) Develop an equipment set that provides the capability to monitor medical vital signs of patients in a high noise or high vibration level environment. The principal use will be in armored vehicles and helicopters functioning as battlefield ambulances. Traditional methods of measuring vital signs cannot be used in such an environment.

24. (U) Investigate new commercial developments in new techniques such as ultrasonics, electronic artifact rejection, etc., and determine their suitability for the problem area of consideration. If nothing suitable exists, development of new techniques in-house or in collaboration with the private sector will be attempted. The ultimate goal of this task is to provide a family of vital signs monitors for the problem environment.

25. (U) 8110 - 8209. A variety of commercial vital signs monitors have been tested, encompassing ausculatory and oscillometric blood pressure techniques and various electronic schemes for artifact rejection. All have failed to perform in the harsh environment of an M113 armored personnel carrier. It appears that obtaining such information may not be possible since tracked vehicles tend to produce high energy vibration and shock pulses at exactly the frequencies of interest, and organs of the human body tend to become resonant within that same frequency range. Consequently, this requirement has been made a subordinate issue on another task dealing with development of a noninvasive monitor for use in a chemical environment. Since the new task involves some research and development, it is hoped that a new technique might evolve that can satisfy the requirement. The efforts under this work unit summary are therefore terminated as a separate task. 149

* Available to contractors upon originator's approval

DETAIL SHEET

TITLE: (U) Vital Signs Monitor for High Noise/Vibration Environment

FUNDING HISTORY: PY - 28K; CY - 39K; BY - 0

PROBLEM DEFINITION: The ability to quantitatively measure the vital signs of a combat casualty in the high noise, high vibration environment of a moving tactical ambulance is needed. This is particularly difficult to achieve in tracked vehicles moving across unpaved terrain, and the common methods of measuring heart rate, blood pressure, etc., are probably not adequate.

IMPORTANCE: Current scenarios for future combat predict that casualties being transported by tactical ground ambulances will spend much more time in transit. This situation mandates that treatment capabilities in these vehicles be upgraded. The ability to adequately measure vital signs of the patient is fundamental to that upgraded treatment.

APPROACH: The efficacy of existing technology when applied to this problem will be evaluated, and new techniques will be sought where existing ones are not adequate.

ACHIEVEMENTS: All currently available technology has been evaluated and has failed to perform. It has been determined that tracked vehicles produce substantial vibrational energy at the exact frequency of interest and that the resonant frequency of many human organs also lies within the vehicle vibration spectrum. Thus, it may not be possible to accomplish this task. The requirement has, therefore, been made a "desirable" characteristic of a new task dealing with monitoring of chemical casualties, and the effort under this work unit is terminated.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 2839	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62772A	3S162772A874	BA	235 APC F798
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1437R			

11. TITLE (Precede with Security Classification Code)

(U) Apparatus, X-Ray, Dental, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8005	8303	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.5	56
FISCAL YEAR CURRENT 83	0.1	27

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

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) 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) 8110 - 8209. A decision was made to evaluate commercial X-ray units in their commercial containers. Modified DT I was conducted and completed during 2nd Quarter FY 82. OT I was conducted and completed during 3rd Quarter FY 82. The final test report was forwarded during 4th Quarter FY 82. A visit was made to the contractor to review findings and determine course of design modifications.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Apparatus, X-Ray, Dental, Field

FUNDING HISTORY: PY - 36K; CY - 56K; BY - 27K

PROBLEM DEFINITION: New Federal Drug Administration (FDA) regulations preclude use of previous X-ray units in field units, necessitating investigation of new X-ray units that will meet these regulations.

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

APPROACH: Commercial sources were searched for devices that will meet the requirements.

ACHIEVEMENTS: Radiation leakage tests were completed. A modified DT I was also completed. A single commercial prototype was subjected to OT I; testing was completed.

RELATIONSHIP TO CORE PROGRAM: This program is directly related to the Laboratory's mission to develop field medical materiel.

