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CONTRACT NUMBER: DAMD17-85-C-5340

TITLE: Chemical Handling and Information for Drug Development System

PRINCIPAL INVESTIGATOR: Tommie G. Curtis

CONTRACTING ORGANIZATION: Herner and Company
Arlington, Virginia 22201

REPORT DATE: February 1992

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PREPARED FOR: Commander
U.S. Army Medical Research and Materiel Command
Fort Detrick, Frederick, Maryland 21702-5012

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13. ABSTRACT (Maximum 200) This contract was for support of the continuing operation of a large-scale, computer based chemical information system, for operation of a storage facility for receipt, storage, and shipping of chemical materials, and for the preparation of a camera-ready copy of a structure activity compendium. Approximately 269,000 updates were done to the information file, the chemical structures file was converted to new software, and 20,000 materials were shipped from the storage facility during the contract period. A 1,500 page compendium of antimalarial activity information was prepared that included 197 tables outlining unique chemical classes.				
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FOREWORD

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Jimmie D. Curtis 1-May-1996
PI - Signature Date

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*These Attachments contain discrete information and have been omitted from this revised report.

I. Introduction

This is a Final Report on Contract No. DAMD17-85-C-5340 encompassing the period October 1, 1985 to January 17, 1992. A cumulative listing of the activities and units of work accomplished under this contract can be found in Attachments I-1 and I-2.

Over the 27 years that Herner and Company has provided inventory and information services in support of this drug development program, research has been directed at counteracting drug-resistant strains of malaria, developing antiradiation drugs, chemical warfare agents, and antischistosomal agents. Emphases and priorities have shifted with time, but processes for acquisition of chemicals for testing, development of broad-based screening tests, and monitoring of candidate drugs from screening to pharmacological and clinical testing has remained a common theme.

The principal objective of this contract was the continuing operation of a large-scale, computer-based chemical information system under the direction of the research staff of the Division of Experimental Therapeutics at Walter Reed Army Institute of Research (WRAIR). This information system is being used for processing chemical, structural, biological, and inventory data on chemical compounds of interest to the WRAIR research staff, particularly those chemicals being tested in antimalarial and other drug development programs. During this contract period, a data review resulted in changes being made in the assignment of salt accessions to chemical structures and subsequent modifications to both the electronic and paper files. Problems were encountered with host based (VAX 11/780) software used for data entry, update, and retrieval which required the implementation of a temporary data entry system using a WANG VS 85 computer system at Herner and Company for weekly information input. By the end of the contract, this temporary system had been replaced with a new on-line data entry system on the VAX. In addition to weekly information processing, procedures were developed for creation of a chemical structure registration and searching

system using Molecular Design Limited (MDL) ChemBase and Molecular ACCess System software products. By the end of this contract period, the database contained 269,613 entries.

A second objective was the operation of the WRAIR Inventory Laboratory. The Laboratory receives, stores, and ships the physical samples and formulated drugs that are in the WRAIR inventory of compounds. During this contract period, the Inventory Laboratory was moved into new facilities at 601 Dover Road, Rockville, Maryland. This was accomplished with minimum interruption of required services. All required licenses and permits were obtained for the new location. In addition to materials normally received for processing, 150 compounds were received from DuPont, 3,340 compounds from Chevron Chemical Company and 8,700 samples from RIID for incorporation into the Inventory and Chemical Information systems. The Inventory Laboratory staff supported an ongoing TAP lotion study by providing labor for labelling and packaging 70,134 samples. The Laboratory staff prepared several lists of materials earmarked for disposal and arranged for removal of these materials from the facility after approval by the Experimental Therapeutics staff. Work was also initiated during this contract period on the replacement of wooden shelving with metal shelving units which provided approximately 40% more storage space within the existing facility. A project to add bar code bottle number labels to each sample and shelf location was begun.

