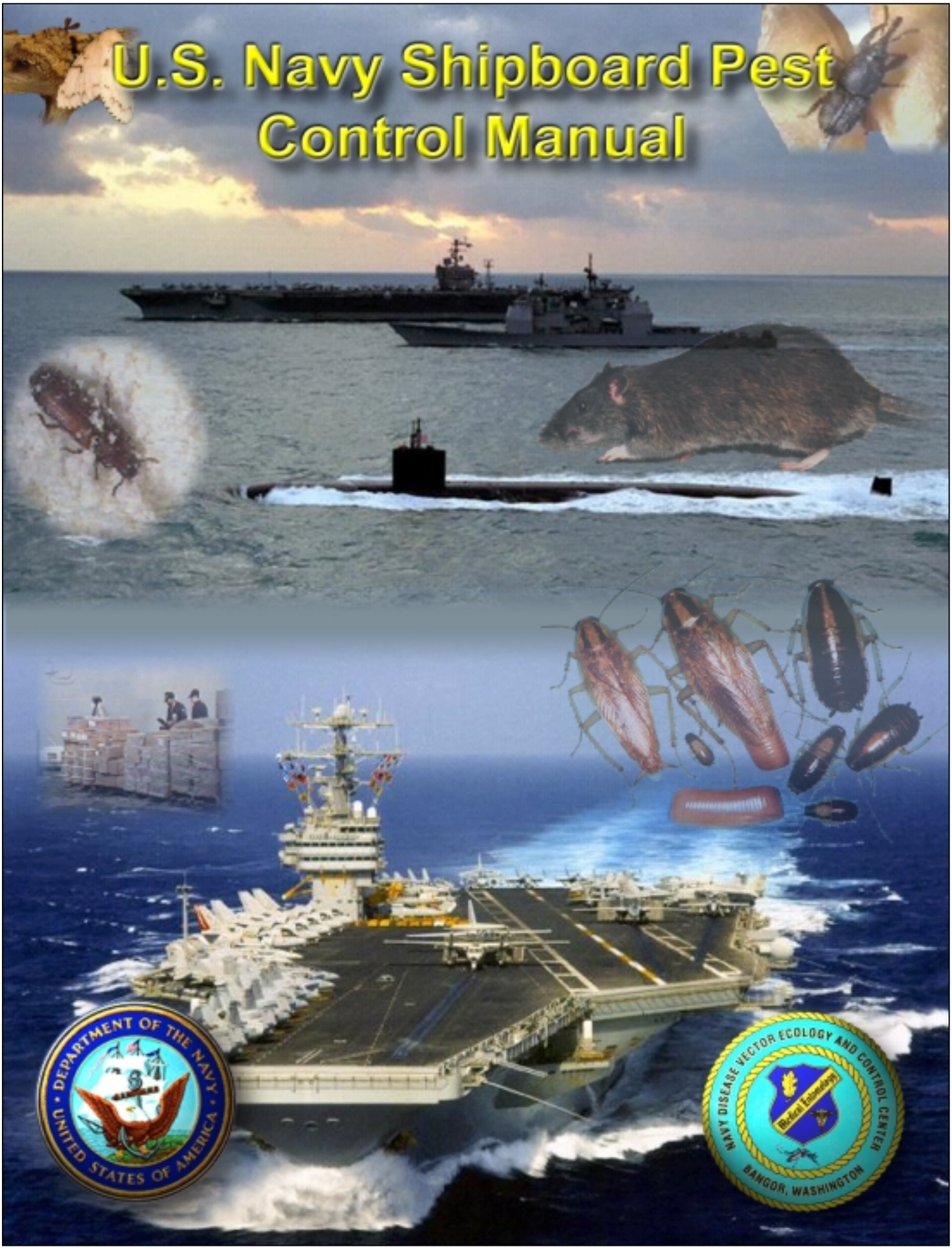
U.S. Navy Shipboard Pest Control Manual



U. S. NAVY SHIPBOARD PEST CONTROL MANUAL

Reviewed and approved by:

CDR J. A. CORNEIL, USN
Officer In Charge, NDVECC, Bangor, WA

June 12, 2000

PREFACE

This manual is the result of coordinated efforts to revise a multitude of related DoD and Navy shipboard guidelines, while widely recognizing the need to update the 1986 “Navy-wide shipboard pest control manual.” The intent of this revised manual is to provide current and effective guidance for the surveillance, exclusion and control of disease vectors and invasive pest species, which may threaten the health and safety of personnel aboard U.S. naval vessels, or be transported between U.S. and foreign shores.

At the date of publication of this manual, every effort has been made to reference the most currently signed written guidance. Additional relevant references are under revision, and will be included in the next version of this manual.

The following individuals and institutions are gratefully acknowledged for their efforts in compiling this edition of the “U.S. Navy Shipboard Pest Control Manual”:

HMC C. Purdin initiated a first working draft from the 1986 version. Dr. W. Tozer, provided significant changes and updates to design, organization, content and formatting, and served as formal editor for earlier drafts through the final copy. The following individuals provided valuable suggestions or significant modifications to various working drafts: CDR M. Mann, CDR R. Jacobs, CDR J. Corneil (also cover design), LT C. Stoops, LT P. Obenauer, HMC S. Berry, HM1 M. Elam, HM1 J. McLearie, HM2 J. Mueller, HM2 J. Church (NDVECC, Bangor); LCDR S. Cope (NEHC, Norfolk, VA); LCDR S. Rankin (NEPMU-2, Norfolk, VA); LT M. Smith (NEPMU-7, Sigonella, Italy); CDR M. Beavers, LCDR S. Presley, LT T. Negus, Dr. A. Beck (NDVECC, Jacksonville). CDR M. Bangs, (NAMRU-2, Jakarta, Indonesia) provided an especially exhaustive and invaluable review of a later draft version. Mr. G. Walker, Defense Supply Center, Philadelphia, PA, kindly offered his expertise and assistance in revising the stored products pest section, including Table 2-1.

Through liaison with Dr. M. Mullen, Ms. B. Waters, USDA, ARS – U.S. Grain Market Research Lab, Manhattan, KS, generously provided much appreciated lab reared, live stored products pest specimens for digitally captured images.

For permission to use: figs. 2-1, 2-2, C. Ogg, L.Schulze, and J. Kalisch, Univ. Nebraska – Lincoln; figs. 2-23 through 2-25, and 2-27 through 2-29, Courtesy of the Central Science Laboratory, U.K.; fig. 2-37, HMC Knapp; fig. 5-1, P.A. Grove, the Whitmire Micro-Gen Research Laboratories, Inc; figs. 2-26, 2-31 through 2-33 and Appendix E, U.S. Public Health Service, CDC, Atlanta, GA.

Figs. 2-3 through 2-11; figs. 2-12, 2-21, and 2-22 digitally captured from U.S. Navy photos/films and figs. 2-13 through 2-20; figs. 2-35, 2-36 and 2-38 through 2-40, Appendix F (lice photos), Dr. W. Tozer, NDVECC, Bangor, WA.

DISCLAIMER

Trade names are used in this manual to provide specific information and do not imply endorsement of the products named or criticism of similar ones not mentioned. Mention of trade names does not constitute a guarantee or warranty of the products by the Navy Disease Vector Ecology Control Center, Bangor, the Military Services, or the Department of Defense (DoD).

TABLE OF CONTENTS

Preface I

Disclaimer ii

Chapter 1 Overview of the U.S. Navy Shipboard Pest Control Program
Introduction 1
Responsibilities 1
Education and Training Requirements 3

Chapter 2 Shipboard Pests
Introduction 5
The German Cockroach 5
Cockroach Control Aboard Surface Ships 11
Cockroach Control Aboard Submarines 15
Stored Products Pests (SPPs) 16
Rodents 30
Miscellaneous Shipboard Pests 36

Chapter 3 Quarantine Issues
Background 43
U.S. Navy Vessels Entering U.S. Ports 44
U.S. Navy Vessels Entering Foreign Ports 45
Pierside/Onloading Inspections of Infestible Products 46
Rodents and Rat Guards 46
Deratting/Deratting Exemption Certification 46

Chapter 4 Records and Reports
The Pest Control Log 49
Personnel Records 49
Materiel Inventory Records 49
Pierside/On-Board Inspection Records 49
Deratting/Deratting Exemption Inspection Certificate Records 49
Courtesy Technical Assistance Visit/Informal Survey 49
Pesticide Use Records 49
Pesticide Use 50
Infested Products 50

Chapter 5 Pesticides
Pesticide Label 53
Pesticide Safety 54
Medical Examinations and Cholinesterase Testing 56

Personal Protective Equipment (PPE).....59
Procurement of Pesticides and Pesticide Dispersal Equipment.....60
Pesticide Storage 60
Pesticide Mixing and Spills 61

Chapter 6 Pesticide Dispersal Equipment
Aerosol Container Pesticide Dispersal Unit.....63
Hand-Compressed Air Sprayer 67

Appendix A Authorized Shipboard Pesticide List 73

Appendix B Pest Control Equipment and Supplies.....75

Appendix C Personal Protective Equipment.....77

Appendix D Technical Information Memorandum 38: Protecting Meal, Ready-to-Eat Rations (MREs) and Other Subsistence during Storage (Selected Pages) 79

Appendix E Navy Shipboard Pest Control Training Centers.....89

Appendix F Taxonomic Keys to Some Common Shipboard Pests 91

Appendix G MIL-STD-904B 103

Appendix H DD Form 1222: Instructions, Blank and Sample Forms 121

Appendix I NAVSUP P-486 Volume 1 Food Service Management 5301, Hazardous Food Items (Selected Pages)..... 125

Appendix J DoD Hazardous Food and Nonprescription Drug Recall System (NAVSUPINST 10110.8C, Selected Pages)..... 135

Appendix K Maritime Health Declaration Form 141

Appendix L Sample Deratting/Deratting Exemption Certificate..... 143

Appendix M Ship's Pesticide Inventory and Pierside Inspection Log Entry Samples..... 145

Appendix N Recording and Archiving Pesticide Use During Military Operations Memorandum, DASN (I & E) 147

Appendix O Instructions for the Use of the Pest Management Use Record, DD Form 1532-1..... 149

Appendix P Pest Management Use Record, DD Form 1532-1 (Blank) 155

Appendix Q **Sample Pest Management Use Record, DD Form 1532-1 (Sample)** 157

Appendix R **References** 159

CHAPTER 1
OVERVIEW OF THE U.S. NAVY SHIPBOARD PEST CONTROL PROGRAM

INTRODUCTION

This manual outlines DoD, OPNAV and BUMED policies and procedures, defines responsibilities, and provides detailed guidelines for the U.S. Navy Shipboard Pest Control Program. The information contained herein is the combined effort of Navy Medical Entomologists and Preventive Medicine Technicians to provide a "ready reference" to assist you in conducting a safe and effective program utilizing the concepts of integrated pest control. Your diligence in detecting potential problems and monitoring control measures is essential. However, controlling pests aboard naval vessels requires the cooperative effort of all hands in maintaining good sanitary standards in workspaces, berthing and common use areas.

RESPONSIBILITIES

The Commanding Officer of a Navy vessel must ensure the Senior Enlisted Medical Department Representative (MDR) and hospital corpsmen responsible for pest control are certified in shipboard pest control. Responsible corpsmen must establish and maintain a safe and effective program for controlling insects, rodents, and other pests that may affect the health and well-being of ship's personnel, lead to loss of materiel, or affect the deployment status of vessels.

The Senior MDR ensures an ongoing shipboard pest control program is maintained. The main elements of an effective program are:

- Rodent Control: Maintaining a current Deratting/Deratting Exemption Certificate and an effective rodent exclusion program.

- Fumigation and Commercial Contracts: Prohibiting fumigation of ships' spaces and prohibiting commercial contracts for pest control services aboard ship, unless specifically approved in writing by a Navy Medical Entomologist.

- Procurement of Pesticides, Pesticide Dispersal Equipment, and Personal Protective Equipment (PPE): Ensuring all pesticides (Appendix A), pest control equipment (Appendix B), and PPE (Appendix C) have been approved for use aboard naval vessels by BUMED. A Navy Medical Entomologist must be contacted to receive approval for the procurement of non-standard stock pesticides.

- Meals Ready to Eat (MREs): Maintaining a control program for MRE rations, to prevent materiel loss from pest infestations (Appendix D).

- Inspections: Conducting ongoing pierside food acceptance inspections and shipboard pest surveillance (every two weeks, or more often if necessary, as part of food sanitation inspections) to identify the presence of any pest species, including source locations and severity of the infestations. Evaluating the effectiveness of control measures through follow-up post-treatment surveys.

- Sanitation: Recommending appropriate sanitation procedures to exclude or eliminate shipboard pests.

- Pesticide Safety: Conducting and supervising safe pest control operations as outlined under current BUMED instructions, including:

    - Personal Protective Equipment (PPE): Coordinating with the Respiratory Protection Officer and Safety Officer to ensure appropriate National Institute for Occupational Safety and Health (NIOSH) approved pesticide respirators are readily available for use (see Chapter 5).

    - Respiratory Protection Program: Ensure that all personnel who perform pest control operations are adequately trained in respiratory protection and respirator use, medically evaluated, and are receiving annual respirator fit-testing.

- Medical Surveillance: Coordinating laboratory testing and monitoring of required long-term medical surveillance procedures for shipboard pest control specialists.

- Material Safety Data Sheets (MSDSs): Maintaining MSDSs for all pesticides stored or used aboard ship.

- Record Keeping and Reporting: Maintaining an ongoing pest control log, which adequately documents pest control procedures and shipboard pest control training conducted aboard ship. Meeting mandated external reporting requirements, including documentation of pesticide use.

- Regulations and Program Guidance: Maintaining a basic reference library of written regulations and program guidance. A general list of current references covering pest control is provided in Appendix E.

- Vessels with no assigned MDR shall obtain technical consultation and assistance from their cognizant preventive medicine personnel or the NDVECC or NEPMU.

Navy Medical Entomologists assigned to Navy Disease Vector Ecology and Control Centers (NDVECCs) and Navy Environmental and Preventive Medicine Units (NEPMUs) oversee the shipboard pest control program. This oversight is achieved by:

- Providing guidance, on-site consultation, technical assistance, and recommendations to fleet commands on all matters relating to shipboard pest control. Commands requesting pest control services are responsible for adequately preparing spaces for treatment with pesticides and must provide post-treatment clean up.

- Conducting education and training of selected personnel for certification as shipboard pest control specialists, following procedures outlined in BUMEDINST 6250.12C.

- Reviewing and evaluating all pest control procedures, pesticides, pesticide dispersal equipment, and new technologies before approval for shipboard use.

EDUCATION & TRAINING REQUIREMENTS

Medical Department

Personnel responsible for pest control operations must be certified to conduct shipboard pest control operations by attending and successfully completing the Shipboard Pest Control Course (CIN: B-322-1075). Ship's stewards or other personnel assigned pest management responsibilities on Military Sealift Command (MSC) ships may also be certified. Personnel of the Medical Department of the U.S. Coast Guard may be trained and certified in shipboard pest control.

Mess Control Specialists, Watch Captains, Mess Deck Masters-At-Arms, And Break-Out Or Cargo personnel ***not assigned to MSC ships*** should be encouraged to attend shipboard pest control training to increase their understanding of sanitation practices related to shipboard pest control, pest recognition, and proper preparation of spaces before and after pesticides are applied. ***Although these personnel will not receive certification***, they may assist the MDR in applying pesticides, when directly supervised by certified personnel.

Certification Training consists of one day of classroom (didactic) instruction and one-half day of field training aboard a ship or vessel. Classroom training is conducted under the supervision of a Navy Medical Entomologist currently certified as a DoD Pesticide Applicator in Category 8. A written examination with a minimum passing score of at least 70 percent must be achieved.

Classroom topics consist of:

Subject	**Hours**
Course Introduction and Administrative Requirements.....	0.75
Program Responsibilities and Training.....…...0.25	
Biology, Surveillance and Control of:	
• Cockroaches	
• Stored Products Insects,	
• Rodents	
• Miscellaneous Shipboard Pests.....…….....	2.50
Quarantine Issues.....	1.00
Pesticides	
• Recording and Reporting Pesticide Use	
• Safety, Health & Personal Protective Equipment	
• Pesticides & Pesticide Dispersal Equipment - Use and Procurement.....	2.50
Review and Examination.....	1.00
Total Classroom Hours.....	8.00

After ship's personnel have completed the classroom portion of the course, the MDR may schedule the field training directly with the course's lead instructor or through the training department of the cognizant NDVECC or NEPMU. The requirement for field training aboard a vessel should be completed no later than 1-week after the classroom phase. A certificate of completion will not be issued until both phases of training are completed.

Annual training is required to retain certification.

Classes are routinely conducted by the NDVECCs and NEPMUs. Information on class convening dates and quotas can be obtained by contacting these activities (Appendix E).

CHAPTER 2
SHIPBOARD PESTS

INTRODUCTION

Global presence and the increased operating tempo of naval forces greatly increase the chances of encountering pests that transmit pathogens, infest food supplies, or simply present a nuisance to crew members. This manual concentrates on the biology, surveillance, and control strategies of pests that are commonly found aboard ships. Taxonomic keys to common pests are presented in Appendix F. These pests are prone to inhabit certain areas, making continual monitoring important for the following spaces:

- Food service areas.
- Sculleries.
- Mess decks.
- Ship's stores (e.g., soda storage areas).
- Snack areas.
- Heads and showers.
- Dry provision storage areas.
- Berthing areas.
- Laundry and dry-cleaning shops.
- Cleaning gear locker.
- Garbage collection areas.

THE GERMAN COCKROACH

Importance

The German cockroach, Blatella germanica, is the most commonly encountered pest aboard Navy ships. Cockroaches contaminate food and food preparation areas, and lower crew morale. The construction characteristics of naval vessels make cockroach control very challenging. Abundant standing water, food, warmth, and numerous potential harborages provide the cockroach with an ideal habitat for growth and survival. Their habits and body structure enable them to potentially transmit pathogens that cause dysentery and diarrhea. Cockroaches also impart a foul odor where infestations are well established. Their presence indicates inadequate sanitary practices or ineffective cockroach control measures. Medical Department personnel must understand the biological characteristics of German cockroaches to provide an effective control program.

Biology

The German cockroach (Fig. 2-1a, b, c) is a small, flattened, light brown insect which can be easily identified from other cockroaches (Fig. 2-2) by the presence of two dark longitudinal stripes behind the head (“Lieutenant’s bars”). Adult German cockroaches are approximately one-half inch long. Adult female cockroaches produce a visible egg capsule (called an ootheca) located at the tip of the abdomen (Fig. 2-1b, d). The egg capsule protects the developing 30-40 eggs until they are ready to hatch. Gravid females may carry the egg capsule up to three

weeks, until the eggs are within 24 hours of hatching. The young cockroaches, are called nymphs and look very similar to the adults. The nymphs shed their skins (molt) several times as they mature. As this process continues, they gradually develop wings and increase in size. Depending upon environmental factors (temperature, moisture, food supply), nymphs will fully mature in 40 to 60 days. The adults are characterized by functional wings and sexual maturity. Adults can live up to one year and a single female is capable of producing up to six egg capsules during her lifetime.

German cockroaches require food, water, warmth, and harborages (cracks and crevices usually less than 1/2-inch wide) for growth and survival. Their flattened bodies enable them to hide in tight places that are warm and dark. Even though their exoskeleton is covered with a thin, water-resistant waxy coating, they are especially intolerant of dry areas and will instead be found close to available sources of water. German cockroaches are nocturnal and gregarious in habit. Typically, the cockroach spends approximately 80 percent of the time in the harborage and the remaining 20 percent foraging within a few feet of an established harborage. Studies have shown cockroaches prefer to have their body pressed against a solid surface in small cracks and crevices (positive thigmotaxis).

Fig. 2-1. German cockroach (Blatella germanica). a = male; b = female; c = nymph; d = egg capsule.

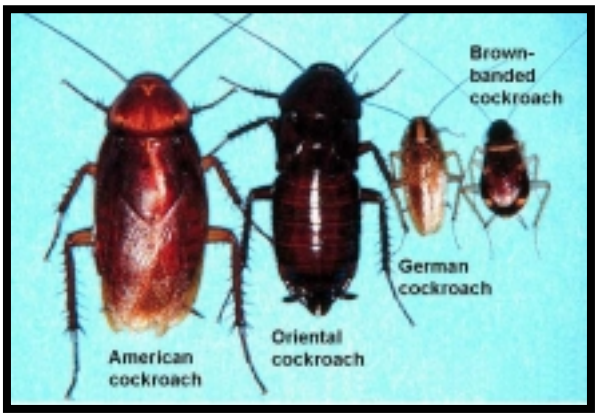


Fig. 2-2. Comparison of some common household cockroaches.

Surveillance Procedures

A visual inspection for cockroach harborages is an essential part of a successful control program. Early identification of sites of cockroach infestations will reduce the need to apply pesticides by eliminating the breeding sources. Frequent inspections are especially important, because light infestations usually go unnoticed by ship's personnel until the infestation becomes more difficult to control.

Cockroaches normally forage in darkness. Therefore, if cockroaches are seen in lighted conditions, it may indicate (1) that an extremely large population exists in overcrowded harborages, resulting in overflow into the ship's spaces, or (2) that a harborage has been disturbed, causing the cockroaches to disperse. Additionally, the presence of immature and adult cockroaches in the same harborages often indicates a well-established infestation.

Cockroaches may also be located in areas not normally surveyed and the infestation may quickly increase unnoticed. The goal of cockroach control will be met only when all harborages are located and properly treated or eliminated.

The shipboard pest control specialist should conduct a cockroach survey ***every two weeks in food service areas, and weekly until cockroaches are no longer present***. Infestations are most likely to be in and around:

- Steam lines.
- Cable bundles
- Berthing
- False bulkheads, overheads, and splash boards.
- Lagging and torn insulation.
- Behind pictures and bulletin boards.
- Around holes for plumbing and electrical lines.
- Behind drawers.
- Around iron supports of counters and serving lines.
- In hollow furniture and utility legs (e.g., refrigeration and heavy equipment supports).
- Oncoming food stores (e.g., bagged onions, potatoes), soft drink containers, and cardboard containers.
- Ovens and oven hoods.
- Motor housings, esp., in refrigeration units, ice cream machines (Fig. 2-3).

Fig. 2-3. Ice cream machine and motor housing.

- Deck drains (Fig. 2-4).

Fig. 2-4. Deck drain.

- Sinks and drains (Fig. 2-5).

Fig. 2-5. Deep sinks.

- Steam kettles (Fig. 2-6).

Fig. 2-6. Steam kettles.

- Behind stainless steel plates and ventilation grating (Fig. 2-7).

Fig. 2-7. Ventilation grating.

- In expansion joints and under pipe insulation (Fig. 2-8).

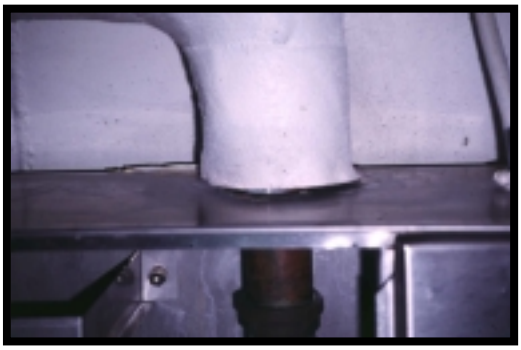


Fig. 2-8. Potential harborage under pipe insulation.

- Inside electrical switch, fuse box, and valve junction panels (Figs. 2-9, 2-10).

Fig. 2-9. Breaker panel.

Fig. 2-10. Valve junction panel.

- Unsecured debris (Fig. 2-11).

Fig. 2-11. Unsecured packing material.

Often the pest control specialist must stoop and crawl to locate harborages. The presence of cockroach feces is a good indication of an active or past cockroach population. Cockroach feces appear as small, straw-colored to reddish-dark brown dots near harborages and infested containers.

Special inspection techniques are necessary to locate cockroach resting sites and harborages. A flashlight is essential when searching for cockroach harborages in dark or dimly lit areas. A screwdriver is also needed to remove screen guards and motor housing covers (Remember to disconnect power to the motor before removing the housing). Replace guards and housings after inspection. Request assistance from engineering department personnel, when necessary.