PREVENTION OF MILITARY DISEASE HAZARDS

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OG 8679	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62770A	3M162770A871	CB	261 APC F901
b. CONTRIBUTING				
c. [illegible]	STOG 80-7.2	2		

11. TITLE (Procede with Security Classification Code)

(U) Vector Control Methods, Material, Equipment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

002600 Biology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8410	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	5
FISCAL YEAR CURRENT 83	1.5	44

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Albertson, John N., Jr.
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Nelson, J.H.
TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Buescher, M.D.
NAME: Pierce, P.E. POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Vector Control; (U) Equipment; (U) Methodology; (U) Surveillance

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

23. (U) Develop threat projections, technological forecasts, and interagency planning to determine operational capabilities, doctrine, organization and potential systems to meet Army vector control needs.

24. (U) Investigate and analyze pertinent studies on vector control systems and develop and evaluate experimental and commercial hardware and control formulations to develop strategies for control of militarily important vectors.

25. (U) 8110 - 8209. The critical field data derived from the integrated vector control program for mosquitoes and black flies clearly indicated that a microbial insecticide can be used effectively in large-scale field control of mosquito and black fly disease vectors. As a spin-off of this research effort, the existence of a dose-time relationship between an insecticide and black flies was demonstrated which enables Army TOE units to apply more accurate methods for black fly control in the field.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Vector Control Methods, Material, Equipment

FUNDING HISTORY: PY - 0; CY - 5K; BY - 44K

PROBLEM DEFINITION: Development of threat projections, technological forecasts, and extensive interagency planning to determine operational capabilities, doctrine, organization, and potential systems is essential to meet the needs of the Army. The basis for future investigations must be established, and concept formulation must be initiated through early on studies of vector control systems and development and evaluation of experimental and commercial hardware.

IMPORTANCE: Identification and resolution of technical issues, operational issues, and logistical support problems are critical to the timely incorporation of new methodology, materials, and equipment into the Army's vector control program.

APPROACH: Pertinent studies on vector control systems, development and evaluation of experimental and commercial hardware, and control formulations will be analyzed and investigated to develop strategies for control of vectors of military importance.

ACHIEVEMENTS: The critical field data derived from the integrated vector control program for mosquitoes and black flies clearly indicated that a microbial insecticide can be used effectively in large-scale field control of mosquito and black fly disease vectors. As a spin-off of this research effort, the existence of a dose-time relationship between an insecticide and black flies was demonstrated which enables Army TOE units to apply more accurate methods for black fly control in the field.

RELATIONSHIP TO CORE PROGRAM: This task is an integral portion of the Laboratory's research and development mission of providing vector control methods, material, and equipment to support the field Army.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6244	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62770A	3M162770A871	CB	262 APC F902
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1406A			

11. TITLE (Procede with Security Classification Code)

(U) Integrated Pest Management - Black Flies

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

005900 Environmental Biology; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7810	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	1.5	65
FISCAL YEAR CURRENT 83	4.3	102

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Vorgetts, L.J.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME:

POC:DA

22. KEYWORDS (Procede 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. Procede text of each with Security Classification Code.)

23. (U) Develop methods of long-term suppression of immature stages of black flies and short-term suppression of adults 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 onchoceriasis or river blindness, a disease of military importance in parts of Africa and Central and South America. Effective vector control strategies will permit increased military training at the affected installations and will reduce the potential threat of noncombat casualties due to onchoceriasis.

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 bacteria and fungi. Improvement of standardized methods for making evaluations of such agents will be emphasized because present methodology does not provide results which can be utilized in interlaboratory comparisons. The use of diluents to improve the activity of adulticides will be studied as a possible approach for suppression of adult black flies.

25. (U) 8110 - 8209. Tests completed during the 2nd Quarter FY 82 demonstrated the efficacy of Bacillus thuringiensis israelensis which is now registered for use against black fly larvae. Preliminary investigations of a juvenile hormone analogue indicate possible direct toxic effects on larvae as well as inhibition of development during the pupal stage. Improvement and standardization of testing methods now under way appear to provide a better means for detecting the existence of a true biomodal mortality curve. This improved methodology also appears to be useful for evaluating a newly acquired fungal pathogen of black flies, Culicinomyces sp.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 66 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-646/8200

DETAIL SHEET

TITLE: (U) Integrated Pest Management - Black Flies

FUNDING HISTORY: PY - 92K; CY - 65K; BY - 102K

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 onchoceriasis and rank high as military nuisance pests. In areas where onchoceriasis 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. No effective means for control of these insects currently exists.