A third objective during this period was the completion of a monograph describing the antimalarial drug development efforts of WRAIR. The author of this was Dr. Thomas Sweeney. One-hundred-ninety-seven tables outlining unique chemical classes of materials that had been tested were prepared. The camera-ready document was prepared using ChemBase/ChemText and WordPerfect 5.1. In a related activity, an index for a previously prepared Schistosomiasis Compendium was completed.

II. Chemical Information System

A. Compound Registration and Information System Updates

During the contract period, work continued in registration of new chemical structures and related information into the on-line Chemical Information System (CIS) located at WRAIR. New materials and their chemical data sheets were sent from WRAIR to the Inventory Laboratory. At the Laboratory, the information on the data sheet was compared with the physical sample to verify sample size, quantity, color, code numbers, and bottle number. Any discrepancies were clarified with WRAIR personnel, and information about storage location was added by Herner staff. The completed data was forwarded to the Herner chemical information section for assignment of compound number (Walter Reed Number) and entry of information into CIS. In order to assign Walter Reed Numbers, a staff chemist determined if the sample had been previously registered and assigned it the appropriate number or gave it a new number if it was a unique material to the system. These assignments were monitored for accuracy by another staff chemist. The chemical data sheet was given a final quality control review by a staff chemist before being given to the data entry staff for registration into the CIS. Copies of the completed sheet were made for the Inventory Laboratory and WRAIR, and the original data sheets were filed at Herner.

At the beginning of the contract period, the CIS was operational on a VAX 11/780 computer located in the Division of Biometrics, WRAIR. During the contract period, this system was updated to a VAX 8810. These computer systems and related peripherals and software were maintained by the Department of Biometrics, WRAIR staff. Early in the contract period, problems were experienced with the hard drives on the VAX resulting in some data losses. On December 9, 1985, the data entry programs Herner used to register information were missing from the system. To compensate for the loss, Herner re-implemented a Herner-developed WRAIR data

entry program on a WANG VS system located at Herner. After quality control review, the data was then transferred from the VS to the VAX via telecommunications for weekly processing by the CIS program. During the third year of the current contract, WRAIR and Herner staff developed, tested, and implemented a new entry system on the VAX. The system eliminated the requirement to upload the weekly data file from Herner. The new system used forms input screens that corresponded to information requirements for various "card" records utilized in the CIS. Documentation was prepared for staff training, and the implementation went smoothly. At the end of the contract period, the new system was still in operation.

During this contract period, 9,893 new compound data sheets were received. Data keying activities resulted in 235,777 records being keyed and 234,119 information system transactions processed during the weekly file updates.

In addition to the maintenance of electronic files, the Herner staff prepared index file cards for each new material registered. These cards were filed in three manual files. The first was ordered by bottle number, the second by Walter Reed Number, and the third by molecular formula. An additional set of files, ordered by bottle number, were maintained at the Department of Experimental Therapeutics, WRAIR. Each card included a chemical structure, bottle number, Walter Reed Number, molecular formula, name, and source information. At the beginning of the contract, cards were prepared on a specialized chemical typewriter. Because this equipment was reaching the end of its useful lifetime, a new method of generating cards was needed. Procedures were developed by Herner, using ChemBase (a product of Molecular Design Limited), to produce information in the proper form for generation of the cards. The information was keyed into ChemBase for card production and registration into the on-line structure registration system. This change increased staff efficiency and reduced re-keying efforts. Error corrections or information changes were done more quickly using ChemBase instead of the chemical typewriter. The new procedure used vendor supported software and hardware and

provided a long-term solution to project needs. Attachment I-3 illustrates an old card format and a new card format.

As part of the ongoing support Herner has provided to WRAIR on this project, the staff continually monitored the information system for errors. When found, the necessary changes were documented, reviewed by a senior staff member, clarified with WRAIR staff, when necessary, and implemented in the next update of the CIS. Examples of quality control projects include verification of all bottle numbers and Walter Reed numbers assignments, review of shipping records, and review of chemical structures.