Flushing Agents

Flushing agents are useful in locating cockroaches and their harborages. Flushing agents consist of an aerosol pesticide formulation of synthetic pyrethroids, such as D-Phenothrin (Appendix A). Spray a small amount of flushing agent into potential harborages using the tip extender on the aerosol can and observe the area for 3 to 5 minutes for cockroach activity. Flushing agents will produce a quick response, if cockroaches are present. The best technique is to spray all suspected harborages in a specific area and then return to the first harborage sprayed and look for any cockroach activity (use a flashlight, if necessary). Because of its repellent properties, do not apply d-phenothrin around bait stations or

surfaces treated with boric acid aerosol dust.

Use caution in areas with electrical or fire hazards and never spray food preparation surfaces or equipment. Food cannot be prepared, served, or consumed during pesticide application. When using a flushing agent during pierside receipt inspections, avoid spraying the agent directly on food or food packages.

Cockroach Traps

Cockroach traps (either toxic or nontoxic) are useful survey tools to detect low-level populations, locate harborages, and determine the effectiveness of treatment. Trapping alone will not eliminate an infestation.

Traps may consist of a rectangular box, a glass jar, or similar container which holds an attractant (e.g., manufacturer supplied bait, slice of banana, fresh bread) to lure the insect into the trap. Spread an ***extremely thin*** layer of petroleum jelly just under the inside opening of the jar trap to prevent cockroaches from leaving the container.

Place traps near suspected harborages and allow them to remain in place for at least 24 hours. Place traps in the same locations each time. For best results, place them in dark areas along bulkheads or in corners. Do not place traps in areas that are wet. Count the trapped cockroaches and record the results in your pest control log. If two or more cockroaches per trap are caught in a 24-hour period, pesticide treatment may be necessary. Traps with a glue board (sticky trap) and a protective covering are commercially available, and in the stock system (Appendix B).

Prevention

Conduct pierside acceptance inspections (random selection) when stores are coming aboard. This is a critical element of the shipboard pest control program while in port. German cockroaches may be brought aboard the ship in the egg, nymph, or adult stages. Inspect potatoes, onions, soda cases, baked products, milk products, and any cardboard box pierside. Segregate and remove infested items from packing material. Ensure items are free of cockroaches before bringing them aboard the ship. Personal items carried aboard by crewmembers may also be infested with pests.

Preventive control strategies can reduce or eliminate most cockroach infestations by denying cockroaches the basic requirements for growth and survival. This includes preventing cockroaches from accessing food, water, warmth, and harborages, as well as excluding cockroaches from supplies being brought aboard ship. Use preventive control measures on a continuous basis even in the absence of a cockroach infestation. Not only are preventive measures effective in avoiding infestations, they also augment corrective control measures.

A high-level of sanitation is the first step to effective cockroach control. Store foods correctly, maintain good housekeeping, and eliminate water leaks and spills. In summary, the four key factors that continue to

support cockroach infestations, and from which they must be denied access to, are:

Food
Cockroaches can exist on very small amounts of food. Strict adherence to the following guidelines will limit the increase of cockroach populations:

- Proper food handling techniques.
- Store food and garbage in containers with tight fitting lids to prevent access to foraging cockroaches.
- Clean food preparation areas, equipment, and eating utensils thoroughly after each use.
- Clean food spills immediately.
- Prohibit food consumption in berthing areas.

Water
German cockroaches require a readily available source of water. Preventing access to water will affect population reproduction and survivability. To accomplish this:

- Eliminate water leaks.
- Store wet swabs with the head up.
- Repair clogged drains and eliminate standing water.

Warmth
Cockroaches can be found in and around warm, sheltered areas. Food packages such as baked goods, bags of potatoes or onions, and other containers with signs of cockroach infestation can be placed in a refrigerator to kill the cockroaches. Cockroaches will be killed within 48 to 72 hours at freezer temperatures (0°F).

Harborages
German cockroaches prefer very small cracks and crevices (harborages) for resting and hiding. All cracks and crevices should be suspected as harborage areas for cockroaches. Cockroach populations will be severely stressed if harborages are reduced or eliminated.

- Seal cracks and crevices with a caulking compound only when all cockroach access is eliminated. Incomplete sealing of cracks and crevices will provide a “safe zone” for the cockroach population by sealing sites where pesticides would normally be applied. If in doubt, do not seal.
- Repair torn, deteriorated, or damaged lagging and insulation. Check with engineering department personnel to repair or remove insulation and lagging.
- Promptly remove cardboard and cardboard boxes from food service areas.
- Prohibit the use of shelf liners.
- Eliminate false overheads and bulkheads, if possible.
- Eliminate unnecessary metal coverings or flashing.

COCKROACH CONTROL ABOARD SURFACE SHIPS

When cockroach populations become established, it may become necessary to apply insecticides to eliminate the infestation. This is accomplished through the use of dust, liquid, aerosol, and bait pesticide formulations. Conduct a thorough pre-treatment survey before initiating corrective actions.

The only certain way to assess effectiveness of treatment is to compare pre-treatment surveys with post-treatment surveys. ***Actual treatment must be performed by certified shipboard pest control specialists.***

Preparation of Treatment Spaces
Before residual insecticide application, properly prepare food service spaces and implement procedures to prevent accidental exposures to food preparation surfaces.

Establish coordination between departments. This helps in scheduling date and time of the treatment, materials, and personnel. Coordination also minimizes disruption of those areas requiring treatment. Ventilation may need to be secured during the treatment to prevent the spread of insecticide odors throughout the ship's spaces.

Notify all individuals directly involved in preparing the space and all who have responsibility for the space. These personnel should include the following:

- Executive Officer
- Food Service Officer
- Department Head
- Supply Officer
- Master-at-Arms
- Damage Control Assistant
- Watch Captain

Proper and timely preparation of each space to be treated is critical to a good pest control program. The following checklist provides general guidance for preparing spaces, and may be modified depending on the type of vessel, insecticide to be used, and severity of the cockroach infestation.

- Conduct a complete field day, ensuring a thorough "deep cleaning" of all surfaces, as grease and dirt will reduce the effectiveness of the applied pesticide. Food service spaces must have all food contact surfaces covered before application. After the treatment is complete, thoroughly clean these surfaces with soap and hot water before use.

- Do not allow exposed food or food utensils in treatment areas. Remove all stored food and materials from the treatment area. Completely cover foods that cannot be removed with impervious material such as aluminum foil or waxed paper.

- Move all non-fixed equipment and furniture away from bulkheads to facilitate proper treatment.

- Disconnect equipment with potential electrical spark hazards.

- Have an electrician secure both exhaust and supply ventilation. Cover vent openings with plastic.

- Ensure access panels to all power boxes, motor compartments, and the ventilation system are opened before beginning treatment. These access panels should be opened only by authorized personnel.

- Open spaces having false bulkheads or overhead panels to provide access for treatment.

- Cover all hatches and doorways which do not have covers, cannot be adequately sealed, or will not be used, with a plastic or paper cover and tape.

- Post warning signs on all entrances to spaces under treatment.

Crack and Crevice Treatment
This technique involves the precise placement of insecticide residues into all existing and potential cockroach harborages. Crack and crevice treatment reduces the chance that the insecticide material will be washed away during routine cleaning procedures. Dust, liquid, and aerosol insecticide formulations can be used. Avoid depositing these products onto exposed surfaces or introducing excessive material into the air. Random spraying of insecticides will not give effective cockroach control. ***Avoid contamination of food, food utensils, and food processing surfaces.***

For crack and crevice treatment, all pesticides in aerosol formulations shall be applied using extender tips.

Crack and crevice treatment with the hand-compressed sprayer shall be performed using the pin stream nozzle setting, or extender tips, if available. The nozzle should almost contact the surface of the crack or crevice for precise coverage. Maintain very low pressure in the sprayer to avoid splash-back and possible contamination of food preparation surfaces.

Direct the spray into all cracks and crevices, including: breaks in insulation and pipe lagging, overhead wiring, deck drains, motor compartments of machinery (when electrical components can be avoided), metal supports under counters and installed tables and equipment, behind splash-boards and shields, false bulkheads, pictures, and bulletin boards). Use extreme caution when spraying areas where possible electrical or fire hazards may exist.

Void Treatments
To access voids behind false bulkheads, an extender tip must first be attached to an aerosol can, hand-compressed sprayer, or aerosol container pesticide dispersal unit (Whitmire® PT® System III). The extender tip is then inserted into the void through any existing hole in the bulkhead, deck, overhead area, or place where screws can be removed and replaced. ***Do not make new holes for placement of void treatments***. Widest dispersal of a pesticide (e.g., boric acid aerosol dust) into a void can be achieved with a 4-way extender void injector tip.

Post-Treatment Procedures
After insecticide treatments have been completed, keeping the area secured and unventilated for one to several hours will greatly increase the effectiveness of the pesticide application (read the pesticide label for reentry statement requirements). In addition:

- Prohibit reentry of personnel into treated spaces until the space has been ventilated for at least one-half hour. It may be necessary to extend this time in poorly ventilated spaces or based on specific pesticide label requirements.

- Residual insecticides are not effective in killing cockroaches developing in egg capsules. It is very important for food service personnel to promptly sweep up dead cockroaches and egg capsules immediately upon reentry to the space to prevent new cockroaches from hatching and seeking untreated harborages.

- Wash all food contact surfaces thoroughly after application.

- Refrain from a complete field day in treated spaces for a minimum of 24 hours to prevent insecticides from being washed out of cracks and crevices.

Pesticide Bait Stations

Pesticide bait stations authorized for shipboard use consist of a food attractant, a humectant (keeps bait moist), and a stomach poison, - both enclosed in a plastic container for easy placement near cockroach harborages. The bait is non-repellent, nonvolatile, and does not produce air contaminants. The stomach poison is slow acting compared to residual insecticides, so an immediate decrease in cockroach population levels may not be observed. It may take from 1 to 2 weeks before there is a noticeable reduction in cockroach numbers. Bait stations can be used in all locations where liquids would otherwise present the danger of electrical shorting or fire. There are no restrictions on where these bait stations can be placed and no special site preparations necessary, except clean surfaces to attach the bait stations. Apply the bait stations per label directions. When placing bait stations, adhere to the following recommendations:

- Place bait stations where cockroaches or their excreta have been detected. Stations may be placed behind equipment, inside fuse boxes, the underside of tables, in overheads, inside torn or damaged lagging, in enclosed motor areas, and in corners of food preparation surfaces (including shelving).

- Place stations ***horizontally*** with the label side against the surface. Vertical placement significantly reduces the likelihood that cockroaches will enter the bait station.

- Check a representative number of stations periodically (10%, every 3-7 days) by cutting them open. High heat or high moisture conditions can cause the bait to dry and crack or soften the bait, causing it to run. Under these conditions, it may be necessary to replace stations more frequently. In heavily infested areas, the bait may be consumed quickly and the empty stations used as a harborage for surviving cockroaches. Replace bait stations as needed.

- Do not place bait stations directly on the deck. The bait can rapidly degrade if liquids are allowed to enter the bait station, rendering it unattractive to cockroaches.

- Do not place the bait stations out in the open such as along the middle of a wall or on top of a table. Cockroaches typically only forage a few feet from a harborage. Placing bait stations as close to harborages as possible significantly increases their effectiveness.

- Do not spray insecticides on or near the stations. Residual insecticides are repellent to cockroaches and they will not enter a bait station on a treated surface. If a flushing agent is used for surveys (conducted every two weeks), take care to avoid contamination of the bait station or areas near a bait station.

COCKROACH CONTROL ABOARD SUBMARINES

Sanitation

"Berthing spaces will be inspected every other week by the MDR to ensure the compartment is free from insects…. The absence or evidence of presence of insects in berthing compartments shall be reported to the commanding officer on the formal sanitation report. Absolutely no open food containers shall be stowed in personal lockers, under bunks, or elsewhere in berthing compartments, working spaces, or offices. No open food packages will be left uncovered."

Pierside Inspections

"Cardboard cartons containing fresh provisions…are ideal for the laying of cockroach eggs. These items will be inspected and unloaded topside on submarines, or left unpacked and the cartons discarded immediately. Spraying of d-phenothrin is authorized for pierside inspection of canned, bottled, and individually packaged stores. For the inspection of vegetables, fruits, and other items such as bagged onions, potatoes, etc., it is not authorized." (COMSUBLANT/COMSUBPACINST 6000.2B CH-2, 1997).

Pesticides

Methods for applying insecticides aboard submarines are the same as those used aboard surface vessels. Read and closely adhere to pesticide label directions and precautions.

Only when in port and able to ventilate outboard for at least 24 hours, can residual crack and crevice pesticide treatment against cockroaches be used. Currently, a 2% aerosol formulation of D-Phenothrin is the recommended approved pesticide.

However, while in port and/or underway, Combat® bait stations may be used aboard submarines. Sufficient quantities of this bait should be maintained to adequately control cockroaches in all food service areas (no more than 144 stations may be stored onboard at any one time). Approximately 4-6 bait stations are required per 100 ft^2. Each bait station remains effective for about 3 months.

With the exception of Combat® bait stations, pesticides cannot be stored aboard submarines. Supporting submarine tenders maintain an adequate supply of insecticides and insecticide dispersal equipment to meet the needs of these vessels.

Residual insecticides are repellent to cockroaches and they will not enter a bait station placed on a treated surface. If a flushing agent is to be used aboard a submarine when in port and venting, take care to avoid contamination of bait stations or areas near bait stations. If in doubt, dispose of any bait stations prior to treatment, and replace with fresh stations before the submarine deploys.

The following also applies when using residual pesticides aboard submarines:

- Residual pesticides are limited to crack and crevice treatment while using extender tips, and will not be used as a space spray at any time. Avoid covering large areas with residual insecticides.

- Determine outboard ventilation time during and following treatment based on treatment conditions and the amount of pesticide used. The general rule is that the exhaust air shall be discharged overboard for at least 24 hours following application. This should be adequate for evacuating the propellant and pesticide odor.

- Use residual pesticides only when the submarine is not expected to submerge for a period of 24 hours following application.

- Secure all equipment having flame or electrical spark hazards during treatment and for 24 hours after application.

- Secure all food preparation and service areas. Cover all food and food contact surfaces. Wash all food contact surfaces thoroughly with soap and hot water after application.

- Prohibit reentry of personnel into treated spaces until the space has been ventilated for at least one-half hour. It may be necessary to extend this time in poorly ventilated spaces or due to specific pesticide label requirements.

STORED PRODUCTS PESTS (SPPs)

General Information

Over 100 species of insects, mostly beetles and moths, can infest food products brought aboard ship. Only a few species are responsible for the majority of damage to stored commodities.

SPPs can cause considerable damage to stored subsistence. Losses are much greater than the amount actually consumed because food, contaminated by feces, odors, webbing, cast skins, and live or dead insects, may need to be discarded or destroyed, depending on the degree of contamination. Insect populations raise the humidity within the food product, increasing mold and fungal growths. Total losses from infestations of SPPs are unknown,

but are thought to be in the millions of dollars annually. When proper procedures are absent, the potential for loss is enormous.

Some of the contaminated food supplies found on ships may already have been infested before new supplies are taken aboard. The most susceptible supply items are farinaceous products (those made from flour or other processed grains). In addition, dry beans and peas, candy, spices, and dried fruit may also be easily infested.

In addition to the monetary losses described above, some species of SPPs may cause illness. Beetle larvae belonging to the family Dermestidae are covered with tiny hairs, which, if eaten, may cause serious intestinal distress.

Some stored products pests, such as the Khapra beetle, Trogoderma granarium, are internationally quarantined pests. Caution must be taken to prevent infestations and, if found, to ensure against infesting other ships or port areas through infested consumables.

Biology

The majority of SPPs are small, avoid light, and multiply rapidly under favorable conditions. Stored subsistence provides an ideal environment for the development of SPPs because of an abundance of nutrients, a stable environment under most storage conditions, and a lack of natural parasites and predators. Detection is difficult because the infestation often remains hidden inside packaging. Discovery is often delayed until insect populations are well established.

A key feature of the biology of SPPs is their ability to conserve water. This makes them well adapted for infesting dry stores. They are extremely resistant to dehydration, excrete only dry material, and retain metabolic water resulting from the breakdown of foods. Because of these adaptations, they are able to thrive in low moisture environments.

Like all cold-blooded animals, activities of SPPs are temperature-dependent. Below an upper limit, development is faster as temperature increases. Thus reduction of temperature and cold storage of susceptible or infested commodities are effective measures for the prevention and control of SPPs.

The more important stored products pests, which may be found aboard ship, are divided into two groups: (1) Medically Important and (2) Non-Medically Important.

Medically Important SPPs

Dermestid Beetles

Beetles in the taxonomic family, Dermestidae (Fig. 2-12), are medically important because hairs on the outside of the larvae can cause intestinal trauma, eye irritation, dermatitis and allergic reactions (Wirtz 1991). Adult dermestids can be recognized by the characteristic patterns of various colors on their wing covers. An adult female can produce approximately 100 eggs during her lifetime.

Most members of the family feed on animal products such as fur, hides, skins, feathers, and dead insects,

and are common pests in warehouses throughout much of the world. The adults and larvae are capable of penetrating both polyethylene and foil packaging.

Fig. 2-12. Dermestid beetle larvae (MOVIE).

The Khapra Beetle, Trogoderma granarium

This dermestid beetle probably originated from India, and has become a quarantinable insect of medical importance worldwide.

The adults and larvae are generally brown in color and covered with yellowish hairs. In contrast to other dermestid species, it feeds on grains and cereal products, instead of animal products.

Adult khapra beetles may live a few days to several months. However, the larvae of the khapra beetle are especially resistant to starvation, and may live for several years without food (Munro 1966). A small infestation can very quickly develop into large populations and, unless completely eradicated from a ship, can continue to survive unnoticed in small numbers for long periods of time.

Because all dermestid larvae have external hairs, and because the khapra beetle, in particular, is difficult to identify from other dermestid species, ***any dermestid infestation*** must be handled extremely aggressively. Every effort must be taken to ensure complete control and thorough destruction of the infested product. An infestation of ***one or more living or dead larvae of Trogoderma or other dermestid species*** shall be justification for condemnation of the ***lot*** (MIL-STD-904B, Appendix G).

Flour Beetles

The red flour beetle, Tribolium castaneum, and the confused flour beetle, Tribolium confusum, are very similar in appearance. The terminal three antennal segments of the red flour beetle are distinctly larger than the other antennal segments (Fig. 2-13).

Fig. 2-13. Red flour beetle (MOVIE) Tribolium castaneum.

In contrast, the antennal segments of the confused flour beetle gradually increase in size throughout their length, similar to the shape of a baseball bat (Fig. 2-14).

Fig. 2-14. Confused flour beetle Tribolium confusum (MOVIE).

Both species are common pests of crackers, cereals, flour, and other grain products. While adults of the red flour beetle can fly, the confused flour beetle does not. Neither are good package penetrators, usually relying on existing openings.

When present in large numbers, both species cause flour to turn gray in color and impair its baking qualities. Adult flour beetles also secrete benzoquinones, which impart a disagreeable taste and odor to infested products. The reported toxic and carcinogenic effects of the benzoquinones and possible levels in stored foods indicate a potential hazard (Wirtz 1991). Because of this, a tolerance level of only ***3 or more insects per pound for Tribolium*** infestations is lower than the limit of ***7 or more insects per pound*** requirement ***for most other insects*** (Appendix G).

Flour beetles appear as shiny, flattened, reddish-brown insects. The head and upper parts of the thorax are densely covered with minute pitting. The wing covers are ridged lengthwise. The female flour beetle lays an average of 440 eggs in her lifetime. Each egg is covered with a sticky secretion that allows the egg to easily and securely adhere to the seams of sacks and boxes. The adult may live 2-3 years.

Non-Medically Important SPPs
Saw-toothed Grain Beetle

The saw-toothed grain beetle (Fig. 2-15) is the most common SPP aboard ship. It can infest a wide range of commodities including grain products, dried fruits, candy, sugar, dried meats, and tobacco products. The adult is slender, flat, and brown. It is easily recognized by the six saw-toothed-like projections on each side of the thorax. The female can lay as many as 280 eggs during her lifetime. The adult usually lives 6 to 10 months, but some may live for up to 3 years. The merchant grain beetle is nearly identical in appearance, similar in habit, but more abundant in the Pacific region. Both are poor package penetrators, normally utilizing breaks along seams, vent holes,or other opening.

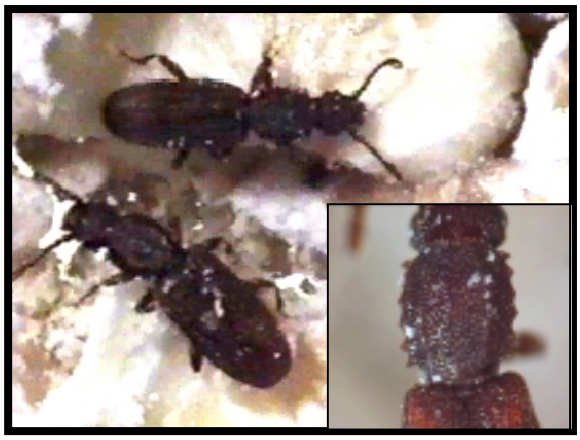


Fig. 2-15. Saw-toothed grain beetle Oryzaephilus surinamensis (MOVIE).

Rice Weevil
The rice weevil (Fig. 2-16) is considered to be one of the most destructive of the stored products pests, feeding on a variety of raw grains and grain products. Adults are reddish-brown and have a characteristic long “beak” or ”snout” that extends down under the head. It may be as long as ¼ the length of the body. The adult can be easily recognized by the presence of two yellowish or reddish spots on the top of each front wing.

Fig. 2-16. Rice weevil
Sitophilus oryzae. (MOVIE)

Indian Meal Moth
The Indian meal moth (Fig. 2-17) has a worldwide distribution and is the number one pest of dried fruits in storage.

Fig. 2-17. Indian meal moth
Plodia interpunctella. (MOVIE)

However, it can also infest a wide variety of other commodities, including grain products, nuts, powdered milk, candy, and pet food.

It can be a problem especially in packaged food items in vending machines and snack areas aboard ship. When infesting grain products, it prefers coarse flours and is commonly found in items like corn meal. The fully-grown larvae are large compared to other common SPPs (about one-half inch long). . The most commonly seen “white worms” found in packaged dried fruits are nearly always the larvae of this moth. They also produce silk webbing, which further lowers the quality of the infested commodity. The adults of this moth have a grayish band across the upper 1/3 of their reddish-bronze wings. The wings are folded over the abdomen when resting. The female moth lays between 100 to 300 eggs during her lifetime.

Cigarette Beetle
The cigarette beetle (Fig. 2-18) infests a wide variety of foods including grains, spices, herbs, dried meats, drugs, and pet food. The adults are very active and fly readily, increasing the risk of adjacent food stores becoming quickly infested. They are capable of penetrating both polyethylene and foil packaging. The adult is light-brown in color and appears rounded. The head is bent downward, giving the insect a strongly humped appearance. The last segments of the antennae are serrate or triangular, and the hardened front wings are smooth in appearance.

Fig. 2-18. Cigarette beetle Lasioderma serricorne.(MOVIE)

Drugstore Beetle
The drugstore beetle (Fig.2-19), like its close relative the cigarette beetle, is very active and will eat almost anything. They can even infest poisons such as strychnine and belladonna. In addition to food products, they can consume paper and wood and can be serious pests in books. They have been known to bore through sheet lead, and have little difficulty penetrating metal foil packaging. The adult is reddish-brown in color. In contrast to the cigarette beetle, the last 3 segments of the antennae are elongated and sausage-like in shape. The front wings have parallel lines along their length. Its life history and habits resemble the cigarette beetle.

Fig.2-19. Drugstore beetle Stegobium paniceum. (MOVIE)

Book-lice (psocids)
Book-lice (Fig. 2-20) are minute insects about the size of a pinhead and are sometimes found covering stored food products (flour, cereals). These almost transparent insects are about 1 mm long. They feed on cereal products, vegetable and animal debris, paste, glue, and other organic substances.
However, their preferred foods are molds and fungi, indicative of conditions of high humidity, which can also attract other SPPs to the site or product. Each female lays up to 100 eggs, growing from egg to adult in about 3 weeks. The book-louse, Liposcelis divinatorius, is common and often extremely abundant in stored grain products.