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 are to develop methods for manipulation, storage, and application of these agents.

ACHIEVEMENTS: Tests completed during the 2nd Quarter FY 82 demonstrated the efficacy of Bacillus thuringiensis israelensis which is now registered for use against black fly larvae. Preliminary investigations of a juvenile hormone analogue indicate possible direct toxic effects on larvae as well as inhibition of development during the pupal stage. Improvement and standardization of testing methods now under way appear to provide a better means for detecting the existence of a true biomodal mortality curve. This improved methodology also appears to be useful for evaluating a newly acquired fungal pathogen of black flies, Culicinomyces sp.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OG 8684	2. DATE OF SUMMARY* 82 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 81 10 01	4. KIND OF SUMMARY H.TERMINATION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING*	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62770A	3M162770A871		263 APC F903
b. CONTRIBUTING				
c. XXXXXXXXX	STOG 80-7.2:6			

11. TITLE (Procede with Security Classification Code)*

(U) Pest Management-Arthropod Control

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002600 Biology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8110	8510	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0	0
FISCAL YEAR CURRENT 83	0	0

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Nelson, J.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Pierce, P.E.

NAME: Anderson, L.M. POC:DA

21. GENERAL USE

22. KEYWORDS (Procede EACH with Security Classification Code)

(U) Pest Management; (U) Methodology; (U) Insect Control; (U) Equipment

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

23. (U) Develop and refine methodology that will enable field entomology detachments to increase their efficiency and effectiveness in the areas of insect control. Utilization of this state-of-the-art methodology will insure that maximum effectiveness is obtained against arthropod disease vectors by field Army personnel.

24. (U) As new control agents and equipment become available, develop and coordinate new insect control programs.

25. (U) 8110 - 8209. This task overlaps with another 871 task. USAMBRDL has no line under Task Area Number CA. This research and technology work unit summary is terminated.

*Available to contractors upon originator's approval

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE ☆U.S. GPO: 1981—341-846/8200

DETAIL SHEET

TITLE: (U) Pest Management-Arthropod Control

FUNDING HISTORY: PY - 0; CY - 0: BY - 0

PROBLEM DEFINITION: Development and refinement of methodology is essential to enable field entomology detachments to increase their efficiency and effectiveness in the areas of insect control.

IMPORTANCE: Utilization of this state-of-the-art methodology will insure that maximum effectiveness is obtained against arthropod disease vectors by field Army personnel.

APPROACH: As new control agents become available, new insect control programs will be developed and coordinated with user organizations.

ACHIEVEMENTS: This task overlaps with another 871 task. USAMBRDL has no line under Task Area Number CA. This research and technology work unit summary is terminated.

RELATIONSHIP TO CORE PROGRAM: The project is in keeping with mission for research in applied military vector control.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OA 6296	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62770A	3M162770A871	CB	264 APC F904
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2	2		

11. TITLE (Precede with Security Classification Code)

(U) Evaluation of Skid Mounted and Special Purpose Pesticide Dispersal Equipment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7503	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.1	3
FISCAL YEAR CURRENT 83	0.2	22

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

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21. GENERAL USE

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

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TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Anderson, L.M.

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Insect Control; (U) Pesticide Dispersal; (U) Engineer Tests; (U) Ultra-Low Volume (ULV); (U) Skid Mounted Sprayer

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

23. (U) Determine the durability of commercially available ultra-low volume (ULV) and power 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 user agencies with comparative durability data for purchase through military channels.

24. (U) 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' claims 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) 8110 - 8209. Evaluations of Yellow Devil skid mounted power sprayer, Micron ULVA, Mini ULVA, and Herbie were completed. Evaluations of Hudson model 98600 and Turbaire models Sprite, Fox, XJ, and Weeder will be conducted during FY 83.