Searching the CIS to provide information retrieval support for the WRAIR staff was an ongoing task for Herner staff during the contract period. The senior staff responded to 965 facsimile requests and 338 telephone or written requests for information searches. A total of 5,525 structures were searched in the manual files, electronic files, or other sources. The results of the searches were provided to the requester either by telephone, facsimile, or printed documents. Ms. Rose Levine of the Herner staff handled most of the information queries. Herner professional staff reviewed 107 proposal structures for the Fall Chemistry Board Meeting held in November 1985. By searching the current holdings, WRAIR was able to prevent duplication of materials already in the inventory and save the related costs on other contracts.

B. Chemical Structure Conversion to MACCSII

One of the major topics of the project team during this contract period was the review of all chemical structure records prior to registration into a new Molecular ACCess System (MACCSII) database. The MACCSII software product is a product of Molecular Design Limited (MDL). This product is a compound registration and retrieval system which permits duplicate checking, substructure searching and

information storage. Previously, chemical structures had been stored and searched using several different mechanisms. In the period prior to the beginning of this contract, problems had been encountered with the chemical structure system, and it was no longer working properly. Information about chemical structures had been archived for future registration into a new system.

During the first year of the contract, Herner staff developed a work plan to utilize the stored structures and convert them to files that could be registered to MACCS. MDL had developed ChemBase, a personal computer based product that permitted the storage of chemical structures and related information, ChemTalk, a communication program, and ChemHost, a VAX resident program used for registration to MACCS. The work plan required that existing chemical structure files be converted to ChemBase databases where the structures and related information could be reviewed and annotated or corrected. After quality control review, the databases could be registered to MACCS using ChemTalk to upload information from a personal computer to the VAX and ChemHost to register information into MACCS. MDL staff demonstrated these products at Herner facility on June 13, 1986.

In preparation for beginning the conversion, Mr. Edward Kelly attended a six-day MDL training class that reviewed the MACCS and DATACCS (a related program for information registration and management) software programs. Techniques for transferring structure data from Herner minicomputers to the WRAIR VAX were discussed, and VAX command procedures were written. The ChemBase data entry and data transfer forms were designed, and a test file was successfully transmitted from a personal computer to a VAX/ MACCS database. During the review of the MACCS product, it was noted that the following functionalities were not available: use of coefficients, ability to declare a valence, structure declarations (other than stereochemistry), registration of compounds of unknown structure (containing R or Z groups) and non-structured compounds. Four IBM/XTs were purchased for this

project and were operational on December 12, 1986. ChemHost was installed on the WRAIR VAX and operational on December 29, 1986.

During the first quarter of 1987, documentation of the input procedures for new chemical structures (i.e., new compounds not achieved from the previous chemical structure system) and text data were developed. Five 100 compound sets were processed and reviewed by WRAIR staff. Procedures were modified, where necessary. By the end of the quarter, 1,800 records had been keyed and reviewed. After finalization of input procedures, the Herner staff continued with input of the backlog structures and began review of 273 1,000-structure databases generated from previously registered structure archive files. The speed of the review process was increased by having chemists indicate structure corrections on printouts of each database, and submit the change sheets to data entry staff for keying. The corrected database was then reviewed by another chemist prior to registration in MACCS.

In the fourth quarter of 1987, WRAIR requested that a parallel structure database be constructed for use while the reviewed database was being prepared. The TEMPDB was constructed by registration of unreviewed ChemBase databases. The database was available for searching during the first quarter of 1988.

MACCS was updated to MACCSII during the first quarter of 1988. Some new functionalities were added, but the biggest gain was faster processing speed for registration and searching. The time to register 900 structures was reduced from 11 hours to 7 hours. Additional improvements in communications between Herner and WRAIR were accomplished during the 1988 contract year. A leased line was installed which provided dedicated 9600 bps service between the two facilities. This improvement further reduced the amount of time required for registration of completed databases.