Fig.2-20 Book-louse
Liposcelis divinatorius.

A more comprehensive list of selected stored products pests that may be encountered aboard ship, is found in Table 2-1.

Table 2-1. Characteristics of some stored products pests found aboard ship

Insect	Length of adult (mm)	Days to develop (egg to adult)	Adults can fly	Presence	Common type of product attacked[1,2,3]
Saw-toothed grain beetle (Oryzaephilus surinamensis (L.)	2-3	30-50	No	Very common	Packaged cereals, crackers, dried fruits, candy, flour, meal, sugar, dried meat, tobacco, wide variety of grain products
Merchant grain beetle, Oryzaephilus mercator (Fauvel)	2-3	30-50	Yes	Very common (Pacific region)	Oatmeal, rice, flour, cake mixes, macaroni, cookies
Cigarette beetle, Lasioderma serricorne (F.)	2-3	30-50	Yes	Very common	Tobacco, breakfast cereals, spices (esp., dry cocoa powder), raisins, rice, teas
Drugstore beetle Stenobium paniceum (L.)	2-3	60-210	Yes	Very common	Flour, oatmeal, spices, leather goods
Bean weevil, Acanthoscelides obtectus (Say)	2-3	20-90	Yes	Very common	Dried Navy beans, kidney beans, peas, seeds
Pea weevil, Bruchus pisorum (L.); and Cow Pea weevil, Callosobruchus maculatus (F.)	3-5	20-90	Yes	Very common	Dried peas and other beans
Rice weevil, Sitophilus oryzae (L.)	2-4	30-50	Yes	Very common	Pasta, rice, raw grains, nuts, fruits
Red flour beetle, Tribolium castaneum (Herbst)	3-4	30-120	Yes	Very common (health concern, if 3 or more/pound)	Flour, other grain products,, beans, peas, dried fruits, shelled nuts, spices, chocolate
Confused flour beetle, Tribolium confusum Jacquelin duVal	3-4	30-120	No	Very common (health concern, if 3 or more/pound)	Flour, other grain products, beans, peas, dried fruits, shelled nuts, spices, chocolate
Furniture carpet beetle, Anthrenus flavipes LeConte	2-3	90-200	Yes	Common, (health concern, Dermestid species, if 1 or more larvae/lot)	Woolens, feathers, silk, animal fibers (hides with hair), natural bristles, products of animal origin
Varied carpet beetle, Anthrenus verbasci (L.)	2-3	1 generation /year	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Grain products, woolens, silks, feathers, products of animal origin, rodent nests, dead insects

Table 2-1 (continued). Characteristics of some stored products pests found aboard ship

Insect	Length of adult (mm)	Days to develop (egg to adult)	Adults can fly	Presence	Common type of product attacked[1,2,3]
Common carpet beetle, Anthrenus scophulariae (L.)	3-5	80-200	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Woolen goods, rugs, upholstered furniture
Khapra beetle, Trogoderma granarium Everts	2-3	60-300+	Seldom	Rare (USA quarantine dermestid species, if 1 or more/lot)	Raw grains, including wheat, barley, rice; dry milk products, breakfast cereals, dried fruits (a concern with products from SW Asia, Middle East and North Africa regions)
Warehouse beetle, Trogoderma variabile Ballion	2-3	40-60	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Grain products, dead insects
Lesser grain borer, Rhyzopertha dominica (F.)	2-3	30-60	Yes	Common	Flour and other raw grains, esp., wheat, corn
Flat grain beetle, Cryptolestes pusillus (Schonherr)	1-2	35-85	Yes	Rare	Broken raw grain, and other grain products, including flour
Spider beetles (Family: Ptinidae)	2-3	90-300	No	Rare	Broken grain, seeds, dried fruits and meats, woolens and dried animal products, rat and mouse droppings
Indian meal moth, Plodia interpunctella (Hubner)	8-10	25-135	Yes	Very common (esp., in vending machine areas)	Flour, corn, cornmeal, dried fruits, nuts, powdered milk, crackers, biscuits, chocolate, dried red peppers, dried flowers
Almond moth, Cadra cautella (Walker)	10-12	60-120	Yes	Common	Cereals, cocoa beans, dried fruits, flour, grain, peanuts, seeds, shelled nuts
Mediterranean flour moth, Anagasta kuehniella (Zeller)	10-14	30-40	Yes	Rare	Flour, cereals, bran, biscuits, seeds, chocolate, dried fruits

[1]Processed grain products: flour, pasta, rice, grits, oatmeal, cornmeal, farina (cream of wheat), bakery mixes (cake, biscuit mixes), cookies, crackers, ice cream cones, (dry pet food is not commonly found aboard ship, but is a highly infestible item, if onloaded).
[2] Raw grains (unprocessed grain products): wheat, rice, corn, barley, oats, rye.
[3]Spices: red & black pepper, cinnamon, dry cocoa powder, dry chili spice mix.

Surveillance Procedures
Pierside and Onboard Inspections
Inspection of infestible commodities before onloading is critical in preventing infestations of SPPs aboard ship. Inspect all dry food products upon receipt and reject them if evidence of infestation is found. Conduct pierside inspections at time of receipt (Fig. 2-21).

Fig. 2-21. Pierside inspection prior to onloading of stored products. (MOVIE)

Conduct onboard inspections of all replenishments within 48 hours of receipt, including newly acquired stored products transferred from supply ships at sea (Fig. 2-22).

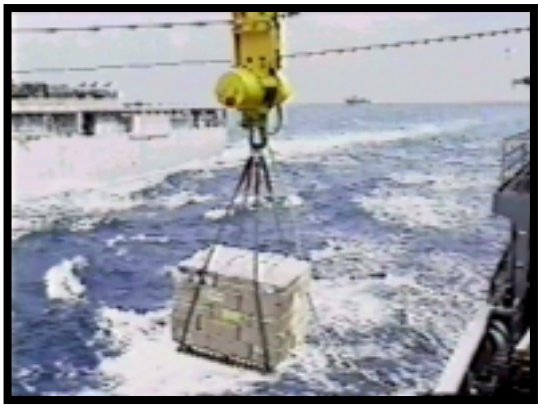


Fig. 2-22. Ship to ship onloading of stored products. (MOVIE)

Personnel performing the receipt inspection can be either medical or supply department members, but all shall be trained in inspection procedures.

Detailed inspection procedures are provided in MIL-STD-904B (Appendix G). It is not necessary to inspect every package. However, the greater the number of packages inspected, the greater the probability of discovering infestations. ***Random inspection*** of packages should detect infestations of SPPs. Sample sizes, based on the number of packages per primary container, are provided in Table 2-2.

Table 2-2. Recommended sample sizes to determine infestation levels of SPPs

Lot size (Primary container)	Sample size
2 to 15	2
16 to 50	3
51 to 150	5
151 to 500	8
501 to 3,200	13
3,201 to 35,000	20
35,001 to 500,000	32
500,001 and over	50

General inspection and surveillance procedures are as follows: (MOVIE)

- Perform the receipt inspection with the aid of a flashlight.
- Examine packaging (e.g., individual boxes, plastic bags, or cardboard boxes) for the presence of live or dead insects; cast “skins,” or pinholes made when SPPs enter or exit the packaging.

- Invert items in plastic bags and look for insect excrement (a fine powdery substance) which may have fallen to the bottom of the package.

- Examine seams and folds in packaging and the inside corners of cardboard boxes.

- Pay special attention to any items at or near the inspection test date (ITD). These items have a higher risk of infestation.

- The Jack-of-the-Dust, Cargo-King, or other personnel responsible for maintaining the storage space should conduct ***biweekly storage inspections***. The Medical Department should be immediately notified whenever live or dead insects are found.

- Medical Department personnel should inspect storerooms at least monthly, or more often as needed, to ensure the highest level of sanitation is maintained. MDR's should recommend that all broken containers, torn sacks, and spilled food should be removed immediately. Decks should be swept and vacuumed, especially prior to receipt of new food stores.

- Items most susceptible to infestation should receive priority during storeroom surveys. Carefully check cereals and other products containing raisins. They are especially vulnerable to SPPs.

Past experience has shown the following items have the highest probability of infestation:

- Grits
- Cornmeal
- Farina
- Fry mix
- Macaroni/Pasta
- Barley
- Cookie and cake mix
- Flour
- Dry beans and peas
- Ready to eat cereal
- Spices

Reporting Infestations of SPPs - DD Form 1222. All infestations of SPPs must be submitted for identification and reported. Send labeled SPP specimen samples with a completed DD Form 1222, "Request for and Results of Tests" to the nearest NDVECC or NEPMU. Instructions for completing DD Form 1222 and examples can be found in Appendix H.

Minimum requirements for submitting specimens include:

- Preserving at least two specimens in 70 percent ethyl alcohol (or isopropyl alcohol, if ethyl alcohol is unavailable). This is especially important for immature or adult soft-bodied stages, e.g., lice, which will otherwise "shrink" and be hard to identify if preserved and shipped dry.

- However, adult moths should be submitted ***dry*** in vials ***without alcohol***, or carefully placed into folded postage envelopes. If an envelope is used, place it on a

piece of cardboard with a short section of cardboard on each side of the envelope to act as protective "spacers". Place another piece of cardboard over the envelope and the other cardboard pieces, taping them all together.

- This dry preservation technique will keep their scales from falling off into the alcohol, while maintaining key color patterns used for identification. However, it is still advisable, if several specimens are available, to preserve a few in alcohol, since species that are difficult to identify by color patterns alone can often be more easily examined microscopically using characters preserved in alcohol.

- Whether a dry or alcohol-filled vial is used, place tissue (***do not use cotton***) in each end of the vial to prevent movement of the specimens during mailing or hand delivery. If cotton is used instead of tissue, specimens will be tangled in the fibers, and extremely hard to free for identification, without damaging the specimens. Several specimens of the same suspected type from the same collection site can be packed in a single vial, alternating layers of tissue on either side of each specimen.

- Carefully pack all vials and/or cardboard protected paper envelopes in thick, well-padded mailing envelopes or cylinders before final shipping.

Following identification, the DD 1222 will be returned to the submitting activity, which should forward a copy to the appropriate accountable officer and the Defense Supply Center Philadelphia, DSCP-HROS, 700 Robbins Ave. – Building 6, Philadelphia, PA 19111-5092.

Additional Reporting Requirements for Infested Stores – NAVSUP Publication 486 Volume 1, Food Service Management states that the presence of insect infested products warrants a "Suspected Hazardous Food Item Message" to be sent to DSCP, Philadelphia. This message is in addition to submission requirements of a DD Form 1222. A sample message is provided in NAVSUP P-486 (Appendix I). Responsibilities and procedural guidelines for recall of hazardous food products are outlined in NAVSUPINST 10110.8C (Appendix J).

When hazardous food messages are sent, include the appropriate NDVECC or NEPMU as an information addressee and:

- Ship's address and Unit Identification Code (UIC).

- Point of contact, with telephone number when in port.

- Quarantine measures taken.

- Amount of product at risk.

- Storage site and type of product infested.

MIL-STD-904B (Appendix G) lists the following thresholds for determining fitness for human consumption of commodities infested with SPPs. Products require disposal when the insects are found ***within*** (not external) inspected packages, as follows:

- One or more dermestid larva(e), adult(s), or cast skin(s) per lot.
- Three or more Tribolium larvae or adults (i.e., flour beetles) per pound of product.
- Seven or more of any other insects (larvae or adults) per pound of product.

Prevention

Preventive controls are the first line of defense against SPP infestations. If properly conducted, the following measures should keep any vessel SPP free:

Sanitation

Sanitation is extremely important in prevention of infestations of SPPs. Infested items shall be isolated or promptly disposed of to prevent contamination of other materials. A small amount of flour on the deck or accumulations of dust in cracks and crevices is enough to maintain a SPP infestation. Always keep storerooms clean. Adhere to the following principles of storeroom sanitation at all times:

- Clean up all spills immediately.
- Dispose of items found in open or damaged packaging.
- Vacuum, do not sweep, deck grates and horizontal ledges.
- Rotate stock by date of pack. Good stock rotation procedures are essential to minimize the potential spread of SPPs infestation. The rule for good stock rotation is "first in, first out."
- If space permits, leave inspection aisles between commodities.
- Ensure decks are clean before receiving new stores.

Inspection and Surveillance

A rigorous inspection program will help prevent the introduction of infested commodities to storerooms and detect the presence of infested commodities before cross infestation can occur. Storage conditions and product history affect inspection frequencies:

- Poor sanitation is conducive to pest infestations and is justification for frequent inspections, monthly or shorter if conditions warrant.
- Any recent pest infestation/activity where products are used or stored is justification to increase inspection frequency to monthly or shorter.
- Warm temperatures shorten insect development time and are justification for frequent inspection of infestible items.
- Cool temperatures and negative findings for pests and sanitation are justification to reduce frequency of inspection.

Segregation of Infested Commodities
When infested commodities are discovered in the storeroom, segregate them from other subsistence and put them in cold storage. Items with an infestation below the levels specified in MIL-STD-904B can be placed in a freezer space for at least 3 days. This will kill many of the insects, which can then be sifted out of the food material to remove the various insect stages, cast skins and excrement. The food items should then be used as soon as possible. Freezing infested food materials for a minimum of 2 weeks at 0° F will kill all stages of insects. Dispose of items infested above the allowable levels. Isolate the products and expedite administrative procedures for disposal.

Low Temperature Storage
All SPPs are temperature sensitive and low temperature arrests development and reduces survival. Low temperature storage will retard the development of infestations in food products. To the extent permitted by available space, keep all items at high risk of infestation in cold storage.

MEALS READY TO EAT (MRE)
Current pest control program guidance for MREs stored aboard ship is contained in the Armed Forces Pest Management Board (AFPMB) Technical Information Memorandum (TIM) No. 38 (Appendix D).

SPPs Control
Fumigation
When large quantities of product are infested, fumigation may be the only practical control measure. Installation fumigation is normally carried out by public works personnel, usually in a warehouse or on the pier. ***Fumigation aboard ship is conducted only under special circumstances and requires the approval of a Navy Medical Entomologist.***

Residual Pesticide Application
Insecticides can be used to prevent infestation of non-infested commodities or control the spread of an existing infestation. All insecticides applied aboard ship require extreme caution to prevent contamination of food products. Residual insecticides are applied per label directions (e.g., to cracks and crevices, as spot or area treatments on decks and bulkheads). For corrective spraying, treat an infested area according to the pesticide label. If spot or area treatment is required, empty and clean the storeroom before applying the insecticide. If total removal of food products from the space is impractical, completely cover all food products with impervious materials. Consult the cognizant NDVECC or NEPMU for the current recommendations on storeroom treatment.

Aerosol Insecticides
These can be used to control the flying stages of SPPs in storerooms when used as a space treatment. ***Never spray aerosols directly on packaging***. Insects inside packages will not be controlled by space treatment. Consult the cognizant NDVECC or NEPMU for the current recommendations on aerosol insecticide use in storerooms.

RODENTS

Importance

The effective control of rodent populations (rats and mice) is extremely important to the Navy. Rodents can carry serious communicable diseases such as plague, murine typhus, leptospirosis, and food-borne illnesses (e.g., salmonellosis). Rodents eat, contaminate, or destroy enormous amounts of food annually. Rodents also gnaw electrical insulation that can cause electrical short-outs or fires.

Biology

Rodents have been in close association with humans for ages. Several species are particularly well suited for specialized conditions found aboard ship, where they can impact greatly on the health and welfare of ship's personnel, food supplies and morale. A successful rodent control program must be based on understanding the behavior and habits of each species. Specifically, rodents:

- Use a sense of touch when moving about, and prefer to run along vertical surfaces (e.g., along bulkheads).
- Have poor vision.
- Have an excellent sense of smell, and are not repelled by human odors.
- Have a good sense of taste, preferring fresh foods.
- Have excellent hearing.
- Are excellent climbers, jumpers, and swimmers.

The most important rodents of concern onboard ship are:

Norway Rat

The Norway rat, Rattus norvegicus, (Fig. 2-23), "common rat," "brown rat," water rat," or "sewer rat" probably originated from Central Asia, arriving in North America in 1776 in boxes of grain brought by Hessian troops hired by the British during the American Revolution. It is associated with diseases such as tularemia, spotted fever and bubonic plague. It is a comparatively large aggressive rat, brown-gray above, gray on the underside, and weighs approximately 7 to 17 ounces. Its tail length of 5-8" is slightly less than half its total body length (12-18 inches, tip of nose to tip of tail). It has relatively small eyes.

Fig. 2-23. Norway rat Rattus norvegicus.

The Norway rat is present wherever human activity creates suitable harborages and there is an adequate food supply. It is an excellent swimmer and a good climber. It is found mainly in the holds and decks of ships. Preferred foods include meat or fish mixed with a diet of grains, vegetables, and fruit. If these

items are absent, any food may be eaten.

Roof Rat

The "roof rat," "ship rat," or "black rat," Rattus rattus (Fig. 2-24), probably originated from Southeast Asia, spreading through Europe and then into the Americas long before the Norway rat. It was the carrier of bubonic plague during the "Black Death" of the 14th century, which killed a third of Europe's population. It arrived in North America in 1609 with the early colonists at Jamestown. When the Norway rat finally arrived, large numbers of the roof rat began to disappear, and today is much less common than the Norway rat. Some propose that this is because the larger, more aggressive Norway rat has outcompeted the roof rat. Others suggest that the roof rat is more suited to warm tropical climates. Regardless, the roof rat is far more common on ships than the Norway rat, and continues to be reintroduced into the U.S at seaports. It is an excellent climber and may be found in the overhead wiring and upper decks of ships. It weighs 4-13 ounces, with its tail length (6-10") greater than half its total body length (13-18"). There are many color and body type variations worldwide. Most are brown or gray above, and gray or white on the underside. These rats prefer seeds, cereals, vegetables, and fruit, but may subsist on leather goods, chocolate, and even weaker members of its own kind.

Fig. 2-24. Roof rat Rattus rattus.

House Mouse

The house mouse, Mus musculus (Fig. 2-25) is a small rodent, adults weighing only about ¾ ounce, with a total length of 5-8". It is gray-brown above and below. It is commonly associated with humans and may cause serious damage to electrical wiring or food stores, especially sweets and grains.

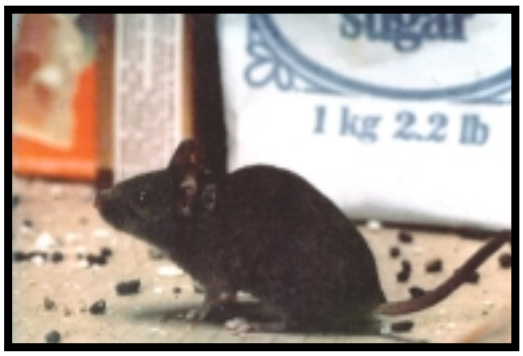


Fig. 2-25. House mouse Mus musculus.

Surveillance Procedures

Careful surveillance helps to identify rodent infestations and is necessary to determine control measures. The following signs help determine location and degree of rodent infestation, the species involved, food and water sources, and needed improvements in exclusion and sanitation.

Runways and Rub Marks
Routes frequently traveled by rodents are called "runways." A dark color at the base of a bulkhead or where the rat climbs stanchions usually identifies the runways. This discoloration results from the repeated passage of rats from one location to another, including leaving their nests and harborages to feed. Since their hair is moderately oily, they leave a mark behind (much like a scuff-mark), that continues to darken as more oils are rubbed off their bodies, with cumulative daily use of the runways.

Runways are usually hidden from obvious view and may be anywhere. For example, if a runway is inside a pipe, it will usually be inside the casing, which will need to either be opened to reveal it, or followed, inch-by-inch, to discover the entrance and exit openings. Because roof rats prefer to travel along overhead wires or steam lines, the most common runways will be found in those areas. Where the point of contact of the cross beams occurs, their roughly semicircular rub marks are usually evident. Other locations of runways may be the free edge of an angle iron, a pipe, an electric cable, or the top of sheathing.

Tracks
Hold a flashlight at an angle to the deck to observe tracks in the dust. The tracks will cast a distinct shadow (Fig 2-26).

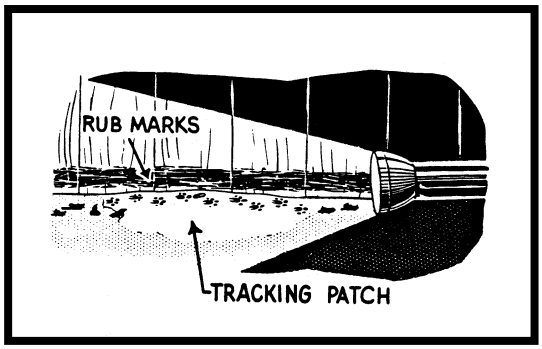


Fig. 2-26. Positioning the flashlight.

Fresh tracks will appear sharp and distinct (Figure 2-27), whereas

Fig. 2-27. Fresh rodent tracks in the dust.
old tracks may be less distinct, because of dust accumulation. The five-toed tracks of the rear paws are more commonly observed than the four-toed front paws, yet both may be present. It is very useful to spread a thin band of talcum powder along runways to check for rodent direction and the amount of recent activity.

Gnawing
Because rodent teeth continue to grow, rodents constantly gnaw to prevent their front teeth (incisors) from becoming too long to use in feeding. They gnaw to gain entrance into containers and obtain food (Fig. 2-28), but will sometimes gnaw on wood and metal simply to keep their teeth worn down to a suitable length.

Fresh gnawings are light in color (like freshly chopped wood) with distinct teeth marks present. Small chips of wood or other materials in the survey area may also indicate recent gnawing. With time, the wood around gnawed holes appears dark and smooth because of frequent contact with the rodent's body.

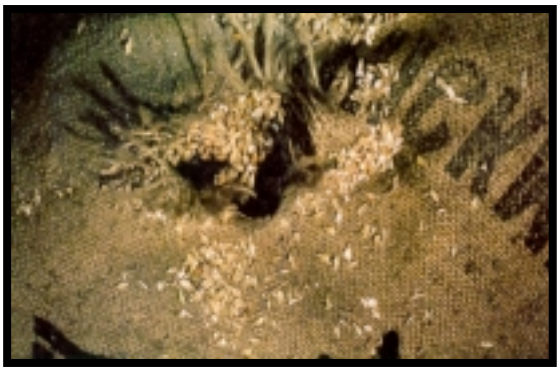


Fig. 2-28. Gnawing in sack of grain.

Droppings
Fresh fecal droppings appear soft, shiny, and dark (Fig. 2-29) and vary in shape and size, depending on the species (Table 2-3).

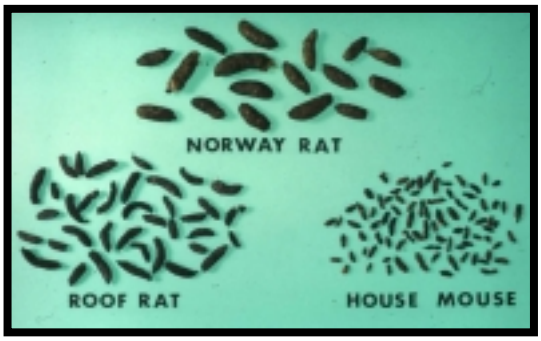


Fig. 2-29. Comparison of rodent droppings.

Table 2-3. Characteristics of rodent droppings

Species	Shape	Length
Norway Rat	Blunt	¾”
Roof Rat	Pointed	½”
House Mouse	Pointed	¼”

After a few days, droppings may appear dry and hard. Old droppings appear dull and gray in color and easily crumble when pressed with a stick. Droppings are usually more abundant near the food source, but they may also be found along runways.

Urine
Rodents cannot regulate or control their urine output, so they constantly urinate. To search for rodent signs along runways, hold a blacklight (UV) at an angle to the deck. Fresh rodent urine fluoresces as a lime green color. Old rodent urine appears bluish-white.

Rodent Hairs
Rodent hairs, particularly rat hairs, appear as a bluish-white color when seen under a blacklight.

Prevention

Sanitation
The elimination of food and shelter by proper handling of food and prompt disposal of garbage and rubbish reduces the attractiveness of the ship to rodents. Sanitation is the key cornerstone in successful rodent control programs.

Exclusion
Rat guards (Fig. 2-30) are required on ***all*** tending lines. International health regulations no longer require the use of ratguards by ships except when berthed in ports where plague is endemic.