* Available to contractors upon originator's approval

DETAIL SHEET

TITLE: (U) Evaluation of Skid Mounted and Special Purpose Pesticide Dispersal Equipment

FUNDING HISTORY: PY - 20K; CY - 3K; BY - 32K

PROBLEM DEFINITION: To continuously evaluate the basic engineering design, durability, and operational effectiveness of commercial pest control equipment.

IMPORTANCE: New and improved commercial items are frequently presented to the 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: Extensive equipment engineering and operational evaluations are conducted when requested by DOD agencies. These evaluations will include specification design, quality assurance testing as required by specification and procurement documents, and individual item reliability and durability analyses.

ACHIEVEMENTS: Evaluation of Yellow Devil skid mounted power sprayer, Micron ULVA, Mini ULVA, and Herbie was completed. Evaluations of Hudson model 98600 and Turbaire models Sprite, Fox, XJ, and Weeder will be conducted during FY 83.

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

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION	2. DATE OF SUMMARY	REPORT CONTROL SYMBOL
DA OB 6058	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY	6. WORK SECURITY	7. REGRADING	8A. DISP'N INSTR'N	8B. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62770A	3M162770A871	CB	265 APC F905
b. CONTRIBUTING				
c. [redacted]	STOG 80-7.2:2			

11. TITLE (Precede with Security Classification Code)

(U) Pesticide Dispersal Evaluation Set

12. SCIENTIFIC AND TECHNOLOGICAL AREAS

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	0.3	18
FISCAL YEAR CURRENT 83	0.2	16

19. RESPONSIBLE DOD ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Albertson, John N., Jr.

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME: US Army Medical Bioengineering Research & Development Laboratory

ADDRESS: Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME: Pierce, P.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME: Anderson, L.M. POC:DA

21. GENERAL USE

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Pesticide Dispersal; (U) Droplet Size; (U) Insect Control; (U) EPA Requirements

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

23. (U) Develop a pesticide field evaluation set capable of measuring ultra-low volume (ULV) droplet 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 the search is unsuccessful, fabricate new equipment and field evaluate for efficacy of design.

25. (U) 8110 - 8209. A Defense Small Business Advanced Technology Program contract was awarded to KLD Associates to develop and refine the "hot wire device" for characterization of liquid aerosol particles. As the monitor for this contract, USAMBRDL personnel are planning several comparative studies with this device and the Particle Measuring System model 200, as well as with the slide wave method of aerosol droplet collection.

*Available to contractors upon originator's approval

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Evaluation Set

FUNDING HISTORY: PY - 34K; CY - 18K; BY - 16K

PROBLEM DEFINITION: To develop instrumentation that 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 ultra-low volume (ULV) pesticide formulations to provide protection for the soldier from disease vectors and pest arthropods. The dissemination of droplets that 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 airflow 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., slidewave, settling, hot wire sampler).

ACHIEVEMENTS: A Defense Small Business Advanced Technology Program contract was awarded to KLD Associates to develop and refine the "hot wire device" for characterization of liquid aerosol particles. As the monitor for this contract, USAMBRDL personnel are planning several comparative studies with this device and the Particle Measuring System model 200, as well as with the slide wave method of aerosol droplet collection.

RELATIONSHIP TO CORE PROGRAM: This item of medical surveillance equipment will enable the TOE entomology service units to insure application of proper droplet sizes by their ULV dispersal equipment. The 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*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 0649	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISP'N INSTR'N	8B. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 10 01	D. CHANGE	U	U		NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62770A	3M162770A871	CB	266 APC F906
b. CONTRIBUTING				
c. [redacted]	CARDS NO: 1405A			

11. TITLE (Procede with Security Classification Code)*

(U) Integrated Pest Management - Mosquitoes

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

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

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 82	4.2	204
FISCAL YEAR CURRENT 83	3.2	129

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Vorgetts, L.J.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME: POC:DA

21. GENERAL USE

22. KEYWORDS (Procede 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. Procede text of each with Security Classification Code.)

23. (U) Develop methods for mosquito control that integrate physical, chemical, and biological control methods so as to maintain effective control economically without undue damage to the environment. Provide baseline laboratory and field data on the efficacy of various insecticides for control of mosquito larvae from which field application rates and methods will be developed.