After the initial review and registration of converted structures, further work was required to register materials that were considered duplicates of existing compounds by MACCSII, materials that had special problems such as undefined attachments, and materials for which exact structures could not be determined. Each of these classes required customized input methods. After registration was completed, the database was compared with compound information in the CIS to verify all compounds were represented in MACCSII. (Compounds were registered in MACCSII based on unique Walter Reed Numbers; a list of Walter Reed Numbers taken from MACCSII was compared with a list of Walter Reed Numbers from the CIS.) Missing compounds were added, other problems were resolved, and the comparison was repeated until the new MACCSII database was accepted as complete a representation of all chemical structures as possible with the existing software. At the end of 1990, the full database was available. At the end of the contract period, January 17, 1992, the database had 269,613 records.

C. Special Projects

During the early part of the contract, plans were implemented for microfilming all of the data sheets (approximately 332,000) in bottle number order. Initially, sheets in the series BK and BL were microfilmed. Plans were made to microfilm other sheets as funds became available.

In addition to the above activities, the Hermer staff participated in several special projects during the term of the contract. In the second quarter of year three, Chevron Chemical sent to WRAIR 3,340 compounds for screening. These new materials were registered into ChemBase databases, Walter Reed numbers and text were added, and the resulting databases were used for registration into the MACCSII database. File cards were prepared for each substance and CIS information was keyed. Similarly, 150 compounds from DuPont were processed into the information system. Procedures were developed using ChemBase to prepare monthly updates for

ICD (test systems EB and EC) which contain chemical structure information for all materials shipped to those test systems by WRAIR. This will reduce the need to re-key structures at ICD.

Beginning in October 1990, the inventory of chemicals previously stored by the Research Institute for Infectious Diseases (RIID) was transferred to WRAIR. Approximately 8,700 samples and related information were received in the form of a MACCSII database, electronic information exported from ORACLE tables, and many notebooks of paper information. The materials were processed into the inventory and CIS in two sets. Items for which there were actual samples were processed first so that they would be available for shipping to test systems. Items that did not have any materials available were processed as the second set. During the first phase, 1,037 samples from Pettit/Arizona State were found in the transferred material that had not been registered into the RIID inventory. A group of samples from Harmon from Michigan were also found that had not been processed into the RIID inventory. At the end of the contract period, these two sets of samples were awaiting additional information from the suppliers so that they could be processed.

III. Chemical and Drug Storage, Shipping and Distribution

A. New Inventory Laboratory Facility

At the beginning of the contract period, the Inventory Laboratory was located at 7801 Norfolk Avenue. Due to development activities in the nearby area and concerns about storage of chemical materials at that site, WRAIR requested that Herner find another, more suitable, location for the facility. A warehouse-type site, located at 2231-2235 Distribution Circle, Silver Spring, MD was investigated as a possible site. The site had two advantages. First, it is located in an industrial park and not in a heavily populated area and second, it is near WRAIR facilities at Forest

Glen. Lease negotiations were undertaken with Danac Associates to obtain 5,200 square feet in the warehouse area. Plans were made to begin the required buildout improvements to make the space suitable for the Inventory Laboratory. However, before the deal could be completed Danac Associates went out of business and sold the property. Negotiations with the new owner were not successful.

A new site was found at 601 Dover Road. Negotiations and planning were repeated for this site. Plans for a move to the Dover Road site were finalized and approved by the Contract Officer during January 1987. A lease was signed on February 2, 1987. All leasehold improvements, installation of a security system, and installation of a fire suppression system were scheduled to be completed within 45 days from that date.

Refrigerators and freezers were moved from the old site on March 6 and March 13. Moving of shelving and chemicals was initiated on March 17. This process required the moving of materials from the shelves at Norfolk Avenue, packing into boxes, dismantling shelving at Norfolk Avenue, and installation of the shelving at Dover Road. Shelving materials from Norfolk Avenue were reused whenever possible. After reassembly, the chemicals were replaced on the shelves at the new site. This process was scheduled to take place during a 60 day period. The relocation was completed on May 31, 1987.