Fig. 2-30. Placement of rat guards.

However, continuing efforts to prevent entry of rodents onto ships and reinforcement of proper sanitary measures to eliminate food and harborage sources aboard each vessel are still necessary, especially in ports where large populations of rodents exist. Consequently, there may be instances when commanding officers or Medical Department representatives determine the use of ratguards to be advisable as an additional protective measure against rodent entry (SECNAVINST 6210.2A). For example, while COMSUBLANT/COMSUBPACINST 6000.2B requires rat guards for plague endemic areas, and recommends ratguards for all foreign ports, CINCPACFLTINST 5440.3H requires rat guards on ***all*** lines in ***all*** ports.

Rat guards should have a 36-inch minimum outside diameter, a cone angle of 30 degrees, and be made of 18 gauge steel or aluminum. Rat guards must be mounted with the point of the cone toward the ship ***on all tending lines***, at least 6 feet from the pier and greater than 2 feet from the ship. Use rags to plug gaps, securing the rags tightly to prevent loosening or being pulled apart by the rat. Ensure stray lines are kept out of the water. If two lines are in close proximity to each other, either group the lines to pass through a single rat guard, or install the rat guards side-by-side or touching to prevent rats from jumping from one line to another, skirting the rat guards and making them ineffective.

The use of rat guards is further detailed in SECNAVINST 6210.2A, BUMEDINST 6250.14, and Manual of Preventive Medicine, NAVMED P-5010, Chapter 8.

Illumination and Movement Restrictions
Since rodents are basically nocturnal, lighting up gangways and landing ramps at night can discourage rodents from coming onboard. Isolate gangways and other means of access to the vessel from the shore by a distance of at least 6 feet, unless guarded. Raise or remove cargo nets when not in use.

Pierside Inspections
Inspect all incoming subsistence items for signs of rodent activity (e.g., droppings, urine, hair, gnawing, or live rodents).

Rodent Contamination
Contaminated units (boxes, cases, bags, bales) shall be condemned under the following conditions:

- When any evidence of rodent infestation/contamination i found within product packaging.

- Penetration of packaging by rodent feces/urine, as evidenced by urine stains and/or feces visible under normal light or blacklight.

- Existence of one or more holes gnawed through the innermost layer of packaging.

- External contamination of waterproof containers (e.g., cans) containing the product, unless it is possible to recondition the container by disinfecting and rinsing under the direction of medical authority. The entire pallet shall be condemned when rework cost is estimated to exceed the value of the product salvaged.

Handling Rodent Contaminated Products

Care in handling rodent contaminated materials must be observed.

- Protective gloves shall be used to avoid direct contact with urine or feces.

- Decontaminate the surface of infested packages with a household bleach 3 tablespoons household bleach per gallon of water) or other sanitizer.

- Seal any holes to prevent leakage, or place damaged packages in a plastic bag.

- If entire pallets are condemned, it is desirable to seal them with plastic sheeting. Segregate damaged materials for reimbursement or dispose of them.

Rodent Control

Because the odor from dead rats in confined spaces of a ship is unacceptable, rodent trapping is the prescribed method for rodent control (Appendices B, D). Use of poison baits must be approved by the cognizant Medical Entomologist at a NDVECC or NEPMU.

Trap Placement.

- The conventional wood base, spring (snap) trap is also an effective way to kill rats and mice. Set traps at right angles to the runway, with the trigger end toward the bulkhead. Once traps are in use, replace bait every 2 days. On the deck, set traps behind objects that are stacked close to a bulkhead, along rows of boxes and between crates. Boxes and barrels can be positioned to create directed runways to force the rodents to pass over the traps (Fig. 2-31).

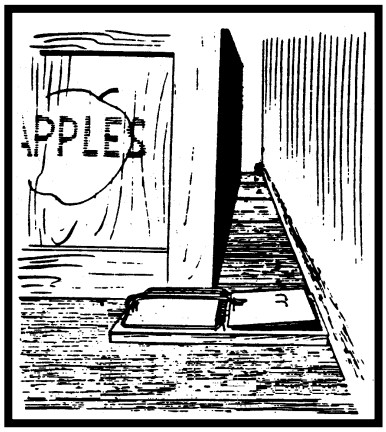


Fig. 2-31. Use of directed barriers.

Place traps so as not to be visible from the passage way entrances. Tie or nail down traps to prevent an injured rodent from crawling off. Secure vertical traps to overhead pipes, beams, and wires, or wherever runways are identified (Fig. 2-32).

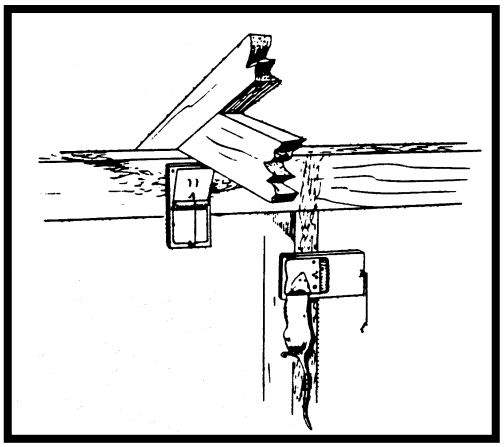


Fig. 2-32. Securing vertical traps.

- **Setting the Trap**. Rodents, being creatures of habit, will frequently avoid traps as unfamiliar items in the environment. Place unset baited traps in the trapping location for a few days before actually setting the spring and trigger. This gives the rodent a false sense of security as it becomes used to the location of the trap and available food. Preferred trap baits vary with each rodent species and regionally available food sources. Traps and bait are usually accepted as part of the environment within 2 to 3 days. When it is time to set the trap, fasten the bait securely to the trigger with cheesecloth or by wrapping it in a 2 x 2-inch gauze square before attaching it to the trigger. This prevents the rodent from taking the bait without springing the trap. Set the trigger on the traps to spring at this time.

- **Expanded triggers**. The trigger may be expanded with cardboard, stainless steel, or screen wire to increase the contact area of the trigger and its sensitivity (Fig. 2-33). Do not set the trap until actual feeding is noted in the unset traps. Usually the catch is best the first night of trapping.

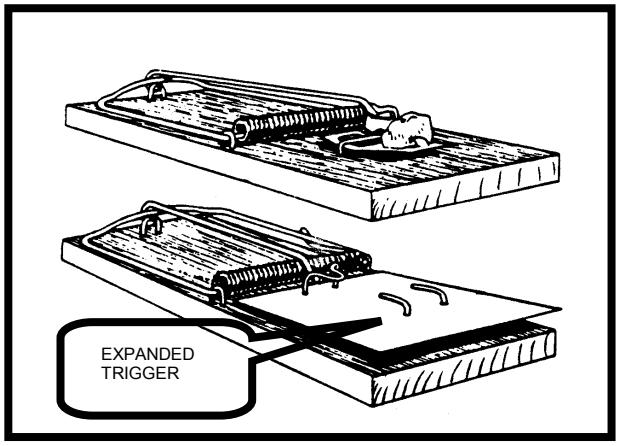


Fig. 2-33. Expanded trigger

- **Cleaning the Trap**. Before reusing heavily soiled or bloodied traps, wash traps with soap and hot water. Rats are not repelled by human odors.

- **Other Traps**
  - **Glue boards** have been effective in reducing small populations of mice (and probably rats) within 2 to 3 weeks, if properly placed in the area of rodent activity.
  - **Live traps**, which consist of a wire-enclosed cage with a spring or gravity-controlled door, can be used to collect rodents for ectoparasite or disease studies.

MISCELLANEOUS SHIPBOARD PESTS

Bed Bugs

Bed bugs, Cimex species, are blood-sucking insects which feed on sleeping hosts. They may occasionally be found aboard ship. These insects are not vectors of any

known human diseases but many people consider the presence of these insects and their bites extremely annoying. These insects can seriously affect crew morale.

Biology

Bed bugs are oval-shaped and flat (when not engorged with blood). Adults are approximately 7 mm long. They appear brownish in color, are wingless, and have piercing-sucking mouthparts (Fig. 2-34).

Fig. 2-34. Bed bug, Cimex lectularius.

Bed bugs hide during the day in mattresses, bedsprings, and other small cracks and crevices in sleeping quarters. They may live for several months without a blood meal. They usually feed at night, and the host is usually unaware of being bitten. Signs of bed bug infestations are tiny spots of red blood from the wound site, or the presence of dead insects that were crushed as the sleeping humans rolled over onto them. Other signs of infestation include brown or black fecal spots on mattresses and other hiding places.

People vary in their reactions to bed bug bites. Some are little affected, while others may experience intense itching and a large inflamed area at the bite site. Bites often occur on the face, neck, arms, and hands.

Bed bugs glue their eggs to the surface of cracks and crevices. Aboard ship, they may lay their eggs in privacy curtains. A female can lay up to 200 eggs at the rate of 1 to 5 per day. Eggs hatch in 6 to 10 days under warm conditions, reaching maturity in 1 to 2 months.

Bed bugs have a characteristic odor produced by scent glands located between the hind legs. The odor may be described as unpleasant, sweet, or fruity.

Infestations are not necessarily associated with unsanitary conditions. Often inadvertently transported in clothing, baggage, and laundry, they are easily introduced into spotlessly clean quarters.

Control

Effective bed bug control depends on locating and treating all actual or potential hiding places. They can be found in any location that offers darkness and protection. Even when live bugs are not seen, spots of fecal material may reveal their harborages.

To determine harborages, conduct a complete survey of the suspected area in question before considering treatment with insecticides.
Treat only the seams, folds, and buttons of mattresses with insecticides labeled for bed bug control. Never soak mattresses with

spray. Allow mattresses to dry thoroughly and cover before use. Steam cleaning is also effective in controlling mattress-dwelling bed bugs.

Follow label instructions to treat all cracks and crevices in the infested area, including the corners of bunks, empty lockers, springs, canvas bottoms, grommets, and stanchions. Apply insecticide behind all equipment close to bulkheads. All bunks in the space from which the complaint originated should be treated. Remove and launder privacy curtains and mattress coverings. Bed bugs are destroyed during normal laundry procedures.

Human Lice

Three types of sucking lice are important parasites of humans: the body louse, the head louse, and the crab louse. These three species differ considerably in habits and therefore require different methods of treatment. Generally, physicians and other health care providers treat infestations of lice, when discovered. The shipboard pest control specialist should understand the biology of these insects and the limited role of pesticide treatment to control infestations.

Biology

The Body Louse, Pediculus humanus humanus, is the species responsible for transmitting louse-borne typhus, trench fever, and relapsing fever. Body lice are found in clothing in contact with the body. Eggs are deposited on clothing, especially along the seams of the inner surfaces. In looking for infestations of body lice, examine the seams and folds of clothing, especially on the inside of underwear.

The Head Louse, Pediculus humanus capitus, is very similar to the body louse in appearance (Fig. 2-35), but entirely different in its habits. Head lice are most commonly found attached to the hair of the head.

Fig. 2-35. Body/head louse Pediculus humanus.

The most important diagnostic characteristic is the presence of eggs, or nits, in the hair (Fig. 2-36). The eggs are generally more numerous than the lice, are not as easily removed from the shafts of human hair, and are easy to see.

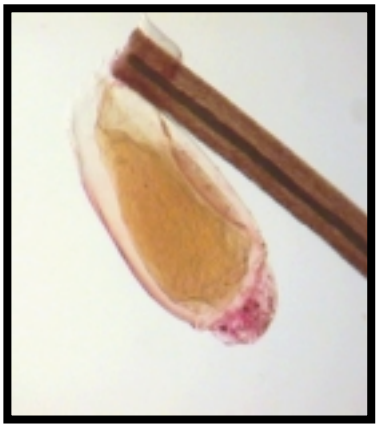


Fig. 2-36. Head louse egg (nit) on hair.

The Pubic Louse (Crab Louse), Pthirus pubis (Figs. 2-37, 2-38), is a small grayish-white insect with a broad abdomen and large second and third pairs of legs, giving it a crab-like appearance. These insects are most commonly found on hairs in the pubic area, but may also be found on hairy areas of the chest or armpits. Infestations of the eyebrows and eyelashes have also been reported. Crab lice are spread chiefly by sexual contact but may be acquired by other means of close personal contact.

Fig. 2-37. Crab louse, Pthirus pubis.

Fig. 2-38. Crab louse, Pthirus pubis. (Internal tissue has been cleared with KOH).

Control

Various prescription shampoos and lotions containing pyrethroids are available for treatment of infested individuals. Consult a physician for current therapy recommendations.

While personnel might request pesticide treatment of their quarters or belongings when a louse infestation occurs, there is usually little need for such action. Lice spend the vast majority of their time on their host and will generally die within 24 to 48 hours, if removed. Residual insecticide treatments are of little, if any, value.

In most cases, ordinary laundering with hot water (100° F) will destroy all stages of lice on infested clothing, bedding, and towels. Hot cycle drying for at least 20 minutes will also provide control. Dry cleaning (the solvent is toxic to lice and the steam used in pressing ensures that control is complete) will destroy lice on wool garments.

Filth Flies

The common house fly and other species such as flesh flies and blow flies (Figs 2-39, 2-40) readily invade enclosed spaces.

Fig. 2-39. Flesh Fly.

Fig. 2-40. Green Blow Fly.

These insects breed in garbage, fecal matter, animal wastes, and carcasses and can carry many disease organisms or cause myiasis. Since contaminated flies may land and feed on human food, there is always the potential for disease transmission.

Biology
One of the most striking aspects of these insects is their ability to multiply rapidly under ideal conditions. A female house fly will oviposit 75 to 150 eggs at a time, and may produce more than a thousand during her lifetime. The offspring can begin reproducing in as little as 9 days depending on temperature.

Filth flies are also capable of traveling long distances. Studies have shown that the house fly can travel as far as 6 miles in 24 hours. Blow flies can disperse even farther, so significant infestations may result from breeding sources as far as four miles away.

Control
Chemical control against filth flies aboard ship is rarely justified. The problem may be best corrected by removing or containing garbage onboard, or by controlling any nearby breeding source ashore.

If fly swatters do not provide adequate control for the occasional filth fly nuisance, space treatment with an aerosol insecticide may be necessary. Personnel should leave the space to be treated, with ventilation secured, and the area closed after treatment for the period of time specified on the label. Always ventilate the area before reentry. Do not expose food during treatment and clean all exposed food contact surfaces after treatment.

Fruit Flies
Fruit flies, Drosophila spp., are occasional pests in food service and berthing areas. These small insects can be brought aboard in infested fruit and vegetables, either in the ship's stores or by crewmembers. They have been encountered in berthing areas of ships that allow food in berthing. Once aboard, they can breed in rotting food or flour found in cracks and crevices in food service areas. They may also be attracted to sugar build-up in cracks and crevices around beverage dispensers.

Biology
Fruit flies are attracted to yeast produced by fruits and vegetables as they ripen and decay. At least one species is also attracted to human and animal feces and may serve as a vector of disease. If ingested, some may cause stomach upset and diarrhea.

Fruit flies can occur in large numbers in very small amounts of decaying organic material. Any substance capable of supporting fermentation can act as a source of infestation. Some potential sources include rotting potatoes, dishwater from sinks or drain water from refrigerators (if allowed to stand), soured swabs or brooms, and clogged drains.

Control

The key to control of these pests is sanitation, and locating and removing the source of infestation. Often disposal of rotting fruit or vegetables may be enough. If the source of infestation is organic debris in cracks and crevices, these areas should be cleaned and, if practical, sealed with caulking compound to provide permanent control.

Space treatment with approved aerosol insecticides is usually adequate to control the occasional fruit fly problem aboard ship. Personnel should leave the space to be treated, with ventilation secured, and the area closed after treatment as for the period of time specified on the label.

Always ventilate the area before reentry. Do not expose food during treatment, and clean all exposed food contact surfaces after treatment.

CHAPTER 3
QUARANTINE ISSUES

BACKGROUND

Risk Assessment

Large volumes of DoD equipment and thousands of DoD personnel move across international boundaries every day. These activities provide many opportunities to accidentally transport a wide variety of pests and disease organisms from country to country. Accidental introductions of organisms into new geographic areas can cause enormous damage to agriculture and health interests, and can adversely impact U.S. foreign relations if an overseas pest introduction is traced to U.S. military activities.

National/International Concerns

DoD interests in quarantine issues increased during and immediately after the Vietnam Conflict when tremendous volumes of retrograde cargo were shipped back to the U.S. Quarantine and retrograde cargo issues were again given intense scrutiny when troops and equipment returned from the Middle East following Operation Desert Storm. Events such as the Japanese beetle problem in the Azores, the brown tree snake in Guam, and Aedes albopictus (the "tiger mosquito"), the Asian gypsy moth, the Asian tiger beetle, and the Zebra mussel introductions into the U.S. are but a few examples that exemplify the need for an increased vigilance to ensure that U.S. and foreign shores are protected

The International Plant Protection Convention (IPPC)

The IPPC is a multilateral treaty administered through the Food and Agriculture Organization (FAO) of the United Nations. The IPPC was created to prevent the spread of pests of plants and plant products and to promote measures for their control. It provides a framework and forum for international cooperation and technical exchange, in collaboration with regional and national plant protection organizations. The IPPC is mostly concerned with the shipment of foodstuffs, plant and animal products, including timber and farm animals. Since the U.S. is a signatory nation, the U.S. Armed Forces fully supports this treaty.

Medical Service Quarantine Regulations Of The Armed Forces (SECNAVINST 6210.2A)

This instruction outlines quarantine policies and procedures of the U.S. Public Health Service and the U.S. Department of Agriculture in U.S. Navy programs. It conforms to the regulations of the United States Departments of Health and Human Services, Agriculture, Treasury, Interior, and Commerce. This regulation is intended to prevent the introduction and dissemination, domestically or elsewhere, of

diseases of humans, plants and animals, prohibited or illegally taken wildlife, arthropod vectors, and pests of health and agriculture importance. Ships, aircraft, or other conveyances of the Armed Forces proceeding to a foreign port will meet the quarantine requirements published by proper authority for such port.

Executive Order 13112
Heightened concern for this ever increasing threat to our food production and natural resources was reinforced on February, 3, 1999, with the signing of Executive Order (EO) 13112, Invasive Species, by President Clinton. This EO established an invasive species management policy for Federal agencies, and created the National Invasive Species Council (NISC), charged with developing a National Invasive Species Management Plan. The purpose of this order is "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts invasive species cause."

U.S. NAVY VESSELS ENTERING U.S. PORTS

Because the United States has some of the strictest quarantine regulations in the world, the U.S. Navy has an inherently important role in preventing the entry of unwanted organisms into the U. S. because of its potential for introducing invasive species from foreign ports.
When entering the Continental United States (CONUS) from foreign countries, Hawaii, or U.S. Territories and its possessions, federal agricultural quarantine laws apply to U.S. Navy vessels as a condition of entry (CFR Title 9, Animals and Animal Products, and CFR Title 42, Public Health). "Inspectors are authorized to board ships, aircraft, and any other means of conveyance of the Armed Forces, and to inspect ports and facilities. Commanders will provide full support for inspections… However, all examinations will be subject to all restrictions necessary to preserve the security of classified material" (SECNAVINST 6210.2A).

To help ensure an effective quarantine program and protect the U.S. from importation of exotic pests, the United States Department of Agriculture's (USDA) Animal Plant Health Inspection Service (APHIS) and the U.S. Navy have a Memorandum of Understanding, through which a USDA/Military Cooperator Program has been established. This program coordinates the inspection of U.S. Navy ships for unwanted organisms, illegal items, and improperly stowed garbage to expedite entry into U.S. ports.

U.S. Navy vessels have two officers (or E-7 or above enlisted personnel) who have been trained by the USDA as Cooperator Plant Protection Quarantine Officers (CPPQOs). A senior MDR, when possible, should be one of the two CPPQO's. Although this program is intended to support USDA quarantine policy and ease entry of U.S. naval vessels into U.S. ports, the same principles, techniques and procedural protocols are applicable to excluding invasive plant and animal species from U.S naval vessels enroute to foreign ports.

U.S. NAVY VESSELS ENTERING FOREIGN PORTS

Under the tenants of the International Plant Protection Conventions, the U.S. Navy has a responsibility to ensure that potentially harmful organisms are not introduced into foreign ports-of-call. It is the responsibility of not only the Medical Department, but also the entire ship's crew to ensure that potentially harmful organisms are not released into another country. This can be best accomplished by immediately reporting infestations, observed during routine inspections, to the Medical Department Representative (MDR).

Maritime Health Declaration And Controlled Free Pratique

U.S. Navy Regulations, articles 0828 and 0859 prohibit inspection of U.S. warships and military aircraft, USNS vessels, and afloat prepositioned force ships by foreign personnel. The following guidance (SECNAVINST 6210.2 series; NAVADMIN MSG R 240023Z MAR 00 ZYB PSN 394755Z33) is provided.

It is a fundamental principle of international law that ships and aircraft being used in exclusive, non-commercial government service fully assert the privilege of sovereign immunity; that is, freedom from the jurisdiction of foreign nations. This applies whether within a foreign territory, foreign territorial seas/airspace, or international waters/airspace. They will not be subject to inspections or searches by officials for any purpose.

Although immune from law enforcement actions by foreign authorities, U.S. military ships and aircraft proceeding to and from a foreign port under diplomatic clearance shall comply with reasonable host country requirements and/or restrictions on traffic, health, customs, immigration, quarantine, etc. The host country's remedies for U.S. noncompliance, however, are limited to asking sovereign immune U.S. ships or aircraft to comply, pursuing diplomatic protest, or ordering sovereign immune ships or aircraft to leave the host country's territory or territorial sea/airspace.

Commanding officers, masters, and aircraft commanders may themselves, or through their representative, certify compliance with host country quarantine regulations and restrictions to foreign health officials. If requested by host country authorities, certification may include a general description of measures taken by U.S. officials to comply with local requirements. At the discretion of the commanding officer, master, or aircraft commander, foreign officials may be received on board for the purpose of receiving certification of compliance.

The foreign official should then provide a Controlled Free Pratique for the ship. A Controlled Free Pratique grants a ship permission to enter a port, disembark, and begin operation under stipulated conditions. Such officials may not, however, inspect the ship or aircraft, or act as observers while U.S. personnel conduct inspections. Actions by foreign officials must be

reported immediately to the chain of command and the U.S. embassy.

Certification, unless otherwise stipulated, can be provided as a locally prepared Maritime Health Declaration (Appendix K).

Each country will have its own quarantine concerns and regulations. Before leaving on deployment, gather country specific quarantine regulations for scheduled or unscheduled port visits. You can obtain this information from the Navy Disease Vector Ecology and Control Centers (NDVECC's) and Navy Environmental and Preventive Medicine Units (NEPMU's).

PIERSIDE/ONLOADING INSPECTIONS OF INFESTIBLE PRODUCTS

Inspection of oncoming consumables, especially fresh fruits, vegetables, and dry grain products for pests and disease vectors, is necessary to reduce degradation of product and to ensure the health and well being of all crew members while underway. By excluding these same organisms from the ship, transportation of unwanted and destructive invasive pest/disease species from port to port will also be prevented. Each foreign country may have varying specific requirements or concerns. Thorough inspections and quick action, when pests or disease vectors are found, will prevent spread of multiple infestations. Detailed documentation of problems detected and corrective actions taken, will help provide information foreign quarantine authorities may request.

RODENTS AND RAT GUARDS

While important in all U.S. ports, movement of rodents onto U.S. naval vessels is an even greater concern in foreign ports, where rodent-borne disease may be a significant health threat to ship's personnel. Required use and correct placement of ratguards are critical elements of this program (SECNAVINST 6210.2A, BUMEDINST 6250.14, and Manual of Preventive Medicine, NAVMED P-5010, Chapter 8). Like the U.S., foreign countries wish to protect their shores, and should require a current Deratting/Deratting Exemption Certificate upon arrival.

DERATTING/DERATTING EXEMPTION CERTIFICATES

A deratting/deratting exemption certificate (Appendix L) is required on U.S naval vessels entering most foreign ports. It is issued by a U.S. Public Health Service (USPHS) officer or designated military officer holding a valid USPHS seal. The inspection may be performed by any trained Preventive Medicine Technician stationed at a different command, but must be signed and certified by a Medical Department Officer who holds a special USPHS seal.