24. (U) Define mosquito problems at a US Army installation using previously accumulated data and on-site observations. Propose strategies for control of the problems which integrate physical, chemical, and biological methods. Proposed strategies will be implemented on-site to test the integrated pest management concept as it applies to mosquitoes.

25. (U) 8110 - 8209. Studies of the bacterial pathogen Bacillus thuringiensis israelensis (Bti) demonstrated that wettable powder (WP) formulations are extremely effective against mosquito larvae, but the duration of activity is very short (< 24 hr). Tests are being continued to determine if a slow-release formulation can be developed. Preliminary results from field trials indicate that the addition of diluents increases the effectiveness of ground applications of mosquito adulticides without increasing the amount of active ingredient applied.

Simulated Field Studies with Four Formulations of Bacillus thuringiensis var. israelensis Against Mosquitoes: Residual Activity and Effect of Soil Constituents. Van Essen, Frank W., and Stephen C. Hembree. Mosq. News 42:66-72, 1982.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Integrated Pest Management - Mosquitoes

FUNDING HISTORY: PY - 157K; CY - 204K; BY - 129K

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 blackflies. While evaluation and assimilation of some of this technology by the Army is under way, 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: Studies of the bacterial pathogen Bacillus thuringiensis israelensis (Bti) demonstrated that wettable powder (WP) formulations are extremely effective against mosquito larvae, but the duration of activity is very short (<24 hr). Recently completed tests indicate that specially modified granular formulations can be used to extend the period of activity. Tests are being continued to determine if a true slow-release formulation can be developed.

Preliminary results from field trials indicate that the addition of diluents increases the effectiveness of ground applications of mosquito adulticides without increasing the amount of active ingredient applied. If this method can be adapted to existing operating procedures, it should reduce the monetary cost and environmental impact of insecticide application.

RELATIONSHIP TO CORE PROGRAM: This project is a systematic approach to providing a vector control program for management of mosquitoes. The project is in keeping with mission for research in applied military vector control.

MANUSCRIPTS: Simulated Field Studies with Four Formulations of Bacillus thuringiensis var. israelensis Against Mosquitoes: Residual Activity and Effect of Soil Constituents. Van Essen, Frank W., and Stephen C. Hembree. Mosq. News 42:66-72, 1982.

Dose-Time Response Between Simulium Vittatum Zetterstedt Larvae and Abate 200 E (Temephos). Frommer, Dr. R. L., Nelson, Dr. J. H., Remington, M. P., Gibbs, P. H., and Dr. L. J. Vorgetts. Mosq. News. In press.

HEALTH HAZARDS OF MILITARY MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OG 6778	82 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
81 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	62777A	3E162777A878	CA	241 APC F955
b. CONTRIBUTING				
XXXXXXXXXX	STOG 80-7.2.4			

11. TITLE (Procode with Security Classification Code)*

(U) Field Provision of Nonpyrogenic Water

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

007800 Hygiene and Sanitation; 010100 Microbiology; 008300 Inorganic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
8103	8309	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING FISCAL YEAR 82	0.5	69
CURRENT FISCAL YEAR 83	1.8	122

19. RESPONSIBLE DOD ORGANIZATION

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ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Duncan, J.B.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Procode EACH with Security Classification Code)

(U) Pyrogen Free Water; (U) Field Production; (U) ROWPU

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

23. (U) The objective is to ascertain the feasibility of current off-the-shelf technology for use in the production of pyrogen-free water. The field production of pyrogen-free water would eliminate the logistical problem of supply to field hospitals during combat operations. The influent for a pyrogen-free water unit would be comprised of the effluent from the ROWPU at a water point.

24. (U) The treatment train will consist of a roughing filter, reverse osmosis unit, carbon filter, ion exchange unit, pyrogen filter, and 0.22 µm filter. Product water will be evaluated for pyrogens (LAL), cellular toxicity (HeLa) and conform to US Pharmacopeia (USPXX).