During the fourth contract year, Herner developed plans to begin replacing all the wooden shelving in the Inventory Laboratory facility with metal shelving. This was done to reduce the amount of combustible materials in the storage space, to reduce chemical odors associated with the absorption of substances by the wooden shelving, and to increase the amount of available storage area for samples. This replacement was done in stages, as funding was available, and was still in progress at the end of the contract period. A full inventory of stored materials was done at the same time.

B. Inventory and Shipping Activities

During this contract period, the Inventory Laboratory continued normal receipt, storage, and shipment activities. Regular inventory increased by 9,663 samples and hand inventory by 145 samples. Returned samples accounted for 1,922 additions. Five-thousand-eight-hundred-thirty-eight empty bottles were removed from the shelves. Weekly sample shipments resulted in 19,658 materials being sent from the Inventory Laboratory to various test systems and investigators. Of all shipments, 3,124 were priority shipment requests and 759 were from hand inventory.

During this contract period, a project to add bar code bottle numbers to each sample and shelf location was started. All new samples automatically received bar code labels. Other materials were labelled when time permitted. Labels were ordered and installed for shelf locations Z, Q, W, F and R. Bottle labels were ordered for Z and Q sections. The labels were color coded with a strip to aid in differentiation of discreet and non-discreet samples.

C. Special Projects

The Inventory Laboratory staff participated in several special projects, in addition to moving the facility from one site to another, during this contract period. Early in the contract period, a complete sample inventory was done by comparing computer records with actual samples. Changes in shelf location were submitted for the weekly CIS update. During this review, lists of materials earmarked for disposal were generated and sent to the Contract Officer Technical Representative (COTR). Disposal of materials was done in several groups of samples in order to fit within allocated funding. A list of large quantity items that were candidates for disposal was sent to the COTR on September 30, 1990. A review of controlled substances stored at the facility was done, and a Class V safe was purchased for storage of regulated substances.

As part of an ongoing quality control check of receipt, inventory, and shipping records, the Inventory Laboratory staff discovered some problems with the CIS system. Along with the WRAIR staff, these "bugs" were corrected, and the inventory system was updated with necessary information.

The staff processed several sets of samples provided to WRAIR from outside sources. One-hundred-fifty materials were received from DuPont, 3,340 samples from Chevron, and 8,700 samples from RIID. The materials from RIID were incorporated in the WRAIR inventory when the RIID storage contract was not extended, and their storage operations were incorporated into the WRAIR facility. All of these materials required assignment of a bottle number, a Walter Reed Number, and a shelf location. All were entered into both the chemical structure system and the CIS.

One of the major projects of the Inventory Laboratory staff was to support the efforts of WRAIR for a study of TAP lotion. The staff stored the samples, applied bottle labels, and packaged the materials for shipment. By the end of the contract period, 70,134 bottles had been processed.

IV. Publication of Drug Compendium

A. Preparation of an Antimalarial Compendium

(In this revised report discrete information has been omitted in Attachments III-1 to III-4.)

During this contract period, a two volume compendium entitled *A Survey of Compounds from the Antimalarial Drug Development Program of the USAMRDC* by Dr. Thomas Sweeney was assembled and ready for publication. Dr. Sweeney, with the help of Herner staff, assembled information concerning 197 tables of chemical compounds representing 62 chemical classes. Attachment III-1 is the Contents, Tables listing, and Chemical Classes listing from the document. The main purpose of this compendium was to present compounds and associated test data that were studied in

the U.S. Army Medical Research and Development Command, Malarial Research Program, initiated in 1963. The compendium contained data from 18 major test systems that were supported by the Command. This testing program was the largest effort to find and develop antimalarial drugs that was ever attempted, as stated by Dr. Sweeney in the Preface to the compendium (Attachment III-2).