This certificate is valid for 6 months, with a single 1-month extension available (***requested by message to the original issuer before the end of the 6 months***).

Manual of the Medical Department, NAVMED P-117, article 22-37, and

BUMEDINST 6250.14 provide guidance regarding Deratting/Deratting Exemption certification. The certificate should be marked as an exemption certificate only when no evidence of rodent activity is found.

CHAPTER 4
RECORDS AND REPORTS

RECORDS

The Pest Control Log

Track shipboard pest control records in a written Medical Department journal, or in a separate pest control log. Pest control log entries should document all aspects of the pest control program. The pest control log may be reviewed during courtesy technical assistance visits or informal surveys. Entries shall contain at a minimum the following information.

Personnel Records

Records of pest control certification credentials for individuals possessing "Shipboard Pest Management Specialist Certification" and "DoD Pesticide Applicator Certification" (specify categories of certification, e.g., Category 8 - Public Health) must be maintained and kept current. These records must include:

- Name
- Rate
- SSN
- Current certification number
- Certification expiration date
- Certifying authority (e.g., NDVECC, JAX; NEPMU-7)

Materiel Inventory Records

Key inventories that must be routinely maintained include: pesticide safety gear, pest control inspection and surveillance items, pesticide dispersal equipment, pesticides, and miscellaneous parts and supplies (see samples, Appendix M).

Pierside/Onboard Inspection Records

All inspections of incoming food and non-food items for pest and invasive species must be recorded upon receipt of items pierside, from supply ships at sea, or routinely on-board when underway. It is important to describe non-chemical methods of control, when used (see samples, Appendix M).

Deratting/Deratting Exemption Inspection Certificate Records

Dates of deratting/deratting exemption inspections and certificates, to include:

- Person(s) conducting inspection.
- Certifying authority.

Courtesy Technical Assistance Visit/Informal Survey Records

Dates of formal assistance from NDVECCs, NEPMUs, and other preventive medicine personnel, to include:

- Person(s) making visit.
- Reason for visit (e.g., technical assist, informal survey).

Pesticide Use Records

Only pesticides from the "Authorized Shipboard Pesticide Use List" (Appendix A) may be used aboard

U.S. Navy vessels. Each pesticide use must be recorded, archived, and reported (see "Reports" section for specific requirements and formats).

REPORTS

Pesticide Use

Memorandum, DASN (I & E), subject: Recording and Archiving Pesticide Use During Military Operations, April 27, 1999 (Appendix N) states that DoD Instruction 4150.7, "DoD Pest Management Program," requires that pesticide use during all military operations, including those applications performed by contract, be recorded, reported, and archived. This requirement includes all pesticide use, ***except* arthropod skin and clothing repellents**. To comply with this requirement, all personnel who apply pesticides during military operations ashore and ***afloat*** will record and report pesticide applications using DD Form 1532-1, "Pest Management Maintenance Record," or a computer generated equivalent. Each month, these records will be consolidated at each command and forwarded directly to the Navy Environmental Health Center (NEHC), ATTN: Preventive Medicine, 2510 Walmer Avenue, Norfolk, VA 23513-2617 for archiving. Negative reports are required.

Historically, shipboard pesticide use records have been maintained in a hand written pest control log book or electronically through a computer based pest control log contained within the "SNAP Automated Medical System (SAMS)" software program. However, many of the data entry fields required by DD Form 1532-1 are missing or out of sequence in current versions of the "SAMS" program.

Therefore, the only format that will be accepted by NEHC to report all pesticide use aboard U.S. Navy vessels will be a paper or electronic copy of DD Form 1532-1. Any attempt to meet this reporting requirement through a format other than DD Form 1532-1 will negatively impact on the ability of NEHC to efficiently merge all fleet pesticide use data into a single centralized database.

Instructions for completing DD Form 1532-1, a blank form, and a sample form incorporating pesticide examples from the "authorized shipboard pesticide use list" are included in Appendixes O, P and Q, respectively. A copy of each monthly DD Form 1532-1 should be retained onboard each vessel.

The information provided through this recording and reporting system is essential to adequately document pest control efforts, track total pesticide usage at specific locations, and identify pest control program deficiencies.

Infested Products

DD Form 1222, "Request for and Results of Tests"

Preliminary recognition and accurately confirmed identification of pest or invasive species is critical to prompt isolation and subsequent disposal of suspected contaminated products. This is of special concern in the case of organisms that may cause medical or health concerns to ship's personnel when underway. Conversely, it goes without saying

that if a suspected pest is incorrectly identified, vital and costly food supplies may be needlessly destroyed.

NAVSUP P-486, Vol. 1, Food Service Management – "Suspected Hazardous Food Item Message"
Responsibilities and procedural guidelines for suspected hazardous products. If food is found to be unfit for human consumption, specific detailed instructions on disposing of unacceptable food items may be found in MIL-STD-904B, NAVSUP 486, and NAVMED P-5010, Chapters 1 and 8. Indicate the survey technique used and the name of the person who determined the food to be unacceptable. Specify whether the food was isolated until it could be further inspected by a more competent authority, or discarded as unfit.

Automated record keeping has become routine, and software is continually being improved. Documentation and reporting of all pesticide use must meet DoD and Navy requirements.

CHAPTER 5
PESTICIDES

PESTICIDE LABEL

Before applying any pesticide, read all label directions for use and precautions. Review the MSDS and any other product information sheets that may be available. The text on the label and the MSDS has been carefully written and contains information on the safe and effective use of the product. The contents and format of pesticide labels are specified under federal law. Pesticide labels must provide the following information:

- Name, brand, or trademark under which the product is sold.
- Name and address of the producer, registrant, or person for whom the product was produced.
- Net weight or measure of contents.
- Environmental Protection Agency (EPA) registration number.
- Producing establishment registration number.
- Ingredient statement.
- Warning or precautionary statements.
- Statement of use classification.
- The statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."
- Directions for use, including:
  - Sites of application.
  - Target pests associated with each site.
  - Dosage rate associated with each site and pest.
  - Method of application and types of application apparatus or equipment required.
  - Frequency and timing of applications necessary to obtain effective results without causing unreasonable adverse effects on the environment.
  - Specific time limitations on reentry to areas where the pesticide has been applied.
  - Specific directions concerning storage and disposal of the pesticide and its container.
  - Any limitations or restrictions on use required to prevent unreasonable adverse effects.
- Category of toxicity. Insecticide labels also list the toxicity category of the pesticide. The text required on the front panel of the label is determined by the toxicity category of the pesticide. Toxicity categories, precautionary statements, and key signal words are listed in Table 5-1 and 5-2.

Table 5-1. Toxicity categories, precautionary statements, and key signal words (oral, inhalation, or dermal toxicity)

Category	Precautionary statements	Signal word	LD_{50} (mg/kg)
I	Fatal (poisonous) if swallowed, inhaled, or absorbed through skin	Danger Poison	0-50
II	May be fatal if swallowed, inhaled or absorbed through skin	Warning	50-500
III	Harmful if swallowed, inhaled or absorbed through skin	Caution	500-5000
IV	No precautionary statements required	Caution	>5000

Table 5-2. Toxicity categories, precautionary statements, and key signal words (skin and eye local effects[1])

Category	Precautionary statements	Signal words
I	Corrosive, causes eye and skin damage (or skin irritation)	Danger Poison
II	Causes eye (and skin) irritation	Warning
III	Avoid contact with skin, eyes or clothing. In case of contact, immediately flush eyes or skin with water	Caution
IV	No precautionary statements required	Caution

[1]Eye tissues are particularly absorbent. Besides chemical injury to the eyes, some pesticides may be absorbed in sufficient amounts through the eye to result in serious or fatal illness.

PESTICIDE SAFETY

Pesticides, if not applied correctly, can pose a serious health hazard to shipboard pest control specialists and other personnel that inhabit the areas where pesticides were misapplied.

Routes for Pesticide Exposure

There are three routes of exposure to pesticides by which poisoning can occur. Pesticides can enter the body through: (1) the mouth (oral ingestion), (2) the nose or lungs (inhalation or respiratory exposure), and (3) the skin (dermal absorption).

Oral

Oral pesticide poisoning occurs when pesticides or pesticide-contaminated items are ingested. To prevent oral pesticide poisoning:

- Always check the pesticide label for special instructions or warnings concerning exposure.

- Never eat, drink, or smoke while handling pesticides.

- Always wash hands and arms thoroughly with soap and water after using pesticides and especially before eating or drinking.

- Never touch the lips to pesticide-contaminated objects or surfaces. Never clear pesticide dispersal equipment nozzles by blowing or siphoning by mouth.

- Never wipe the mouth with forearms, hands, clothing, or rags contaminated with pesticides.

- Never expose food, beverages, utensils, or food and beverage containers to pesticides.

- Never bite nails or put fingers in the mouth when handling pesticides.

- When handling pesticides, always wear a NIOSH approved full face-piece respirator, or a NIOSH approved half-face respirator with non-vented or indirectly vented goggles.

- Never store pesticides in unlabeled containers.

Inhalation or Respiratory Exposure

Inhalation pesticide poisoning occurs when persons are exposed to aerosols, mists, dusts (including dusts from working with granular pesticides), and volatile liquid formulations. Applying pesticides in confined spaces increases the potential for respiratory exposure.

To prevent inhalation pesticide poisoning:

- Always open and pour pesticides in well-ventilated areas.

- Always wear a properly fitted NIOSH certified respirator, specifically approved for use with pesticides. OPNAVINST 5100.19C and OPNAVINST 5100.23E provide specific guidelines on respirator use aboard ships. Personnel using respirators shall have had a medical evaluation and been properly fit-tested. Personnel using respirators also shall be provided training in proper respirator usage and care, and be included in the command's respiratory protection program.

- Always inspect the respirator before each use to ensure that it fits and functions properly. Check for cracks and proper fitting of valves, filters, and cartridges.

- Always change the respirator filter cartridge after every 8 hours of use or sooner if pesticide odors are detected while wearing the respirator. To ensure 8 hours are not exceeded, mark the respirator filter cartridge for each hour of use.

- Always restrict unprotected personnel from entering areas where pesticide operations are being conducted, and for at least 2 hours after spraying, or until the space can be properly ventilated.

- Always remove pesticide-contaminated clothing before removing the respirator.

Dermal Absorption
Dermal pesticide poisoning can occur when pesticides contact the skin. Dermal exposure is the most frequent route of pesticide poisoning. High temperatures, dermatitis, or damage to the skin (e.g., sunburn) can increase the dermal absorption rate of a pesticide 4 to 10 times. Occlusive clothing such as sweat bands, coveralls, and leather boots also increases the absorption rate of pesticides 4 to 10 times. Different pesticide formulations penetrate at different rates. Oil solutions penetrate most quickly. To prevent dermal pesticide poisoning:

- Immediately wash any pesticide from the skin with soap and water to minimize absorption of pesticides.

- Always read the pesticide label and follow all recommended personal protection measures against exposure to the pesticide ***before use***.

- Select and wear proper personal protective clothing to ensure skin contact with the pesticide does not occur. Coveralls with long sleeves and made of closely woven material should be worn. At the minimum, wear long-sleeved shirts and long pants.

- Depending on the pesticide to be applied, wear rubber boots or impermeable shoe coverings when spraying. Pants should be worn outside the boots to prevent pesticides spilling into the boot. Leather boots will absorb pesticides, and can cause chronic dermal exposure.

- Always wear waterproof headgear, such as a hard hat, when working with pesticide mists or conducting overhead spraying.

- Always wear unlined neoprene, nitrile, or rubber gloves.

- Never wear contact lenses when handling pesticides.

- Always wear good and snug fitting, non-vented, or indirectly vented goggles to prevent eye contamination.

- Never wipe the eyes with forearms, hands, clothing, or rags contaminated with pesticides. If pesticides get in the eyes, flush eyes with a gentle stream of clean water for at least 15 minutes; then seek prompt medical attention.

- Always wash with soap and water after using pesticides, especially before eating, drinking, smoking, or using the toilet.

- Always launder clothes/coveralls after ***each*** pesticide application.

MEDICAL EXAMINATIONS AND CHOLINESTERASE TESTING

The Medical Department shall provide appropriate medical surveillance for personnel engaged in routine pest control operations.

Minimum requirements for medical surveillance examinations are contained in the Medical Surveillance Procedures Manual and Medical Matrix series. The minimum requirements for medical surveillance are found in NEHC 6260, Technical Manual 96-1 (NOTAL). Medical surveillance is directed towards the measurement of cholinesterase activity to estimate inhibition by organophosphate and carbamate compounds. The following guidelines shall be followed for personnel working with organophosphate and carbamate pesticides:

- Determine baseline plasma (or serum) and red blood cell (RBC) cholinesterase levels on all pesticide applicators. The baseline values shall be the average of two or more tests taken at least 72 hours but not more than 14 days apart. If the difference between the two tests exceeds 15 percent, a third baseline level shall be obtained. The true baseline value will be the average of the two closest values. Obtain baseline testing when the pesticide applicator has had no exposure to cholinesterase inhibitors for at least 30 days. When circumstances preclude a 30-day exposure-free period, levels shall be drawn after the longest exposure-free period available, with a notation in the medical record as to when the last exposure occurred.

- At least annually, test plasma and RBC cholinesterase of personnel who handle only pesticides labeled "CAUTION" (regardless of frequency) and personnel who handle pesticides labeled "WARNING," less than any part of the day for seven or more days in any 30-day period. No shipboard pest controller should reach or exceed this level of exposure.

- Perform cholinesterase testing anytime a pesticide applicator develops signs or symptoms of acute pesticide toxicity.

- A drop to 80 percent or less of an individual's baseline plasma or RBC cholinesterase level may indicate excessive pesticide exposure and requires prompt retesting. If confirmed, investigate pest control practices.

- A decrease to 70 percent or less of a pesticide applicator's baseline RBC cholinesterase or 60 percent or less of the plasma cholinesterase baseline indicates a need for ***immediate removal from all exposure to cholinesterase inhibitors*** until parameters return to at least 80 percent of the baseline level. Promptly retest persons exhibiting such decreases. Evaluate laboratory cholinesterase testing procedures as inaccuracies in cholinesterase testing exist and there are marked variations among different cholinesterase testing methods and laboratories using the same method. To ensure greater reliability, cholinesterase testing for a given pesticide applicator shall be performed in the same laboratory using the same method whenever possible.

- It is not necessary to relieve persons demonstrating lowered cholinesterase levels from conducting other tasks unrelated to any additional exposure risks.

Symptoms of Acute Pesticide Poisoning

Organophosphate and carbamate pesticides inhibit cholinesterase and may cause the following signs and symptoms:

- tremors of tongue
- tremors of eyelids
- pupillary constriction
- slow pulse
- salivation
- lacrimation
- muscle tremors
- vomiting
- sweating
- diarrhea
- anorexia
- headache
- dizziness
- weakness
- anxiety
- impaired visual acuity
- nausea
- abdominal cramps

In severe cases, respiratory difficulty, pulmonary edema, cyanosis, loss of sphincter control, convulsions, coma, and death may occur.

Organophosphates are irreversible cholinesterase inhibitors while carbamates are rapidly reversible cholinesterase inhibitors. The above symptoms are signs of acute poisoning. Acute poisoning is due to short-term, high-dose exposure, which happens within a relatively short period of time. The possibility of chronic poisoning with organophosphate pesticides exists. Chronic exposure is due to long-term, low-dose exposure over a long period of time. Chronic exposure to pesticides can be just as life threatening, but there may be no obvious symptoms immediately. This type of poisoning is often difficult to diagnose. Comparison of current cholinesterase levels against baseline levels may be required if chronic poisoning is even remotely suspected.

Pyrethroids are not cholinesterase inhibitors. Exposure to pyrethroids has resulted in far fewer systemic poisonings of humans. Some pyrethroids may cause distressing paresthesia (stinging, burning, itching, and tingling with some progressing to numbness) when liquid or volatilized materials contact human skin. The skin of the face seems to be most commonly affected. The hands, forearms, and neck are sometimes involved. Sweating, exposure to sun or heat, and application of water may enhance the disagreeable sensations. Sometimes the effect is noted within minutes of exposure, but a 1 to 2 hour delay in symptoms is more common. Sensations rarely persist more than 24 hours. Little or no inflammatory reaction is apparent where paresthesia is reported (the effect is presumed to result from pyrethroid contact with sensory nerve endings in the skin).

Not all pyrethroids cause a marked paresthetic reaction. This reaction is prominent following exposure to pyrethroids whose structures include cyano-groups: fenvalerate, flucynthrinate, cypermethrin, and fluvalinate (none of which is on the

current shipboard pesticide list). The paresthetic reaction is not allergic in nature and sensitization does not occur.

Treatment for Pesticide Poisoning
The MDR shall be aware of the pesticides being dispensed and procedures to follow for treatment of acute pesticide poisoning. A current MSDS for each pesticide must be on file in the Medical Department. Atropine sulfate is the recommended antidote for organophosphate and carbamate poisonings. Pralidoxime (Protopam, 2-PAM) is recommended in cases of severe poisoning by organophosphate pesticides only.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Safety Rules for Maintaining and Wearing PPE
Requirements and training for wearing appropriate personal protective devices (i.e., face shields, respirators, eye protection, impervious gloves, and protective clothing), are provided in OPNAVINST 5100.23E, Navy Occupational Safety and Health Administration (NAVOSH) Program Manual; OPNAVINST 5100.19C, NAVOSH Program Manual for Forces Afloat (NOTAL); Title 2 Code of Federal Regulations (CFR), part 1910; and the pesticide label. Respirators shall be NIOSH approved for the pesticides used. Individuals who apply pesticides shall not have facial hair that comes between the skin and the sealing surface of the respirator. Obtain guidance for selecting essential pest control protective equipment from the Safety Officer, MDR, or cognizant NDVECC or NEPMU.

PPE for Shipboard Pest Control Programs
PPE for shipboard pest control and their applicable National Stock Numbers (NSN) are listed in Appendix C. Additional information on PPE is located in the Shipboard Safety Equipment Shopping Guide available from the ship's safety officer.

Types of PPE

- Head Protection: Wear hard hats for protection from protruding objects and possible exposure of the scalp to pesticides sprayed overhead.

- Foot Protection: Depending on the pesticide to be applied, wear rubber boots or impermeable shoe coverings when spraying. Do not wear leather shoes or boots.

- Hand Protection: Wear only ***unlined*** neoprene or nitrile, chemical-resistant gloves while handling pesticides. Surgical gloves are not acceptable substitutes.

- Eye and Face Protection: Wear non-vented or indirectly vented goggles while handling pesticides.

- Respiratory Protection: Wear only NIOSH respirators approved specifically for pesticides during all phases of handling.

- Clothing: Wear coveralls while handling pesticides. ***Before*** leaving the treated space, remove contaminated coveralls to prevent skin absorption and unnecessary pesticide contamination to other areas. Place contaminated clothing in a plastic bag or a biodegradable laundry bag labeled accordingly and treat as contaminated clothing for ***designated laundry systems***. On ships without such systems (designated for contaminated clothing), a full wash and rinse cycle is recommended to clean the washer after rinsing contaminated clothing and before continued washing of non-contaminated items.

Cleaning and Storage of PPE

- Store and properly maintain PPE to ensure its effectiveness.

- Always clean PPE after each use. Clean respirators, gloves, goggles, and boots in warm water with mild detergent.

- Never store PPE in the same enclosed space (locker) as pesticides or pesticide dispersal equipment.

- Always store PPE in a clean, dry area away from pesticides and pesticide dispersal equipment.

Procurement of Pesticides and Pesticide Dispersal Equipment

Requisitions Submittal. Standard Material Requisitions for NSN pesticides (Appendix A) and pesticide dispersal equipment (Appendix B) will be submitted directly through normal supply channels.

Non-standard materials include nonstandard pesticides or pesticide dispersal equipment that may be required for effective vector and pest control. The requisitions will contain a statement of planned use and will be forwarded to normal supply sources ***via the appropriate area Entomologist*** for technical review and approval. If procurement is approved, the Entomologist will enter the appropriate code and the requisition, and forward it to the supply source indicated in the requisition document. If the Entomologist does not approve procurement, the requisition will be returned to the originator. ***Only under unusual circumstances will non-standard materials be approved***.

The area Entomologists who are authorized to approve requisitions for nonstandard pesticides and pesticide dispersal equipment, and who are available for technical assistance in vector and pest control procedures, can be contacted at cognizant NDVECCs and NEPMUs (Appendix F).

Pesticide Storage

- Store all pesticides in safe, secure (locked), well identified areas that meet shipboard ventilation specifications. Keep pesticides in approved flammable storage lockers.

- Never store pesticides inside patient care areas. Store pesticides according to label and MSDS requirements.

- Store pesticides in the original labeled container with the label clearly visible. Ensure that the container is tightly sealed.

- Never store pesticides near food or drink.

- Always store pesticides in areas protected from freezing or excessive heat.

- Do not store pesticides for more than 2 years. Stock rotation (first in – first out) helps to prevent this.

Pesticide Mixing and Spills

Mix and pour all pesticides into dispersal equipment in ship's spaces that meet ventilation and spill containment specifications. For some ships, it is not practical for the MDR to maintain all of the equipment and materials needed to contain and clean up every type of spill. However, a basic spill kit should be available to handle most small spills (Table 5-3). Mark the kit "FOR PESTICIDE SPILLS ONLY" and keep it where pesticides are stored, mixed, and poured. Absorbent material, (e.g., cat litter, vermiculite, or sand) should be readily available in the event of a spill. Some type of absorbent material is usually available from the engineering department. Keep a 5 to 10 pound bag of absorbent material where it is easily accessible. Discard all brooms or swabs used to clean up the absorbent material and hazardous materials. Do not use these for other purposes. Place contaminated absorbent material, swabs, and brooms in appropriately labeled containers, and hold as hazardous waste for suitable disposal on return to port. For additional information on pesticide spills, contact the ship's Safety Officer or nearest NDVECC or NEPMU.

Table 5-3. Recommended pesticide spill kit

Nomenclature	NSN
Coveralls, disposable	Appendix C
Gloves, protective	8415-01-013-7382
Goggles, non-vented	4240-00-190-6432
Pesticide respirator	Appendix C
Dustpan	7290-00-616-0109
Sponge, 4 $^{1}/_{4}$" x 6 ½"	7920-00-633-9906
Liquid detergent	7930-00-282-9699
Brush, dusting	7920-00-178-8315
Scrub brush, household	7920-00-282-2470
Bag, plastic, polyethylene	8105-00-848-9631
Labels, hazardous waste	0116-LF-051-0020
Compound, absorbent, HAZMAT spills (25 lb)	7930-01-145-5797

Containment Procedures for a Pesticide Spill:

- Immediately secure the spill site from entry by unauthorized personnel.

- Notify the Damage Control Assistant (DCA) of the spill and location where the spill occurred.

- Put on appropriate PPE.
- Prevent spill from spreading by using absorbent materials.
- Ensure the space is well ventilated, during and after clean-up procedures.
- Use a broom or brush and dustpan to collect spilled pesticides and absorbent materials. Put spilled materials into durable plastic bags. Double the bags to prevent further spillage. Write the name of the pesticide and associated health hazards on a card or piece of paper and attach it securely to the bag.
- Use liquid detergent and sponge to remove excess spillage. Bleach may be required for decontamination (see pesticide label or MSDS). Pour detergent on spill site and wash area with a sponge. Wring the sponge out into the plastic bag containing the contaminated materials.
- Put all contaminated cleanup items into bag with contaminated absorbent material. Turn bags into the hazardous materials coordinator for disposal.
- Remove PPE. Place disposable coveralls, gloves, and items heavily contaminated with pesticides into a plastic bag. Turn bag into the hazardous materials coordinator for disposal. If coveralls are reusable, bag for washing in appropriate ship's laundry systems.
- Shower with hot water and soap as soon as possible.

CHAPTER 6
PESTICIDE DISPERSAL EQUIPMENT

AEROSOL CONTAINER PESTICIDE DISPERSAL UNIT

The aerosol container pesticide dispersal unit uses a series of aerosol container insecticide formulations and a crack and crevice injector gun to deliver survey and residual insecticides directly into insect harborages. This system requires very little preventive maintenance. It is a convenient, dependable, safe and effective tool for treating insect harborages. Certain minor repairs can be easily handled on the job.