25. (U) 8110 - 8209. A Letter of Agreement has been staffed through the Academy of Health Sciences (FSH), and it is to be sent to HQDA. The treatment train is intact and two reverse osmosis units will be evaluated, i.e., a cellulose acetate spiral wound configuration and an inside-skinned polyamide hollow filter RO.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: (U) Field Provision of Nonpyrogenic Water

FUNDING HISTORY: PY - 24K; CY - 69K; BY - 122K

PROBLEM DEFINITION: To ascertain the feasibility of off-the-shelf technology for the production of nonpyrogenic water in a field environment.

IMPORTANCE: If generation of nonpyrogenic water can be accomplished in the field, it will alleviate a large logistical burden on the resupply of parental solutions.

APPROACH: A treatment train consisting of turbidity filter, reverse osmosis, carbon filter, ion exchange, pyrogen filter, and a 0.22 μm filter will be evaluated.

ACHIEVEMENTS: The above materials have been received. LOA staffed through AHS, FSH to be sent to HQDA. Treatment train built.

DISTRIBUTION LIST

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MANUSCRIPTS CLEARED FOR PUBLICATION/PRESENTATION
1 October 1981 - 30 September 1982

1. Competitive Pathways in Chlorine Dioxide Oxidation of Amines: Amide Formation from Cyclic Amines, Burrows, Elizabeth P. and David H. Rosenblatt. Technical Report #8109.

2. Concentration of Trace Amounts of Organophosphorus Pesticides from Water by Sep Pak C_{18} Cartridges, Dennis, William H. Jr., Wade, Clarence W.R., Rosencrance, Alan B., Trybus, Theresa M. and Ernst E. Bruggemann. Technical Report #8107.

3. Utilization of Aquatic Organisms for Continuously Monitoring the Toxicity of Industrial Waste Effluents, van der Schalie, William H. Oral presentation at Twelfth Conference on Environmental Toxicology, Dayton, Ohio, and for publication in Conference Proceedings.

4. Enteric Virus Removal in Wastewater Treatment Lagoon Systems, Bausum, Howard T., Schaub, Stephen A., Rose, William E. and Paul H. Gibbs. For publication in EPA Technical Report.

5. Estimation of the Toxicity of Munitions-Related Materials to Fish and other Aquatic Organisms, van der Schalie, William H. and J.G. Pearson. For presentation at American Fisheries Society, Northeastern Division, Warm Water Workshop. Environmental Contaminants and Warm Water Fishes, Kearnysville, WV and for publication in Workshop Proceedings.

6. Analysis of Unquenched Reaction Mixtures of Chlorine Dioxide and Phenols by Reversed Phase High Performance Liquid Chromatography, Brueggemann, Ernst, Wajon, J. Edmund, Wade, Clarence W.R. and Elizabeth P. Burrows. For publication in Journal of Chromatography.

7. Recommended Decisions about Two Environmental Pollutants: o-Chlorobenzalmalononitrile and Diphenylamine, David H. Rosenblatt. For presentation at Society of Environmental Toxicology and Chemistry, Arlington, VA and for publication in SETAC Journal.

8. Quantitative Analyses of Pesticides by TLC under Field Conditions, Wade, Clarence W.R., Dennis, William H., Jr. and Theresa M. Trybus. Oral presentation at American Chemical Society Meeting at Las Vegas, Nevada.

9. Evaluation of a Controlled-Release Silicate Formulation of Temephos against Aedes Aegypti Larvae in the Laboratory and Psorophora Columbiae Larvae in Rice Field Plots, Anderson, L.M., Nelson, J.H., Thies, C. and M.V. Meisch. For publication in Journal of Medical Entomology.

10. Catalytic Degradation of Trihalomethanes, Burns, Michael (Summer Student). Baxter, Louanna and Steven H. Hoke. Abstract for presentation at Middle Atlantic Regional ACS Meeting, Newark, DE.

11. Treatment of Pesticide-Laden Wastewater by Activated Carbon, Dennis, W.H., Jr., Wade, C.W.R. and E.A. Kobylinski. Abstract for presentation at Middle Atlantic Regional Meeting, ACS, University of Delaware, Newark, DE.