The selection of compounds for inclusion in the compendium was done by designation of a chemical class of interest, searching the chemical structure database to find all compounds to be included in the class and sorting of compounds into groups of similar structures. Once a material had been selected for inclusion, biological data was retrieved from the CIS and other sources, such as reports and private conversations with test system investigators. Calculations were done to present information in standard format. Structure-activity tables were prepared showing chemical structure, attached groups and biological test data. Throughout this process, structure searches continued to add new compounds to the tables, tables were revised and restructured, and new data was obtained from testing sites. Compounds for which test data could not be found were dropped from the final tables.

Attachment III-3 is an example of text from the compendium. Each section references tables of chemical structures and data. Examples of tables can be seen in Attachment III-4. Two types of tables were prepared. A two page format, is illustrated by Table 1, which has sections on both the left and right hand sides of the open document and a single page format, as seen in Table 6, with all information on one page. An example of the document index by Walter Reed compound number with reference table number can be seen in Attachment III-5.

WordPerfect 5.1 was used for text keying, table preparation and document formatting. Encapsulated Postscript graphics files for the chemical structures were prepared with ChemText (a product of Molecular Design Limited) and imported into WordPerfect. Ms. Louanne Marinos keyed and formatted the document text, and Ms.

Moo Kang drew the chemical structures and prepared all the tables. Ms. Kang also prepared the camera-ready copy for the final document.

At the end of the contract period, all camera-ready copy was completed, backup of all electronic files had been done, and the materials were ready for publication. Six review copies were sent to WRAIR. Funding for final document publication had not been allocated by USAMRDC. The camera-ready copy was in storage at Herner at the end of the contract period.

B. Preparation of an Index for a Schistosomiasis Compendium

During the early part of this contract, work continued on preparation of an index from a previously completed Schistosomiasis Compendium. The index terms (approximately 17,000 records) were compared to the structures listed in the compendium for missing or incorrect molecular formulas and/or Walter Reed compound numbers. Upon completion, the compendium index was given to Walter Reed for publication.

V. Conclusions

The work just completed under this contract continues to be very important in the continuing mission of the Department of Experimental Therapeutics, WRAIR. Herner and Company has been very pleased to work with the WRAIR staff to provide continuing support for their very important efforts in the protection of the soldier. We are also pleased to have had the opportunity to aid them in the continuing evolution of the Chemical Information System into a system that uses state-of-the-art software and hardware and in ongoing efforts to provide sample inventory and shipping operations. We look forward to continuing this partnership in the future.

Attachment I-1

WORK ACCOMPLISHED DURING CONTRACT PERIOD

Units of Work

	Cumulative
<u>Chemical and Drug Storage, Shipping and Distribution</u>	
New Samples Received	
Regular Inventory	9,663
Hand Inventory	145
Returned Samples Processed	1,922
Samples Shipped	
Shipment Orders Received	19,658
Samples Shipped to Test Systems	19,658
Priority Shipment Orders	3,124
Samples Shipped from Hand Inventory	759
Inventory Maintenance	
Empty Bottles Removed from Shelves	5,838
Special Projects: Laboratory TAP	70,134
<u>Chemical Information and Inventory Control</u>	
Compound Registration	
New Data Sheets	9,893
Data Sheets Processed	9,890
Number of Copies	113,212
Number of Microfilm Images	12,133
Information Processing	
Data Keyed/Edited for Weekly Update	235,777
Transactions for Inventory File	234,119
Information Retrieval	
FAX Requests	965
Written or Telephone Requests	338
Structures Searched	5,525
Special Projects: Chemical Information MACCSII Conversion	269,613