Component Parts and Assembly

Save the manufacturer's manual that comes with the unit. The only current unit recommended for use aboard naval vessels is the Whitmire® PT® System III (Fig. 6-1). It is available through the NSN system (Appendix B).

To attach the aerosol can clamp, set the can on a flat surface and place the can clamp in the disengaged position over the “lip” of the insecticide can. Turn the handle clockwise to engage. Be sure the valve stem on the insecticide can is centered in the screw hole opening of the can clamp.

To attach the sprayer assembly to the pressurized can, hold the sprayer assembly (including spray gun, coiled hose, shutoff valve, and valve-clamp adapter) in one hand and the aerosol can (with can clamp attached) in the other. Center the assembly can clamp and hand tighten by rotating the can clockwise. Place the void injector with attached tip onto the spray gun. Insert the aerosol can into pouch. Put on the belt and pouch. Open the shutoff valve and begin applying the pesticide.

To change insecticides, close the shutoff valve. Empty the hose. Unscrew the aerosol can and can clamp from the sprayer assembly. ***Caution***: Do not disengage the can clamp without first unscrewing and detaching the sprayer assembly.

To change the hose, first work the hose spring guards away from the fittings. Unscrew the hose fittings from the spray gun and shutoff valve. Replace with a new hose and fittings. Use Teflon tape on both joints. ***Caution***: Do not remove the hose and gun from the pressurized insecticide can after a spray operation without first closing the shutoff valve.

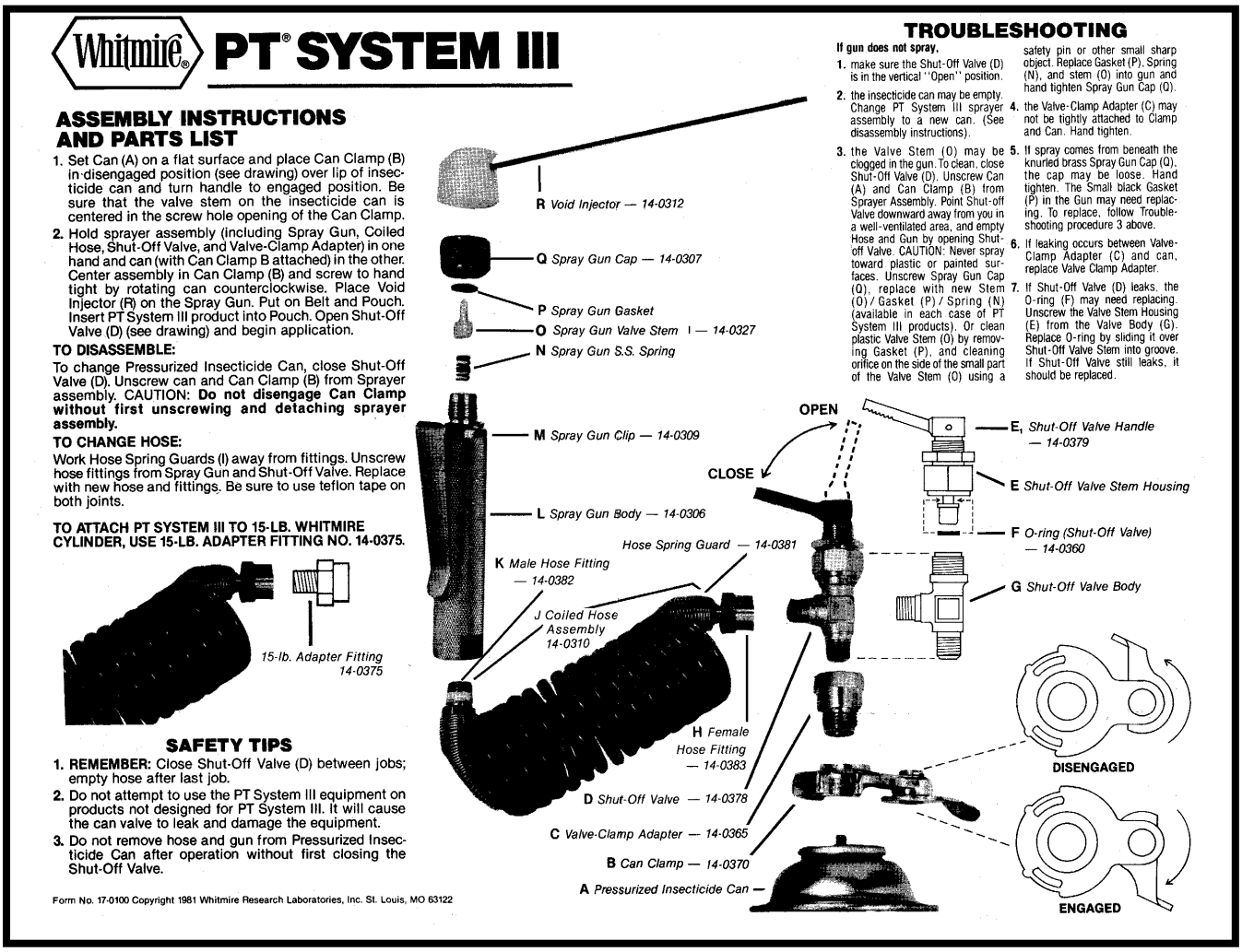


Fig. 6-1. Whitmire® PT® System III aerosol container pesticide dispersal unit.

Operation of the Pesticide Dispersal Unit

This unit shall only be used for crack and crevice treatment.

Depress the void injector to precisely apply insecticides into harborages.

Maintenance

The aerosol container pesticide dispersal unit requires little maintenance. It is not generally necessary to perform routine maintenance to keep it in working order. Insecticide canisters can remain attached when not in use without system deterioration. Because of excessive wear and potential leakage, it is recommended that the stem, spring and gasket (located directly underneath the gun cap) are replaced after every six aerosol cans are dispensed. These replacement items usually come with the aerosol products.

Repair

- Save the manufacturer's manual that comes with the unit. Repairing the pesticide dispersal unit is not difficult. The manual will be needed to troubleshoot and repair the unit if it malfunctions.

- Retain all repair parts that come with aerosol cans. This is especially important for deployed ships. Additional repair assistance is available upon request from the NDVECCs and NEPMUs.

- ***Safety Precautions***. If a hose ruptures or a slow leak in the equipment or the hose occurs, immediately turn off the valve. Cover the hole with paper towels if available. Empty the equipment and make all repairs in a well-ventilated area.

- Table 6-2 provides basic trouble-shooting techniques for the aerosol container pesticide dispersal unit.

Table 6-2. Basic troubleshooting guide for the aerosol container pesticide dispersal unit (Whitmire® PT® System III)

Problem	Probable cause(s)	Solution
Actuator or gun cap leaks	Loose gun cap	Hand tighten gun cap
	Worn actuator	Replace actuator
	Worn stem or gasket	Replace stem or gasket
Hose leaks near compression fittings	Hose wear	Cut hose above leaking point and replace[1]
Fails to spray	Clogged hose or valve stem (or other parts)	Check and clean hose, valve stem[2], shutoff valve, valve-clamp adapter, or can clamp.
	Empty can	Remove can, place actuator directly on can to see If it functions
Leaks below valve	Loose valve clamp adapter	Hand tighten adapter, shut off, then loosen ¼ to ½ turn or replace

[1]Shut off the valve and empty the hose according to label directions. Detach the gun and hose from the can by unscrewing the valve clamp adapter from the can clamp. Work the hose spring guards away from fittings. Unscrew the hose fittings from the spray gun and shutoff valve. Using two $^{7}/_{16}$" wrenches, remove the old compression fitting without removing the $^{7}/_{16}$" brass adapter fitting from the end of the spray gun. Cut the hose above the leaking point. Slide the replacement compression fitting onto the hose, (make sure hose protrudes through the ferrule at least $^{1}/_{8}$"). Tighten the compression fitting down onto the knob of the brass adapter at the end of the spray gun. Attach the hose to the gun or shutoff valve and slide the hose spring guards back into position.

[2]Shut off the valve and unscrew the can and the can clamp from the sprayer assembly. Point the shutoff valve downward away from you ***in a well-ventilated area***, and empty the contents of the hose and gun by opening the shutoff valve. ***Caution***: Never spray toward plastic or painted surfaces. Unscrew the spray gun cap and replace old stem, gasket, and spring with new parts. Replace and hand tighten the brass cap or clean the plastic valve stem by removing the gasket and cleaning the orifice on the side of the small part of the valve stem, using a safety pin or other small sharp object. Replace the gasket, spring, and stem into the gun and hand tighten the spray gun cap.

HAND-COMPRESSED AIR SPRAYER

The hand-compressed air sprayer can be used for applying insecticides aboard ships. It is available through the stock system (Curtis Dyna-Fog® Model #2981-A; Appendix B). The "B & G" hand compressed air sprayer is available only through "open purchase." The best sprayer is one that has low maintenance and high reliability. The hand-compressed sprayer ranges in size from a one-half to two-gallon cylindrical tank, fitted with an air pump, hose, spray gun, and other components necessary for applying liquid insecticide formulations.

Component Parts

- The tank of the sprayer is made of stainless or galvanized steel, but remains susceptible to corrosion if not properly cleaned after each use (Fig. 6-2).

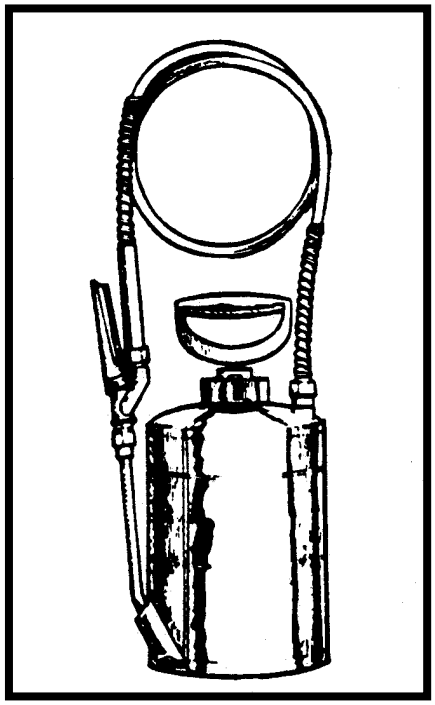


Fig. 6-2. The hand compressed sprayer.

- The air pump (Figs. 6-3, 6-4), consisting of a handle, rod, and piston, forces air into the sealed tank through a check valve in the bottom of the cylinder. The piston has either a leather or synthetic rubber cup, which requires regular inspection and maintenance.

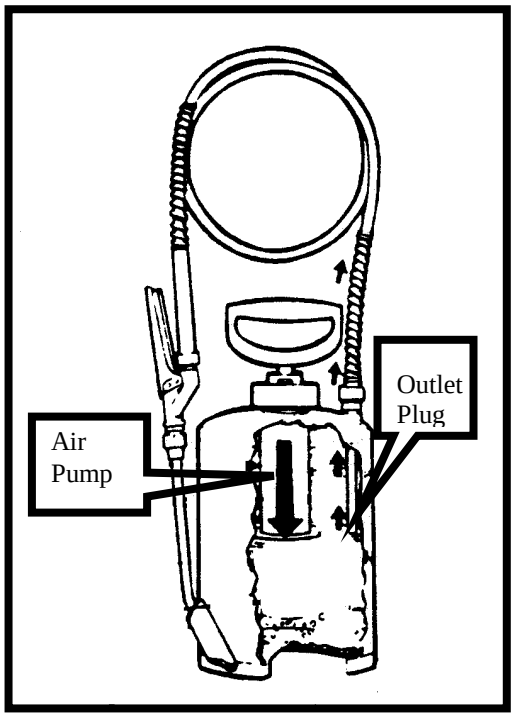


Fig. 6-3. Internal air pump and outlet plug.

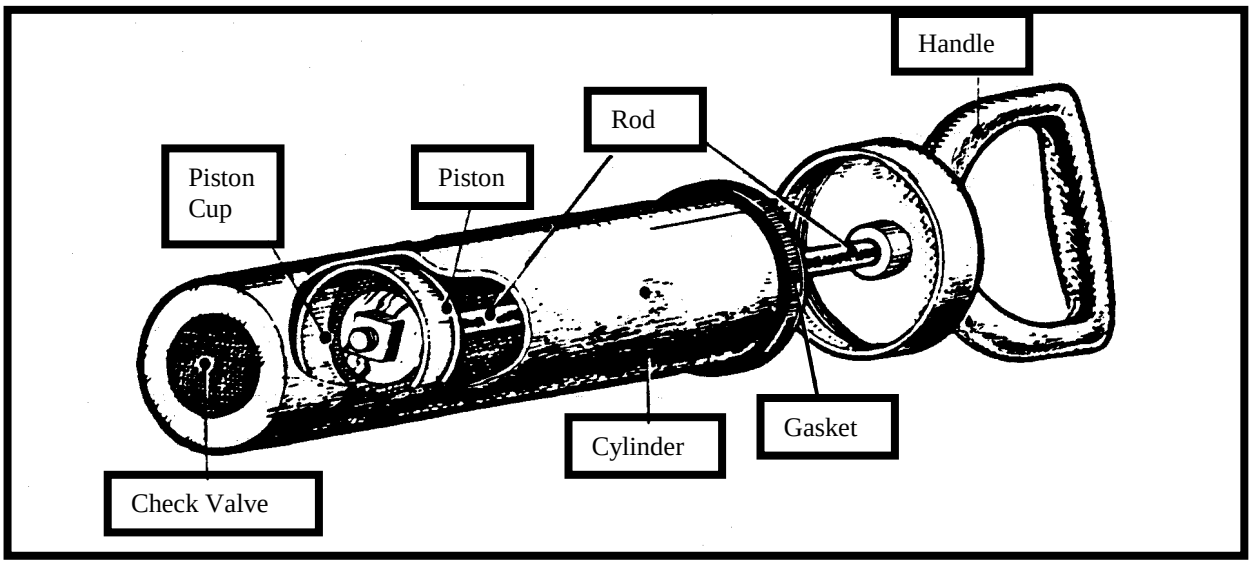


Fig. 6-4. Air pump assembly

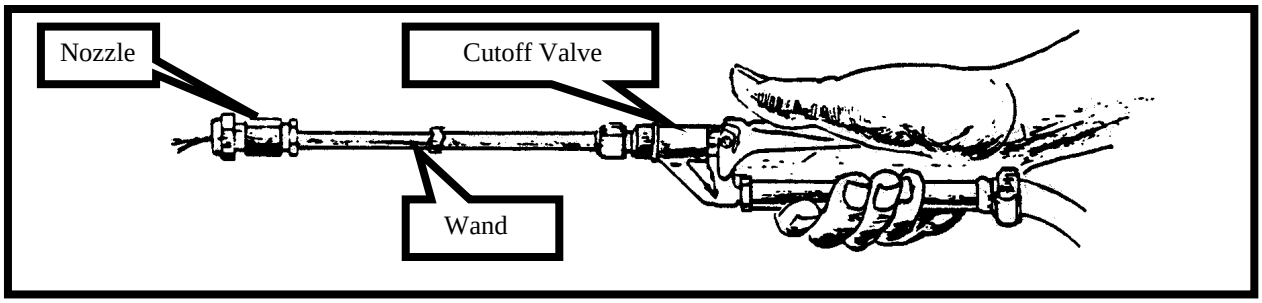


Fig. 6-5. Spray hose assembly

- The spray gun consists of a cutoff valve, strainer, wand, and nozzle (Fig. 6-5).

- The cutoff valve or trigger assembly is a spring- loaded valve to regulate the spray flow rate. Poor quality or poorly maintained cutoff valves do not completely stop the pressurized flow of liquid, resulting in some residual pesticide dripping from the nozzle.

- The wand is a metal tube extending from the cutoff valve to the nozzle. Two or more wands may be joined together for applying insecticides to hard-to-reach areas.

- The strainer is a heavy screen mesh, usually located inside the metal fitting, which connects the hose to the cutoff valve. This screen prevents unwanted large solid particles from entering and clogging the cutoff valve and nozzle.

- The nozzle is the most important part of the sprayer. The nozzle determines the amount and pattern of the insecticide spray dispensed. The two basic nozzles used in hand-

compressed sprayers are the solid or pin stream nozzle and the flat or fan spray nozzle.

- The solid or pin stream nozzle applies a fine jet of insecticide for treating cracks and crevices. A sprayer should also have a crack and crevice tip for inserting into cracks and crevices.

- The flat or fan spray nozzle applies the insecticide in a wide, fan-shaped pattern for residual coverage over large areas.

- A combination nozzle is available for most sprayers to easily allow the operator to change spray patterns.

Operation of the Sprayer
Test the sprayer with water before using the insecticide. This prevents wasting time and reduces potential exposure to insecticide if the sprayer is leaking or not functioning properly. Place a funnel into the sprayer, filling the sprayer no more than two-thirds full with the pesticide to be sprayed. Do not mix or add more pesticide than necessary to complete the job. Pump pressure depends on which treatment method is chosen.

Crack and Crevice Treatment

- Use a pin stream nozzle or extender tip. Apply this treatment at low pressure to avoid splash back. Four or five pump strokes should give enough tank pressure.

- Hold the nozzle as close to the crack and crevice as possible. An extender tip can be placed into the crack or crevice for direct application.

Spot and Area Treatment

- Use a fan spray nozzle. Pump the plunger until it becomes difficult to pump. Approximately 40 pounds per square inch (psi) will be needed for residual treatment. It will be necessary to repeat charging the tank as the sprayer empties. If the sprayer and nozzle are in good condition, adequate pressure will yield very fine droplets.

- Hold the nozzle 18 to 24 inches from the surface to be sprayed.

Maintenance
The hand-compressed sprayer requires proper maintenance to ensure long service life. Empty and clean sprayers thoroughly after each day's use.

- Empty unused insecticide into its original container.

- To clean, add a warm detergent and water solution to the sprayer, agitate, pressurize, and spray through the hose and nozzle.

- Repeat the above step three times with clean water.

- Remove the pump and let the tank air-dry (upside down).

- Place a few drops of oil on the leather plunger cup to keep it pliable. Silicon lubricant (grease) should be used instead for synthetic rubber plunger cups.

Repair

- Save the manufacturer's manual that comes with the sprayer. Repairing the hand-compressed air sprayer is not difficult. Most sprayers are similar in construction. Some parts are interchangeable. Many parts may ***appear*** to be interchangeable; however, ensure correct parts are used. The manual will be needed to troubleshoot and repair the sprayer when if it malfunctions.

- Maintain extra gaskets, valves, nozzles, hoses, and small spare parts used in the sprayers. This is especially important for deployed ships. Repair assistance is available upon request from NDVECCs and NEPMUs. Most manufacturers produce a service kit, which contains small parts needed for sprayer repair.

- Table 6-2 provides basic troubleshooting techniques for the basic hand-compressed sprayer.

Table 6-2. Basic troubleshooting guide for the hand compressed sprayer

Problem	Probable cause	Solution
Fails to build pressure, may be hard to pump	Dry or worn plunger	Oil cup with clean oil (no heavier than 30 SAE); if this fails, replace worn cup.
	Worn or missing pump cylinder gasket	Clean seating surfaces and replace gasket.
Hard to pump, liquid in pump cylinder	Worn check valve	Replace check valve.
Fails to shut off, drips at nozzle	Improper wand valve spring tension	If sprayer has a trigger assembly, which is adjustable, tighten or loosen tension of valve spring.
	Worn gaskets or "O" - ring	Replace worn parts. note: some trigger assemblies can not be serviced and may require replacement.
Inadequate spray or failure to spray, but pressure is o.k.	Improper wand valve spring tension	Adjust wand spring tension.
	Clogged strainer	Tight fittings.
	Clogged nozzle	Replace worn parts.
Leaks around threaded fittings	Loose fittings	Tight fittings.
	Worn gaskets or "O" – rings	Replace worn parts.
	Worn fittings	Plumbers tape will seal fittings.
Cracked and worn hose at attachment points	Normal wear and tear	Cut off worn ends and replace hose.
	Missing hose springs	Replace springs and reattach hose.

Appendix A

Authorized Shipboard Pesticide List

Item	Active ingredient	EPA Reg. #	User code[1]	Unit package	Unit issue	NSN
Insecticide, cockroach bait station , regular size (Combat Quick Kill)	0.03% fipronil	64240-33	N	12 bait stations/box/ 12 boxes	PG	6840-01-180-0167
Insecticide, cockroach bait station, large size (Combat Quick Kill)	0.03% fipronil	6240-34	N	8 bait stations/box/ 12 boxes	PG	6840-01-224-1269
Insect repellent, clothing application, aerosol (Permethrin Arthropod Repellent)	0.5% permethrin	50404-5 4816-738	A	(12) 6-oz cans	BX	6840-01-278-1336
Insect repellent, personal application (3M)	33% DEET	58007-1	A	(12) 2-oz tubes	BX	6840-01-284-3982
Insecticide, aerosol (Whitmire Micro-Gen PT® Perma-Dust®)	35.5% Boric acid	499-384	N	(12) 9-oz cans	BX	6840-01-287-3938
Insecticide, Dursban, aerosol (Whitmire Micro-Gen PT® Engage®)	0.5% chlorpyrifos	499-292	N	(12) 20-oz cans	BX	6840-01-338-2487
Insecticide, Dursban, microencapsulated (Empire 20)	20% chlorpyrifos	62719-88	C	1-pint container	PT	6840-01-338-6003
Insecticide, D-Phenothrin, aerosol	2% D-Phenothrin	901-82	N	12-oz can	CN	6840-01-412-4634
Insecticide, Pyrethrin, aerosol (Whitmire Micro-Gen PT® 565 Plus XLO®)	0.25% pyrethrins; 0.25% d-trans allethrin; 1% piperonyl butoxide, technical; 1%n-octyl bicycloheptene dicarboximide	499-310	N	(12) 20-oz cans	BX	6840-00-823-7849
Insecticide, Siege® Gel Bait	2% hydramethylnon	241-313	N	4-30 gm reservoirs	BX	6840-01-398-6799
Insecticide, Maxforce Roach Killer Bait Gel	0.01% fipronil	64248-14	N	4-30 gm reservoirs	BX	6840-01-471-5650

[1]Indicates who may use the product aboard ship
N – Navy Shipboard Hospital Corpsmen
C – Controlled use by Navy Medical Entomologists or PMTs at a NDVECC or NEPMU
A – All hands use approved, when issued by the ship's Corpsman

Appendix B

Pest Control Equipment and Supplies

Nomenclature	NSN
Brush (small; to transfer insects)	8020-00-503-0000
Flashlight	6230-00-243-6069
Funnel, polyethylene, 1 quart	7240-00-404-9793
Funnel, polyethylene, 2 quart	7240-00-404-9795
Magnifier (reading glass)	6650-00-252-6250
Ratguard, ship, 38" diameter	2040-00-272-2353
Ratguard, ship, 48" diameter	2040-00-272-2355
Traps, mouse, 3 or 4 way snap, wood base	3740-00-252-3384
Traps, rat, spring, wood base, 1 doz	3740-00-260-1398
Trap, glue, rodent, box of 24	3740-01-240-6170
Traps, cockroach, box of 48	3740-01-096-1632
Screens, porthole, 10 inches	2040-00-371-8031
Screens, porthole, 12 inches	2040-00-371-8032
Screens, porthole, 16 inches	2040-00-371-8033
Screw cap vials, 9 ml	6640-00-408-2200
Screw cap vials, 3 ml	6640-00-408-2300
Sprayer (hand compressed air), pesticide, manually carried, 1-gal stainless tank, with pressure gauge. Formerly MIL-S-14102, replaced by CID A-A-55748. Flow rate – 0.8 l/min. Current inventory on hand does not include a spare parts package. Future purchase will include 3 sets of spare parts including: crack and crevice tip assemblies, nozzle gaskets and “O”- rings, plunger cups, check valves, and strainer/filters. Cage Code 58536	3740-00-191-3677
Sprayer, pesticide, manually carried, Whitmire System III single pack, part number 20-2300, includes pouch for 3 product aerosols and a 10 foot memory coiled hose. Pesticide aerosols must be ordered separately. Cage Code 67184	3740-01-338-5390
Ultraviolet light (specimen examining)	6530-00-663-2140
Ultraviolet light batteries, two 45-volt	6135-00-100-0464

Appendix C

Personal Protective Equipment

Nomenclature	Model	Size	NSN
Coveralls, disposable		X-Small	8415-00-601-0792
		Small	8415-00-601-0793
		Medium	8415-00-601-0794
		Large	8415-00-601-0797
		X-Large	8415-00-601-0801
Coveralls		36S	8405-01-057-3482
		36R	8405-01-057-3483
		38S	8405-01-057-3484
		38R	8405-01-057-3485
		38L	8405-01-057-3486
		40S	8405-01-057-3487
		40R	8405-01-057-3488
		40L	8405-01-057-3489
		42S	8405-01-057-3490
		42R	8405-01-057-3491
		42L	8405-01-057-3492
		44R	8405-01-057-3494
		44L	8405-01-057-5582
		46S	8405-01-057-3495
		46R	8405-01-057-3496
		46L	8405-01-057-3497
		48R	8405-01-057-3498
Gloves, protective		Size 7	8415-01-147-2637
		Size 8	8415-01-147-9540
		Size 9	8415-01-012-9294
		Size 10	8415-01-013-7382
		Size 11	8415-01-013-7384
Respirator, air filtering (3M brand), with prefilter	Model 5111	Small	4240-01-300-9416
	Model 5211	Medium	4240-01-300-9417
	Model 5311	Large	4240-01-300-9418
	Model 7200S	Small/medium	4240-01-246-5401
	Model 7300S	Medium/large	4240-01-246-5404
Retainer cartridge rings			4240-01-235-0823
Retainer, filter respirator			4240-01-246-5414
Respirator, air filtering (Scott brand)	PN66STC-OVP	Small	4240-01-250-0751
	PN66MTC-OVP	Medium	4240-01-250-0748
	PN66LTC-OVP	Large	4240-01-250-0749

Nomenclature	Model	Size	NSN
Facepiece, gas mask (Pro-Tech)	PN B122	Small	4240-01-249-9169
	PN B222	Medium	4240-01-249-9170
	PN B322	Large	4240-01-249-9171
Respirator, air filtering (Cabot/AO): AO 5-star half-facepiece		Small	4240-01-251-1574
		Medium	4240-01-251-1577
		Large	4240-01-251-1579
Respirator, air filtering (Cabot/AO): cartridge			4240-01-245-7233
Respirator, air filtering (Cabot/AO): prefilter			4240-01-249-9289
Respirator, air filtering (MSA)		Small	4240-01-150-7937
		Medium	4240-01-022-8501
		Large	4240-01-086-7670
Respirator, air filtering (MSA): cartridge			4240-01-248-9155
Respirator, air filtering (U.S. safety brand)	PM300	Small/medium	4240-01-250-6521
	PM300	Medium/large	4240-01-250-6519
Respirator, air filtering (U.S. safety brand): cartridge			4240-01-247-7229
Facepiece, gas mask(North/Norton), rubber		Small	4240-01-249-3559
		Medium	6515-01-231-7194
		Large	4240-01-220-7617
Respirator, air filtering (Wilson)	Model 6111S	Small	4240-01-269-4170
	Model 6111M	Medium	4240-01-269-4171
	Model 6111L	Large	4240-01-269-4172
Respirator, air filtering (Wilson): Prefilter			4240-01-249-2577
Respirator, air filtering (Wilson): Pesticide Pre-filter			4240-01-268-0567
Goggles, Industrial			4240-00-190-6432
Helmet, Safety			8415-00-836-8618

Note 1: Consult the Shipboard Safety Equipment Shopping Guide available from the ship's Safety Officer for other PPE.