12. Sterilization Equipment in Support of the Army in the Field, Keyser, LTC Collette P., Young, Dr. J.H., Prensky, William C. and S.A. Gohara. Abstract for presentation at AAMI 17th Annual Meeting, San Francisco, CA, and for publication in the Proceedings.

13. Letter to the Editor of Fundamentals and Applied Toxicology, by Jack C. Dacre. For publication in Fundamentals and Applied Toxicology.

14. The Care and Grooming of Commissioned Mobilization Designees, Rosenblatt, Dr. David H., Kainz, CPT Robert and COL J.D. Gensler. For publication in Commanders Call. (This draft was never cleared by this office).

15. Clinical Studies to Assess the Health and Performance Effects of Carbon Monoxide (CO) on Combat Weapons System Crewmembers, CPT James W. Carroll. For publication in MRDC Newsletter.

16. Field Drinking Water Standards, by Jay D. Gensler. For publication in USAMRDC Research Newsletter.

17. Dose-Time Response Between Simulium Vittatum Zetterstedt Larvae and Abate 200E (Temephos), Frommer, R.L., Nelson, J.H., Remington, M.P. and P.H. Gibbs. For publication in Mosquito News.

18. Free Available Chlorine Disinfection Criteria for Fixed Army Installation Primary Drinking Water by Katheryn Kenyon. Technical Report #8108.

19. Comparison of Several Methods for the Determination of Chlorine Residuals in Drinking Water, Cooper, W.J., Mehran, M.F., Slifker, R.A., Smith, D.A., Villate, J.T. and P.M. Gibbs. For publication in the Journal of the American Water Works Association.

20. Material for Special Issue featuring Army Research and Development Laboratories, by Colonel Duane G. Erickson. For publication in RDA Magazine, July/August 1982 Issue.

21. Considerations for a Patient Wrap, by Major James T. Kardatzke. For presentation at Medical R&D Command Bioscience Review, Edgewood Arsenal, MD, 14 May 1982.

22. Integration of Health Effects Research with Systems Development: Recent Funding Policy Guidance, by CPT David L. Johnson. For presentation at Smoke Symposium VI, Adelphia, MD, 27-29 Apr 82, and for publication in Proceedings of Smoke Symposium VI (PM Smoke Technical Report).

23. Technical Issues Raised during Risk Assessment Case Studies, Rosenblatt, David H., and Robert J. Kainz. For Oral Presentation, and Extended Abstract, at American Society of Civil Engineers, National Conference on Environmental Engineering, Minneapolis, MN, July 14-16, 1982, and for publication in Proceedings,

24. Development of Colorimetric Methods for Chemical Agent Detection in Water, Wade, Clarence W.R., and Evelyn H. McNamee. For Oral Presentation at Bioscience Review, Aberdeen Proving Ground, MD, 13-14 May 82.

25. Solving Environmental Problems Using the PPLV Approach and Guild Theory, Rosenblatt, David H. and Robert J. Kainz. For Oral Presentation at The Application of Guilding Workshop Corps of Engineers, Chicago, IL, 19-22 April 1982, and for publication in Proceedings of the Workshop.

26. Consequences Associated with the Inhalation of Uncombusted Diesel Vapor, Kainz, Robert J. and Lu Ann E. White. Abstract for presentation at American Petroleum Institute, Washington, DC, 11-13 May 82, and for publication in Abstract and Proceedings.

27. Generation of Vapors by Partial Evaporation of Diesel Fuel, Kainz, Robert J., and Terry C. Lee. Abstract for Oral Presentation at American Industrial Hygiene Association, Cincinnati, Ohio, 11 June 82.

28. Neurotoxic Effect and Performance Deterioration Resulting from Uncombusted Diesel Vapor Inhalation, Kainz, CPT Robert J., and Lu Ann E. White. Abstract for Oral Presentation at Society of Environmental Toxicology and Chemistry, Arling, VA, 14-17 November 1982, and for publication in Abstracts.

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30. Article for US Medicine, by John N. Albertson, Jr., COL, MSC. Article for publication in US Medicine.

31. Persistence and Partition of Pesticides in Primary Sewage Sedimentation, Bausum, Howard T., and William H. Dennis, Jr. Abstract for Oral Presentation at Division of Pesticide Chem., American Chemical Society, Kansas City, MO, Sep 82, and for publication in Division of Pesticide Chemistry, ACS, Proceedings.