Attachment I-2

CUMULATIVE DIRECT LABOR HOURS EXPENDED

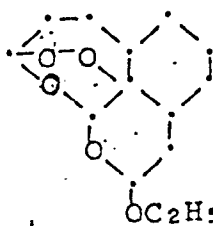
Labor Category	Professional	Clerical
Data Sheet Processing	2,335	522.5
Proposal/Catalog Processing	35	0
Manual Searches	366	0
Computer Searches	175.5	0
File Maintenance: Manual	2,503	2,771
File Maintenance: Inventory	2,415.5	4,051.5
File Maintenance: Chemistry	8,477.25	13,998.75
Data Keying/Editing	0	10,102.75
Special Projects: Chemical Information		
RIID	2,015.5	449.25
MACCSII	2,723	5,220.75
Schistosomiasis Publication	113	491
Antimalarial Publication	11,266.5	1,367.5
Messenger Service	0	6,489.5
Laboratory Maintenance	3,121	10,963
Shipping of Chemical Samples	506	5,680.25
System Support	5,151	7
Supervision and Management	12,852.5	0
Manuals and Documentation	322	1
Reports and Meetings	2,297.5	280
Training	827.5	876.5
Other Labor Categories	3,462.25	1,142.25
TOTAL	60,965	64,414.5

Attachment I-3

FILECARDS

Old Style Made with Chemical Typewriter

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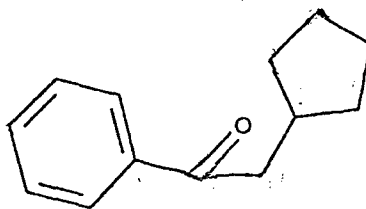
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Attachment III-1*

CONTENTS, TABLES LISTING AND CHEMICAL CLASSES

FROM

A SURVEY OF COMPOUNDS FROM THE ANTIMALARIAL DRUG DEVELOPMENT

PROGRAM OF THE USAMRDC

*This Attachment contains discrete information and has been omitted from this revised report.

Attachment III-2*

PREFACE

FROM

A SURVEY OF COMPOUNDS FROM THE ANTIMALARIAL DRUG DEVELOPMENT

PROGRAM OF THE USAMRDC

*This Attachment contains discrete information and has been omitted from this revised report.

Attachment III-3*

EXAMPLE OF TEXT

FROM

A SURVEY OF COMPOUNDS FROM THE ANTIMALARIAL DRUG DEVELOPMENT

PROGRAM OF THE USAMRDC

*This Attachment contains discrete information and has been omitted from this revised report.

Attachment III-4*

EXAMPLES OF TABLES

FROM

*A SURVEY OF COMPOUNDS FROM THE ANTIMALARIAL DRUG DEVELOPMENT
PROGRAM OF THE USAMRDC*

*This Attachment contains discrete information and has been omitted from this revised report.

Attachment III-5

EXAMPLE OF WALTER REED NUMBER INDEX

FROM

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PROGRAM OF THE USAMRDC*

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PROJECT STAFF LIST

Ram Agarwal
Gene Allen
Alice Austin
Mozelle Bagley
Joe Brown
Andrew Callander
Mary Callander
Ruth Christie
David Clausen
Calvin Curtis
Tommie Curtis
William Embry
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Maria Puente
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Indrauadan Shah
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Rene Stein
Thomas Sweeney
Nina Varehenidze
Herbert Williams
Gregory Wilson
Molly Wolfe



DEPARTMENT OF THE ARMY

US ARMY MEDICAL RESEARCH AND MATERIEL COMMAND
504 SCOTT STREET
FORT DETRICK, MARYLAND 21702-5012

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MCMR-RMI-S (70-1y)

21 Apr 97


MEMORANDUM FOR Administrator, Defense Technical Information
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SUBJECT: Request Change in Distribution Statement

1. The U.S. Army Medical Research and Materiel Command has reexamined the need for the limitation assigned to technical reports written for Contract Number DAMD17-85-C-5340. Request the limited distribution statement for Accession Document Number ADB215738 be changed to "Approved for public release; distribution unlimited." This report should be released to the National Technical Information Service.

2. Point of contact for this request is Ms. Judy Pawlus at DSN 343-7322.

FOR THE COMMANDER:


GARY A. GILBERT
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Information Management