Note 2: Retainer rings for respirators are required to hold in the cartridge or to hold a pre-filter on a cartridge.

Note 3: All respirators are available through the paperless order placement system (POPS). POPS is a computer ordering system operating between the Defense General Supply Center (DGSC) in Richmond, VA and various manufacturers. To use POPS, use S9G in the Routing Identifier Code (RIC) on the NAVSUP Form 1250 (top left-hand corner of the form). This will automatically send your request to DGSC through the fastest possible route for procurement.

Appendix D

Technical Information Memorandum (TIM) No. 38: Protecting Meal, Ready-To-Eat Rations (MREs) and Other Subsistence During Storage (Selected Pages)

Armed Forces Pest Management Board

TECHNICAL INFORMATION MEMORANDUM NO. 38

❖❖❖

PROTECTING MEAL, READY-TO-EAT RATIONS (MREs) AND OTHER SUBSISTENCE DURING STORAGE

Acknowledgments ii
Disclaimer ii
Foreword ii

PART I. INSTALLATION PROGRAMS

Instituting an Integrated Pest Management Program 1
Initial Inspection 1
Structural Design/Pest Exclusion 1
Sanitation/Housekeeping 3
Stock Handling Practices 3
Pest Exclusion Methods 4
Nonchemical Control Methods 5
Chemical Control Methods 5
Inspection/Survey/Monitoring Techniques 6

PART II. SHIPBOARD PROGRAMS

Introduction 8
Landing Force Operational Reserve Materiel (LFORM) 9
U.S. Marine Corps and U.S. Army Prepositioned Stocks 9
Stacking Requirements 9
Pest Management Guidelines 10

REFERENCES 13

Acknowledgments

The AFPMB Stored Products Committee completed this Technical Information Memorandum No. 38 (TIM 38) as a revision of information that was included in earlier issuances of OPNAVINST 6240.4, Pest Management Program. The AFPMB acknowledges and thanks Mr. William Gebhart for providing background information for this TIM and for reviewing drafts; MAJ Zia Mehr for reviewing the draft TIM; LCDR Steven Presley for providing assistance on Marine Corps terminology and issues associated with the TIM; and the members and advisors of the Stored-Products Committee and AFPMB staff for reviewing and preparing this TIM. Mr. Gary Walker, Vice-Chair of the AFPMB Stored Products Committee, served as the editor for this revision. CAPT Herbert Bolton, AFPMB Research Liaison Officer, provided technical assistance.

Disclaimer

Trade names are used in this TIM to provide specific information and do not imply endorsement of the products named or criticism of similar ones not mentioned. Mention of trade names does not constitute a guarantee or warranty of the products by the AFPMB, the Military Services, or the Department of Defense (DoD).

Foreword

This Technical Information Memorandum (TIM) implements guidance for the protection of Meal, Ready-to-Eat (MRE) Combat Rations owned or under the custody of military installations and forces consistent with the references listed at the end of this document. Historically there have been few incidents of MRE infestation/damage by insects or rodents. However, the 10 mil polyethylene bags used for MRE rations are susceptible to insect and rodent attack and damage. Until different packaging is used for the rations, pest prevention measures must be taken ashore and afloat to protect them. Currently, MRE rations are stored in dry storage (ambient temperature) warehouses; refrigerated/cold storage facilities, both above and below ground; and aboard ships including the Maritime War Reserves (MWR). Furthermore, the rations are included in the Marine Corps Landing Force Operational Reserve Materials (LFORM) which, under the present situation, are stored for extended periods of time on board ships below deck and usually in areas inaccessible for thorough inspection. Since temperature and humidity conditions in shipboard storage are highly conducive to development of stored product pests, action must be taken to prevent infestation prior to and during storage aboard ship. Parts I and II of this TIM provide pest control measures for the two broad MRE storage situations: ashore and aboard ship. Although this TIM is geared to MRE storage, most of the information in the TIM also applies to other stored subsistence.

(2) Insects.

(a) Note the number and type of dead insects on floors, ledges, and window sills, as well as any live insects crawling on or flying around commodities.
(b) If New Jersey style or similar light traps are used, their contents must be checked weekly for the number and species of insects. The responsible pest management consultant should identify these insects.
(c) Pheromone traps are recommended and may be used at the discretion of the responsible pest management consultant. Technical Information Memorandum No. 27, Stored Product Pest Monitoring Methods, (Reference (h)), provides guidance on their use.
(d) Check infestible food products by moving a layer or two of packages off the top of the pallet and look closely for insects on package surfaces or in cracks and folds between packages. Insects infesting food products will usually be found on the underside of plastic bags, in and along folds and seams of bagged commodities, in the bottom of cartons and sacks, or underneath carton or box flaps. The existence of "frass" or silk in or on a product or chewed entry or exit holes are clues to an infestation, even if actual insects are not immediately seen.

PART II. SHIPBOARD PROGRAMS

1. Introduction.

A. General. The Meal, Ready-to-Eat (MRE) is a combat ration packaged in a 10 mil polyethylene bag which is strong and lightweight, but can be penetrated by rodents and certain insects. Under the confined conditions found aboard ship, MREs may be at risk to infestation or damage by those pests. Because of the critical importance of the MRE in future contingency operations, it is essential that ship commanders ensure these rations are protected through an effective shipboard pest management program.

B. Ships Carrying MREs.

(1) The MRE rations are stocked aboard Navy ships when specifically authorized by a fleet commander and the Navy Food Service System Office. For example, an LSD may requisition MREs to feed the ship's landing party during training or field exercises. In that situation, the rations will be found in the food service storerooms and will be the responsibility of the supply department. Additionally, the Marines and the U.S. Army store pre-position MRE stocks aboard contract vessels and USNS vessels (Military Sealift Command).
(2) Navy replenishment and USNS vessels may carry MREs, some of which will be transported in refrigerated spaces. Certain types of amphibious assault ships have

been designed to carry large quantities of MREs under a program called Landing Forces Operational Reserve Materials, or LFORM. The very nature of the program renders the MRE vulnerable to invasion by insects and rodents.

2. Landing Force Operational Reserve Materiel (LFORM).

A. Concept of LFORM. LFORM are part of Marine Corps Pre-positioned War Reserves Materiel stocks and are maintained aboard selected amphibious warfare ships to provide support for embarked troops in contingencies. Embarked Marines aboard for training operations will not draw stocks from LFORM. The combat cargo officer is responsible for LFORM stocks, not the supply officer.

B. Ship Types Carrying LFORM MREs. MRE rations for a Marine Expeditionary Unit (MEU) will be pre-positioned and stored in secure spaces aboard each LPH, LHA, LPD and LKA. Designated ships each receive and hold five to seven thousand cases with 12 rations per case. Note: For most pre-position situations the MREs are stored in certified containers (sealed containers, no openings/vents). As long as the MREs are pest free when the containers are loaded, and the containers are tight, there should be no pest problems. Additionally, once staged aboard the pre-position ships the MREs are not readily accessible.

C. Palletizing MREs in LFORM. MREs are palletized and banded on standard 40" x 48" wooden pallets. There are 48 cases/pallet.

D. Rotation of MREs in LFORM. MREs have a 3 year shelf life under normal conditions. Current policy is to rotate MREs every deployment. Rotation will return MREs to supply channels for reissuing and consumption.

3. U.S. Marine Corps and U.S. Army Pre-positioned Stocks.

New production MRE rations are used for pre-positioned stocks. MREs are stored in containers aboard either contracted or chartered ships or USNS vessels maintained by the Military Sealift Command. Once placed aboard ship, the rations are not readily accessible and generally will not be inspected until the stocks are rotated off the ships. Some ships have containers equipped for remote monitoring of container conditions. The rations are stored for 30 months (U.S. Marine Corps) and 24 months (U.S. Army). When rotated, the rations are replaced with new rations to maintain the serviceability of the stocks. It is essential the containers receive a proper inspection prior to loading. Container integrity and cleanliness are key components of this program.

4. Stacking Requirements.

A. Stacking. MREs shall be stacked no more than four (4) pallets high in a warehouse to prevent crushing the cases at the base of the stack. Continual vibration while underway will hasten the settling or crushing effects on the lower cases of MREs pallets. On

those ships having overhead clearance allowing stacking of MREs, it is recommended that stacks be no more than three (two preferred) pallets high. While other LFORM gear may be placed under the MREs, no items shall be placed over the MRE rations. MREs shall not be stacked over or immediately adjacent to petroleum products (oils, greases, fuels or solvents).

B. Inspections. Marine Corps Service Support Group LFORM loading plans should allow accessibility to the MRE rations for stored product pest inspections by medical department personnel. In this situation, accessibility means sufficient space for an individual to closely inspect a minimum of one side and the top of the MREs as stacked on a pallet.

C. Time and Temperature Guidelines. MREs stored in LFORM blocks can be expected to experience temperature ranges that allow them to last for at least one year. Studies by the U.S. Army, Natick Laboratory indicate the following time and temperature storage guidelines for MREs: seven years at 60°F, five years at 70°F, four years at 80°F, thirty months at 90°F, and five months at 110°F (See Reference (d)). Daily temperature logs should be kept on LFORM stowage areas where ordnance is held. Similarly, any spaces with MREs must also be monitored for temperature. The combat cargo officer should consider placing MREs in the coolest sections of the LFORM stowage spaces when designing the load plan.

5. Pest Management Guidelines.

A. Initial Inspection and Treatment of LFORM MRE Stowage Spaces. The combat cargo officer must coordinate the initial inspection of storage space with the preventive medicine technician or Medical Department representative (MDR) prior to loading LFORM MRE rations. A meticulously thorough survey for any insect or rodent must be made at the time. Even if no insects or rodents are found, flawless sanitation and housekeeping practices will substantially reduce pest food sources and harborage, as well as facilitate chemical and nonchemical measures for any pest that may be introduced later. A high degree of sanitation is essential in all store rooms to prevent or limit infestations.

(1) Thoroughly clean the entire stowage space where MREs are to be placed. Any nearby spaces which hold or have recently held foodstuffs or animal products (boots, blankets, brushes, wool uniforms, etc.) must receive similar attention. Remove debris from the ship after each cleaning.

(2) Once a spotlessly clean stowage area is achieved, residual insecticide sprays can be applied, however, this treatment is not warranted unless pest activity was noted during clean up. The preventive medicine authority certified to apply pesticides or station pest control personnel shall use an approved residual insecticide. Residual sprays provide long lasting protection to noninfested stocks and prevent the spread of pests from previously infested stocks. Specific pesticide recommendation, rate,

and type of application must be obtained from the respective area medical entomologist.

(3) If subsistence supplies are procured at overseas ports, ensure they receive a proper receipt inspection to prevent the introduction of stored product pests into ship storage areas.

B. Inspection of LFORM MREs Prior to Loading. Paragraph 4200 of Reference (c) states that stores received from military installations require only a quantity inspection. It further states that quality inspections are made by the supply activity upon acceptance of the material from the original supplier and will not be duplicated aboard ship. The receiving ship, however, may make inspections to detect any deterioration or breakage that may have occurred since the quality inspection. It is during this inspection that the Medical Department Representative must check closely for signs of insects and rodents. Receipt of stores from government installations other than military are to be inspected for both quantity and quality. Due to the absolutely critical importance of the LFORM MRE in future contingency operations, only stocks in good condition and free of defects should be accepted.

C. Loading of LFORM MREs. Loading can begin once the combat cargo officer has determined the quality and quantity of LFORM MREs, and that stowage spaces are properly prepared. Care must be taken to avoid damaging the rations during loading operations. Damaged cases with exposed foodstuffs must be removed from the pallet and repackaged. Prompt cleanup of spillage is essential. Supervisors must encourage caution and consciousness among forklift and elevator operations to avoid damage to these rations.

D. Routine Inspection Program for MREs Stored Aboard Ship.

(1) Inspection of Ship's Company MREs. In those storerooms where MRE rations are collocated with ship's company food stuffs, the Medical Department should conduct a thorough monthly inspection of several of the most highly infestible commodities (flour, mixes, cornmeal, grits, pasta, cookies, cereals, spices, beans, nuts, and candy). Handle infestations detected as a result of those inspections per Reference (c).

(2) LFORM MRE Inspection Program Requirements. Due to the absolutely critical nature of these rations, conduct intense surveillance of the LFORM MREs. Any insect life form found in these stowage spaces must initially be considered as a threat to the MRE. The combat cargo officer should coordinate with the medical officer to have designated Medical Department representatives conduct weekly inspections for stored product pests. The LFORM load plan must allow for reasonable access; otherwise, adequate inspections cannot be performed.

(3) Surveillance Equipment. To conduct an adequate and thorough inspection, the inspector will need to carry several items, such as a flashlight, clipboard, paper,

pen, alcohol vials for preserving insect specimens, magnifying hand lens to aid in initial pest identification, and optionally, a portable black light to identify rodent urine.

(4) The inspector should note the condition of pallets and cases, as well as look for actual infestations in the products stored adjacent to MREs. Damaged cases should be viewed with suspicion. Note: Open package inspection of MRE meals for insect infestation is not necessary nor is it recommended unless the pouch bag has been damaged or a special inspection has been requested.

(5) Rodent Inspection.

(a) The MRE ration is vulnerable to rodent attack, especially in the LFORM configuration. Mice, for example, may be brought aboard in plywood boxes containing other materials in LFORM (burlap bags, ordnance, barbed wire, etc.).

(b) Inattention to detail on the part of the inspector looking for rodents could have serious consequences. The inspector should look for droppings, urine stains, rub marks, gnawing, and shredded nesting materials on, in, and under palletized goods. Rats and mice may also infest the interior of palletized goods.

(c) The inspector should not confine the search for rodents to the MRE rations. The pests will nest in nonfood pallets as well.

(6) Insect Inspection.

(a) The inspector should note number and type of dead insects on the deck, as well as any live insects on or around pallets and packages.

(b) Check the MREs by removing cases from the top of the pallet and looking closely for insects on package surfaces or in cracks or folds between packages. Insects may be found on the underside of plastic bags, in the bottom of cases, or between the box and the sides of the MRE case. The existence of "frass" or silk in or on the product or chewed entry or exit holes are clues to an infestation, even if actual insects are not immediately seen. Breaking open pallets of all MREs stowed aboard ship is not recommended.

(c) Positive insect identification may be obtained from the nearest area medical entomologist or PMC listed in Reference (h).

E. Procedures When LFORM MREs are Infested by Insects.

(1) Notify the combat cargo officer and medical officer.

(2) Determine the extent of infestation and record lot numbers of MRE containers.

(3) Remove all infested/damaged cases from the LFORM stowage space immediately, in order to minimize the possibility of infestation of "clean" supplies. Refrigerate cases, if possible, or dispose of them following current directives. When cases are

damaged during loading, the cases shall be replaced with undamaged cases from stock.

(4) Contact the nearest Navy medical entomologist or PMC by phone or message for guidance and to transmit information on the lot numbers, condition and quantity of infested MRE rations. See Reference (h) for location of the nearest area entomologist.

(5) No fumigation procedure for MREs or other food stores aboard ship is currently approved. MREs and other food stores found to be infested can be covered with plastic and the plastic sealed to the floor with tape to isolate the product. If possible the products should be placed in refrigerated storage. This will serve as a temporary means of minimizing cross contamination to other products. Local medical or veterinary representatives must then determine through ration breakdown which components can be salvaged.

F. Procedures When MREs are Infested by Rodents.

(1) Light gangways well at night. Set traps and dispose of rodent carcasses following guidance provided in Reference (i). Check all traps during weekly inspections. When in port, rat guards must be utilized on all ship-to-shore lines on any vessel carrying MREs.

(2) Rodent bait blocks made of paraffin are not recommended for use aboard ship for two reasons: (1) the grain bait in the paraffin block may be infested with insects during the manufacturing process and serve as foci for infesting the ship's stored products, and (2) any rodent poisoned by a bait block may die in an inaccessible area and cause unpleasant odors.

(3) Glue boards may be useful for rodent control, especially in inaccessible areas. As with traps, locate the glue boards in natural rodent runs.

(4) Remove damaged cases from storage. Pallets with damaged cases should receive 100% inspection of the cases to ensure there are no rodent nests present. Adjacent pallets should also be examined. A blacklight is useful for identifying rodent contaminated cases. Remove pouches from contaminated cases and destroy the cases. The pouches should be examined for damage or contamination.

(5) MRE pouches that exhibit gnawing by rodents should be destroyed. Pouches with urine contamination can either be sanitized with a chlorine solution (Reference (i)) or destroyed as per Navy medical entomologist or local medical authority.

References

(a) COMNAVSURFPACINST 4080.1/FMFPAC ORDER 4080.2 (NOTAL)
(b) COMNAVSURFLANTINST 4080.1B/FMFLANT ORDER 4000.10B (NOTAL)
(c) NAVSUP PUB 485, Afloat Supply Procedures. Revision 2, 15 Nov 89, with changes through 31 Jan 96.

(d) DPSC Handbook 4155.2, Subsistence, Inspection of Meal, Ready-to-Eat (MRE) Rations, Appendix A.
(e) DLAI 4145.31, Integrated Stored Products Pest Management, 9 May 1997.
(f) DLAR 4155.37/TB 702-18, Appendix S, Materiel Quality Control Storage Standards, 24 Feb 93.
(g) AFPMB Technical Information Memorandum No. 11, Hydrogen Phosphide Fumigation of Subsistence with Aluminum Phosphide.
(h) AFPMB Technical Information Memorandum No. 27, Stored Product Pest Monitoring Methods.
(i) MILSTD 904B, Department of Defense Standard Practice: Guidelines for Detection, Evaluation, and Prevention of Pest Infestation of Subsistence.
(j) DoD Instruction 4150.7, DoD Pest Management Program, April 22, 1996.