32. Biodegradation of 1,3 Dinitrobenzene, Mitchell, Wayne R. and William H. Dennis. For publication in Environmental Science and Engineering.

33. Kinetics and Products of Hydrolysis of 1,2-Dibromo-3-chloropropane (DBCP), Burlinson, N.E., Lee, L.A. and D. H. Rosenblatt. For publication in Environmental Science & Technology.

34. The Rowpu Prefiltration System: Removal of Microorganisms, Small, Mitchell J., Duncan, James B. and Paul H. Gibbs. Technical Report #8104.

35. Preparation of Kilogram Quantities of SEX and TAX: HMX and RDX Intermediates, Bedford, Clifford D., Rosenblatt, and Maria A. Geigel. Abstract for presentation at Explosives Safety Board Seminar, Norfolk, VA, 24-26 Aug 82.

36. A Comparison of Early Life Stage Effects and Histopathology with the Chronic Life Cycle Effects of 2,4 Dinitrotoluene on the Fathead Minnow (Pimephales promelas), Broich, S.G., van der Schalie, W.H., and W.R. Hartley. Abstract for Oral Presentation at the Society of Environmental Toxicology and Chemistry Third Annual Meeting, Arlington, VA, 18 June 1982.

37. Army Provides Vector Control Assistance, by Dr. James H. Nelson, with rewrite by LTC William H. Hames, Jr. Article for publication in Fort Detrick Newspaper "Standard."

38. Environmental Risk Assessment for Four Munitions-Related Contaminants at Savanna Army Depot Activity, by Dr. David H. Rosenblatt. Technical Report #8110.

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43. Mechanism of Oxidation of Trialkylamines by Ferricyanide in Aqueous Solution, Burrows, Elizabeth P. and David H. Rosenblatt. For publication in Journal of the American Chemical Society.

44. Pesticide-Laden Wastewater Treatment for Small Waste Generators, Dennis, William H., Jr. and Edmund A. Kobylinski. For publication in Journal of Environmental Science and Health, Part A.

45. Anaerobic Digestion of Lime Sludge, Kobylinski, Edmund A., and Bruce A. Bell, Associate Professor at George Washington University. Technical Report #8205.

46. Tertiary Treatment of Effluent from Holston AAP Industrial Liquid Waste Treatment Facility I. Batch Carbon Adsorption Studies: TNT, RDX, HMX, TAX, and SEX, by W. Dickinson Burrows. Technical Report #8207.

47. Preparation of Specific Selective Adsorbents for Pollutants in Wastewater, Kulkarni, Dr. R.K., and Ms. T. Trybus. Article for publication in MRDC Research Newsletter.

48. Options and Recommendations for a Polybromo-biphenyl Strategy in the Vicinity of the Gratiot County, Michigan Landfill, Rosenblatt, Dr. David H., Kaintz, CPT Robert J., and Appendix by George F. Fries, US Department of Agriculture, Beltsville, MD. Technical Report #8204.

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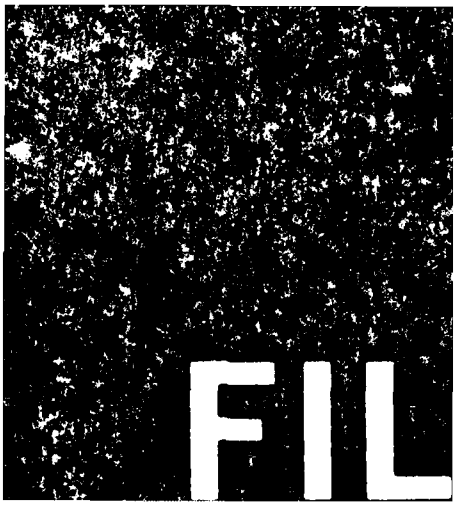
50. Malathion Susceptibility of Eggs and 1st-Instar Larvae of Callosamia promethea and Antheraea polyphemus, Miller, Thomas A. and Jerry Highfill. Article for publication in Journal of Economic Entomology.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