Appendix E

NAVY SHIPBOARD PEST CONTROL TRAINING CENTERS

Navy Disease Vector Ecology and Control Center
19950 Seventh Avenue NE, Suite 201
Poulsbo, WA 98370-7405
DSN: 322-4450; Com: (360) 315-4450
FAX: (360) 315-4456; E-mail: postmaster@ndvecc.navy.mil
PLAD: NAVDISVECTECOLCONCEN BANGOR WA

Navy Disease Vector Ecology and Control Center
P.O. Box 43
Naval Air Station
Jacksonville, FL 32212-0043
DSN: 942-2424; Com: (904) 542-2424
FAX: (904) 542-4324; E-mail: dvj0ccj@jax10.med.navy.mil
PLAD: NAVDISVECTECOLCONCEN JACKSONVILLE FL

Navy Environmental and Preventive Medicine Unit No. 2
1887 Powhatan Street
Norfolk, VA 23511-3394
DSN: 564-7671; Com: (757) 444-7671
FAX: (757) 444-1191; E-mail: epc0epu2@bumed30.med.navy.mil
PLAD: NAVENPVNTMEDU TWO NORFOLK VA

Navy Environmental and Preventive Medicine Unit No. 5
Naval Station, Box 368143, Building 3235
3035 Albacore Alley
San Diego, CA 92136-5199
DSN: 526-7070; Com: (619) 556-7070
FAX: (619) 556-7071; E-mail: nepmu5@nepmu5.med.navy.mil
PLAD: NAVENPVNTMEDU FIVE SAN DIEGO CA

Navy Environmental and Preventive Medicine Unit No. 6
1215 North Road
Pearl Harbor, HI 96860-4477
DSN: (315) 473-0555; Com: (808) 473-0555
FAX: (808) 473-2754; E-mail: nepmu6@nepmu6.med.navy.mil
PLAD: NAVENPVNTMEDU SIX PEARL HARBOR HI

Navy Environmental and Preventive Medicine Unit No. 7
PSC 824, Box 2760
FPO AE 09623-2760
DSN: 624-4101; Com: 011-39-95-56-4101
FAX: 011-39-95-56-4100; E-mail: sig1pmu@sig10.med.navy.mil
PLAD: NAVENPVNTMEDU SEVEN SIGONELLA IT

Appendix F

Taxonomic Keys to Some Common Shipboard Pests

COMMON TAXONOMIC CLASSES AND ORDERS OF ARTHROPODS OF PUBLIC HEALTH IMPORTANCE

KEY TO SOME COMMON CLASSES AND ORDERS OF ARTHROPODS OF PUBLIC HEALTH IMPORTANCE

by

H. D. Pratt, C. J. Stojanovich, and K. S. Littig

1. Three or 4 pairs of legs (Figs. 1 A and 1 B)..... 2

   Five or more pairs of legs or swimmerets (Figs. 1 C and 1 D)..... 22

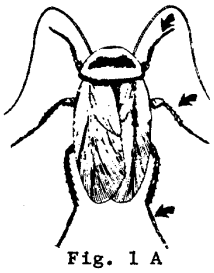


Fig. 1 A

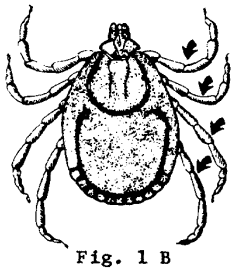


Fig. 1 B

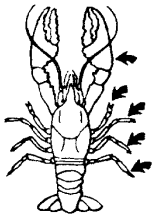


Fig. 1 C

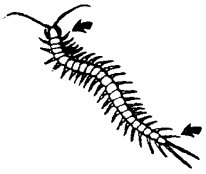


Fig. 1 D

2. Three pairs of legs; antenna present (Fig. 2 A). CLASS INSECTA.....
   .....INSECTS..... 3

   Four pairs of legs; antenna absent (Fig. 2 B). CLASS ARACHNIDA.....
   .....SCORPION, SPIDER, TICK, AND MITE 20

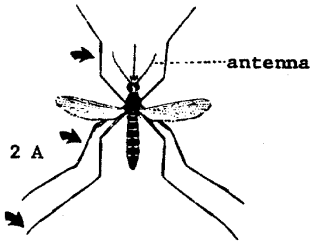


Fig. 2 A

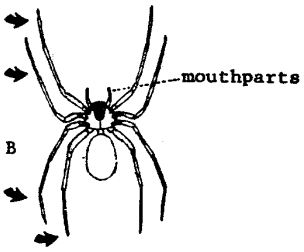


Fig. 2 B

3. Wings present, well developed (Fig. 3 A)..... 4

   Wings absent or rudimentary (Fig. 3 B)..... 12

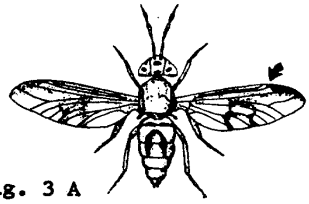


Fig. 3 A

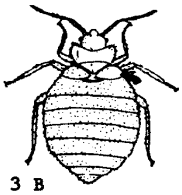


Fig. 3 B

4. One pair of wings (Fig. 4 A). ORDER DIPTERA 5

Two pairs of wings (Figs. 4 B and 4 C)..... 6

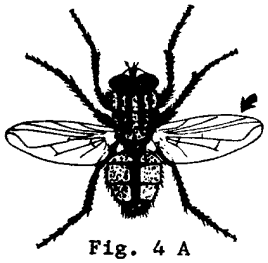


Fig. 4 A

Fig. 4 B

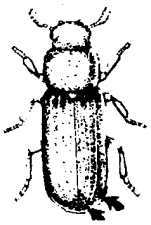


Fig. 4 C

5. Wings with scales (Fig. 5 A). FAMILY CULICIDAE .....MOSQUITO

Wings without scales (Fig. 5 B). OTHER DIPTERA .....FLY

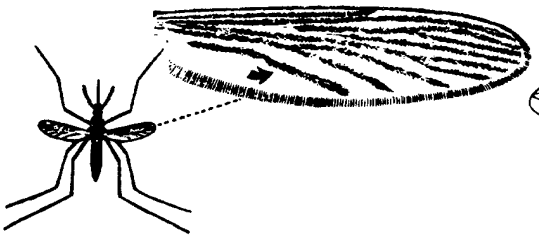


Fig. 5 A

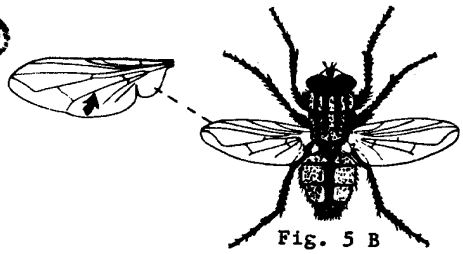


Fig. 5 B

6. Mouthparts adapted for sucking, consisting of an elongate proboscis (Fig. 6 A)..... 7

Mouthparts adapted for biting and chewing (Fig. 6 B)..... 8

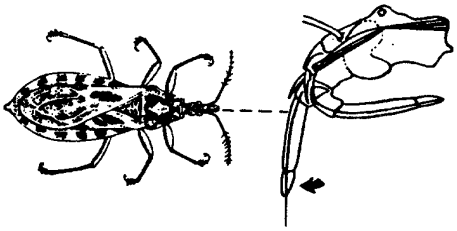


Fig. 6 A

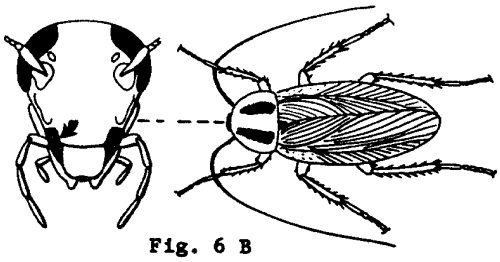


Fig. 6 B

7. Wings densely covered with scales; proboscis coiled up under head (Fig. 7 A). ORDER LEPIDOPTERA .....MOTH AND BUTTERFLY

Wings not covered with scales; proboscis directed backward between front legs when not in use (Fig. 7 B). ORDER HEMIPTERA .... TRUE BUG AND KISSING BUG

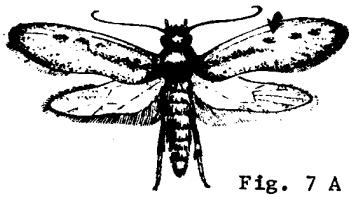


Fig. 7 A

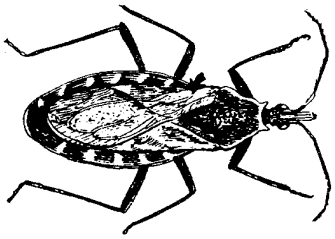


Fig. 7 B

8. Both pairs of wings membranous and similar in structure, though they may differ in size (Fig. 8 A)..... 9

Front pair of wings leathery or shell-like, serving as covers for membranous hind wings (Fig. 8 B)..... 10

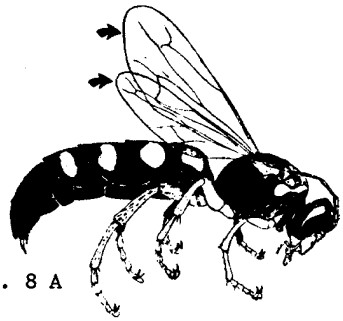


Fig. 8 A

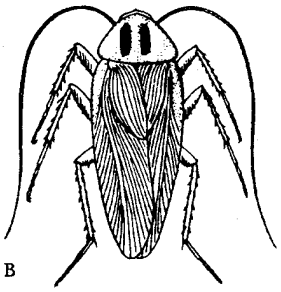


Fig. 8 B

9. Hind wings much smaller than front wings (Fig. 9 A). ORDER HYMENOPTERA.... ..... BEE, WASP, HORNET, OR ANT

Both pairs of wings similar in size (Fig. 9 B). ORDER ISOPTERA ..... TERMITE

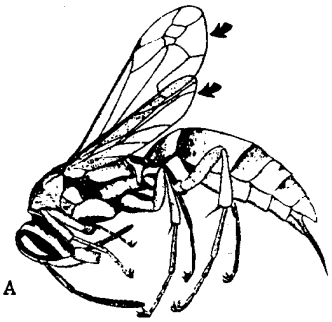


Fig. 9 A

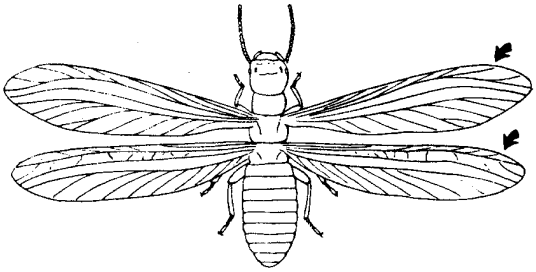


Fig. 9 B

10. Front wings horny or shell-like without distinct veins, meeting in a straight line down middle (Fig. 10 A)..... 11

Front wings leathery or paper-like with a network of veins, usually overlapping at the middle (Fig. 10 B). ORDER ORTHOPTERA ....COCKROACHES, CRICKETS, GRASSHOPPERS

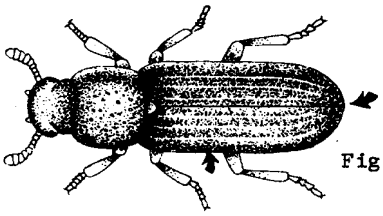


Fig. 10 A

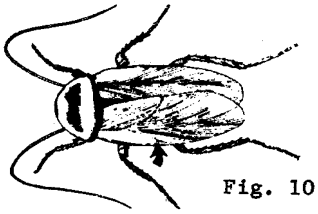


Fig. 10 B

11. Abdomen with prominent forceps; wings shorter than abdomen (Fig. 11 A). ORDER DERMAPTERA .....EARWIG

Abdomen without forceps; wings typically covering abdomen (Fig. 11 B). ORDER COLEOPTERA ..... BEETLE

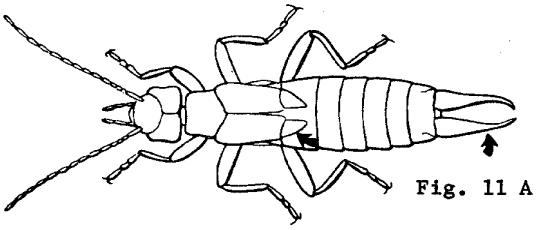


Fig. 11 A

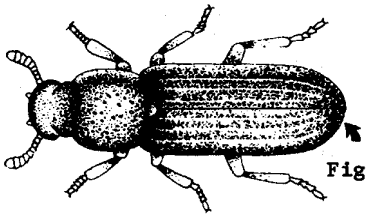


Fig. 11 B

12. Abdomen with 3 elongate, tail-like appendages at tip; body usually covered with scales (Fig. 12 A). ORDER THYSANURA... SILVERFISH AND FIRE BRAT

Abdomen without 3 long tail-like appendages at tip; body not covered with scales (Fig. 12 B)..... 13

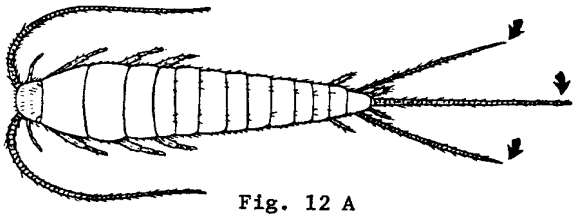


Fig. 12 A

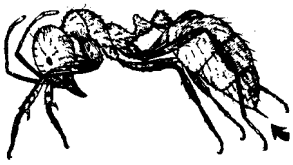


Fig. 12 B

13. Abdomen with narrow waist (Fig. 13 A). ORDER HYMENOPTERA ..... ANT

Abdomen without narrow waist (Fig. 13 B)..... 14

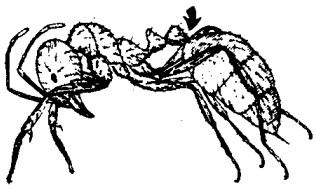


Fig. 13 A

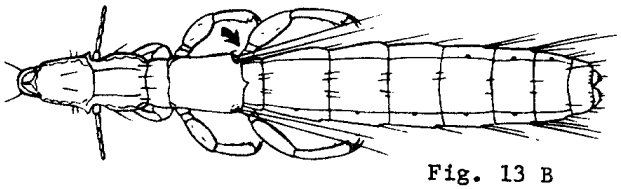


Fig. 13 B

14. Abdomen with prominent pair of forceps (Fig. 14 A). ORDER DERMAPTERA... ..... EARWIG

Abdomen without forceps (Fig. 14 B)..... 15

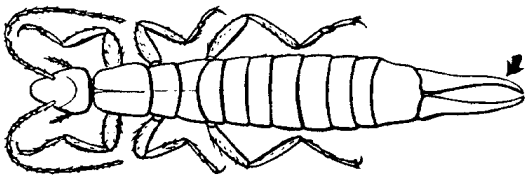


Fig. 14 A

Fig. 14 B

15. Body strongly flattened from side to side; antenna small, fitting into grooves in side of head (Fig. 15 A). ORDER SIPHONAPTERA ..... FLEA

Body not flattened from side to side; antenna projecting from side of head, not fitting into grooves (Fig. 15 B)..... 16

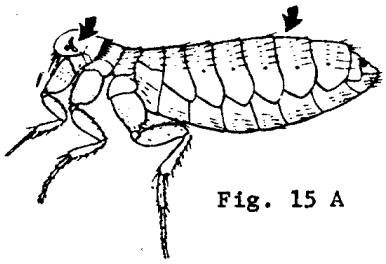


Fig. 15 A

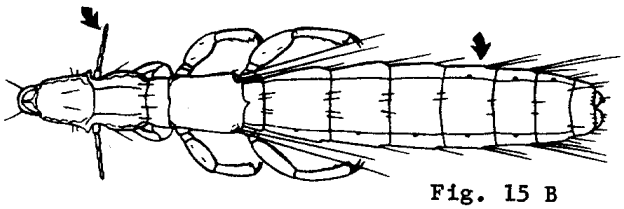


Fig. 15 B

16. Antenna with 9 or more segments (Fig. 16 A)..... 17

Antenna with 3 to 5 segments (Fig. 16 B)..... 18

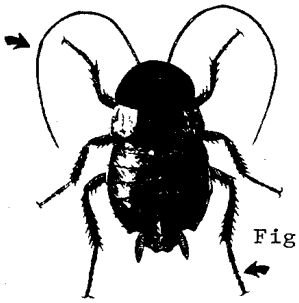


Fig. 16 A

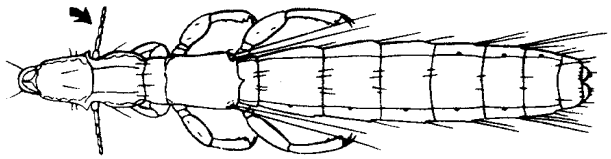


Fig. 16 B

17. Pronotum covering head (Fig. 17 A). ORDER ORTHOPTERA .....COCKROACH

Pronotum not covering head (Fig. 17 B). ORDER ISOPTERA ..... TERMITE

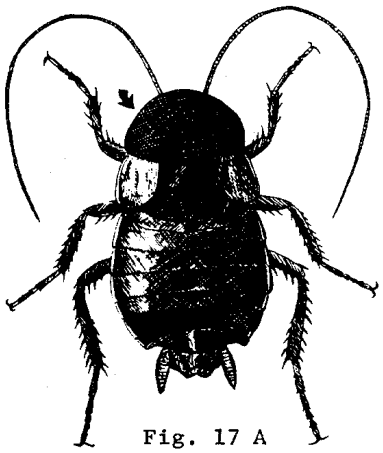


Fig. 17 A

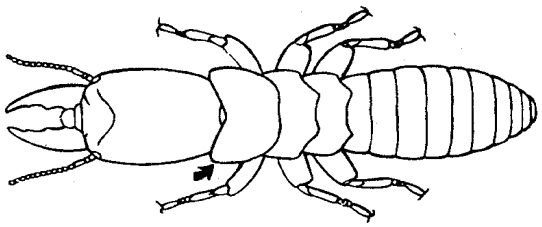


Fig. 17 B

18. Mouthparts consisting of tubular jointed beak; tarsi 3-5 segmented (Fig. 18 A). ORDER HEMIPTERA .....BEDBUG

Mouthparts retracted into head or of chewing type; tarsi 1 or 2 segmented (Fig. 18 B)..... 19

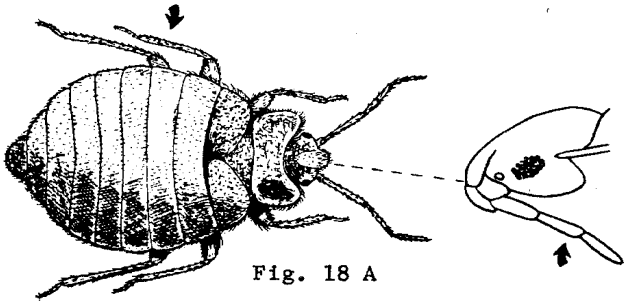


Fig. 18 A

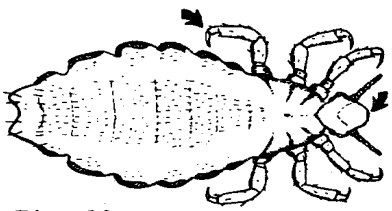


Fig. 18 B

19. Mouthparts retracted into head, adapted for sucking blood (Fig. 19 A); external parasites of mammals ....ORDER ANOPLURA .....SUCKING LOUSE

Mouthparts of chewing type (Fig. 19 B); external parasites of birds and mammals.....ORDER MALLOPHAGA .....CHEWING LOUSE

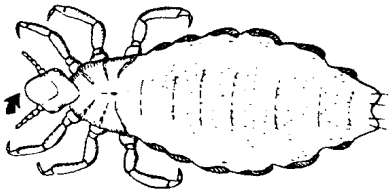


Fig. 19 A

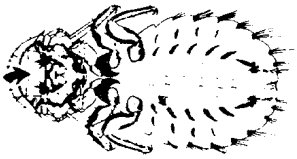


Fig. 19 B

20. Body oval, consisting of a single sac-like region (Fig. 20 A). .....ORDER ACARINA .....TICK AND MITE

Body divided into 2 distinct regions, a combined head-thorax (cephalothorax) and an abdomen (Figs. 20 b, 21 A, 21 B)..... 21

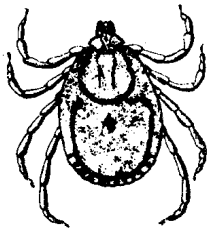


Fig. 20 A

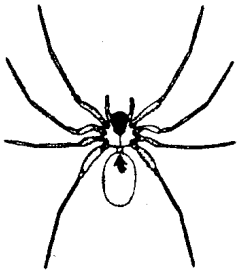


Fig. 20 B

21. Abdomen joined to cephalothorax by slender waist; abdomen with segmentation indistinct or absent; stinger absent (Fig. 21 A)... .....ORDER ARANEIDA .....SPIDER

Abdomen broadly joined to cephalothorax; abdomen distinctly segmented, ending in stinger (Fig. 21 B)....ORDER SCORPIONIDA.....SCORPION

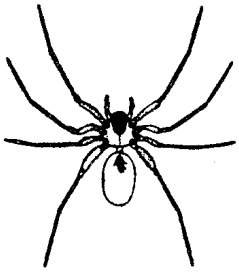


Fig. 21 A

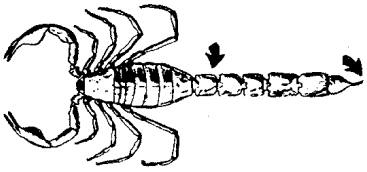


Fig. 21 B

22. Five to 9 pairs of legs in some species, swimmerets in others; 1 or 2 pairs of antennae present; principally aquatic animals (Figs. 22A, 22 B, 22 C). CLASS CRUSTACEA.....
.....CRAB, CRAYFISH, SHRIMP, LOBSTER, SOW BUG, COPEPOD

Ten or more pairs of legs; swimmerets absent; 1 pair of antennae present; terrestrial animal (Fig. 23 A, 23 B)..... 23

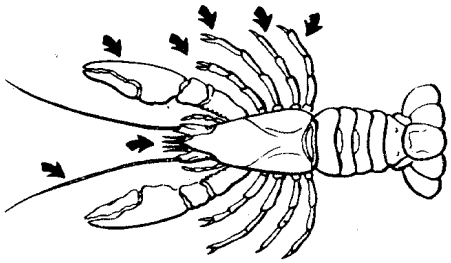


Fig. 22 A

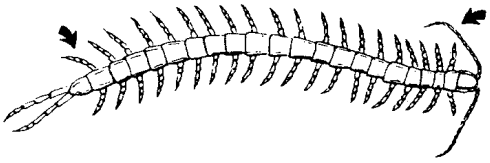


Fig. 22 B

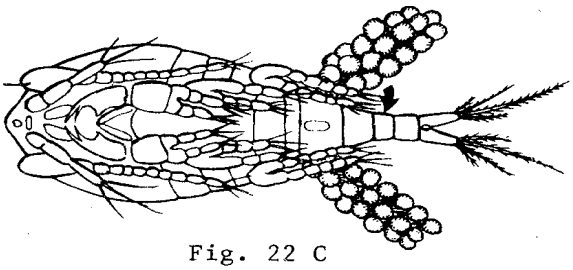


Fig. 22 C

23. Body segments each with only one pair of legs (Fig. 23 A).....
CLASS CHILOPODA .....CENTIPEDE

Body segments each with two pairs of legs (Fig. 23 B).....
CLASS DIPLOPODA .....MILLIPEDE

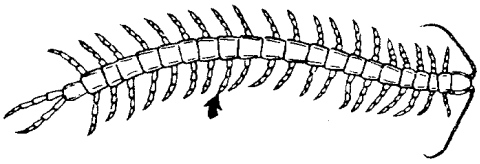
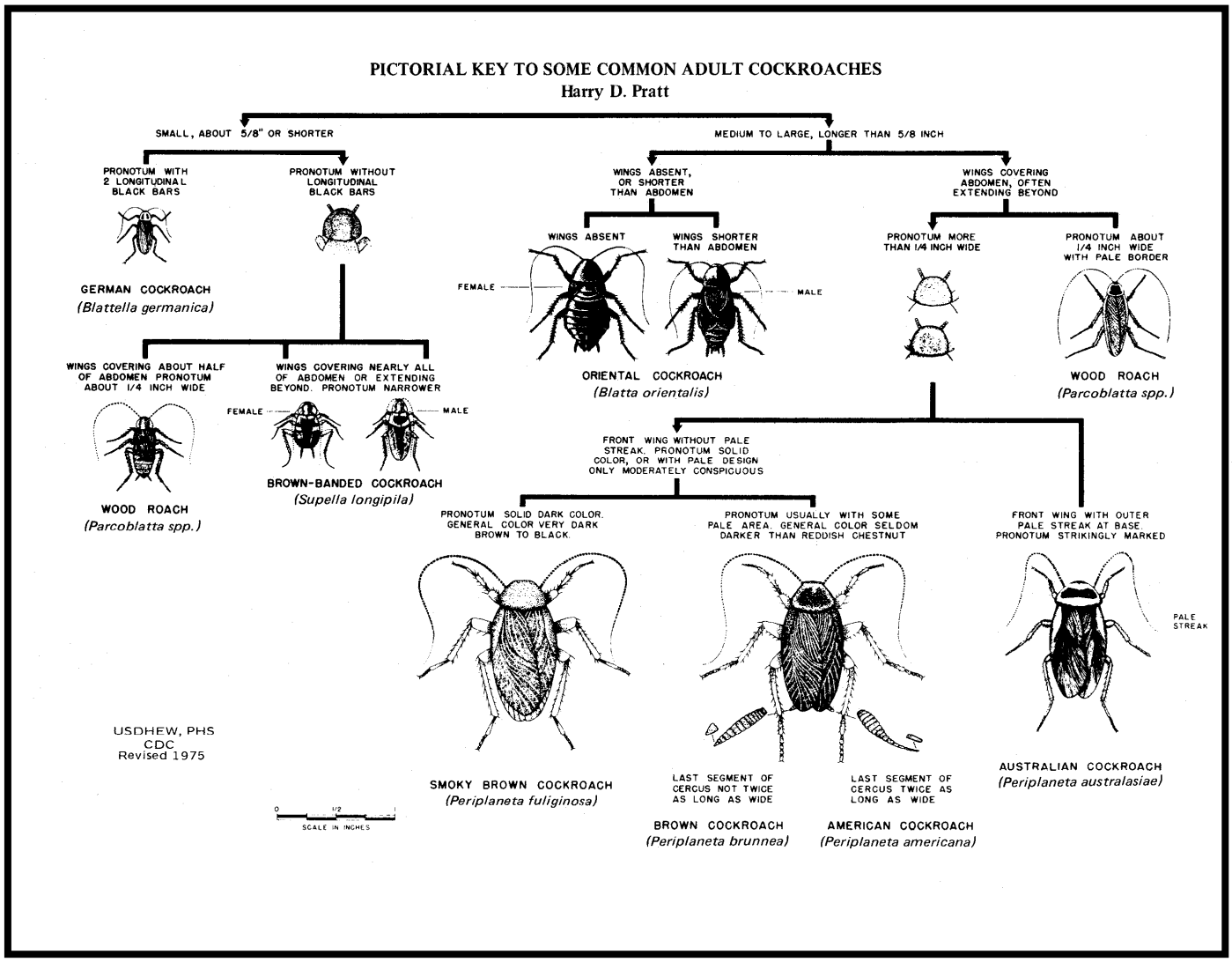


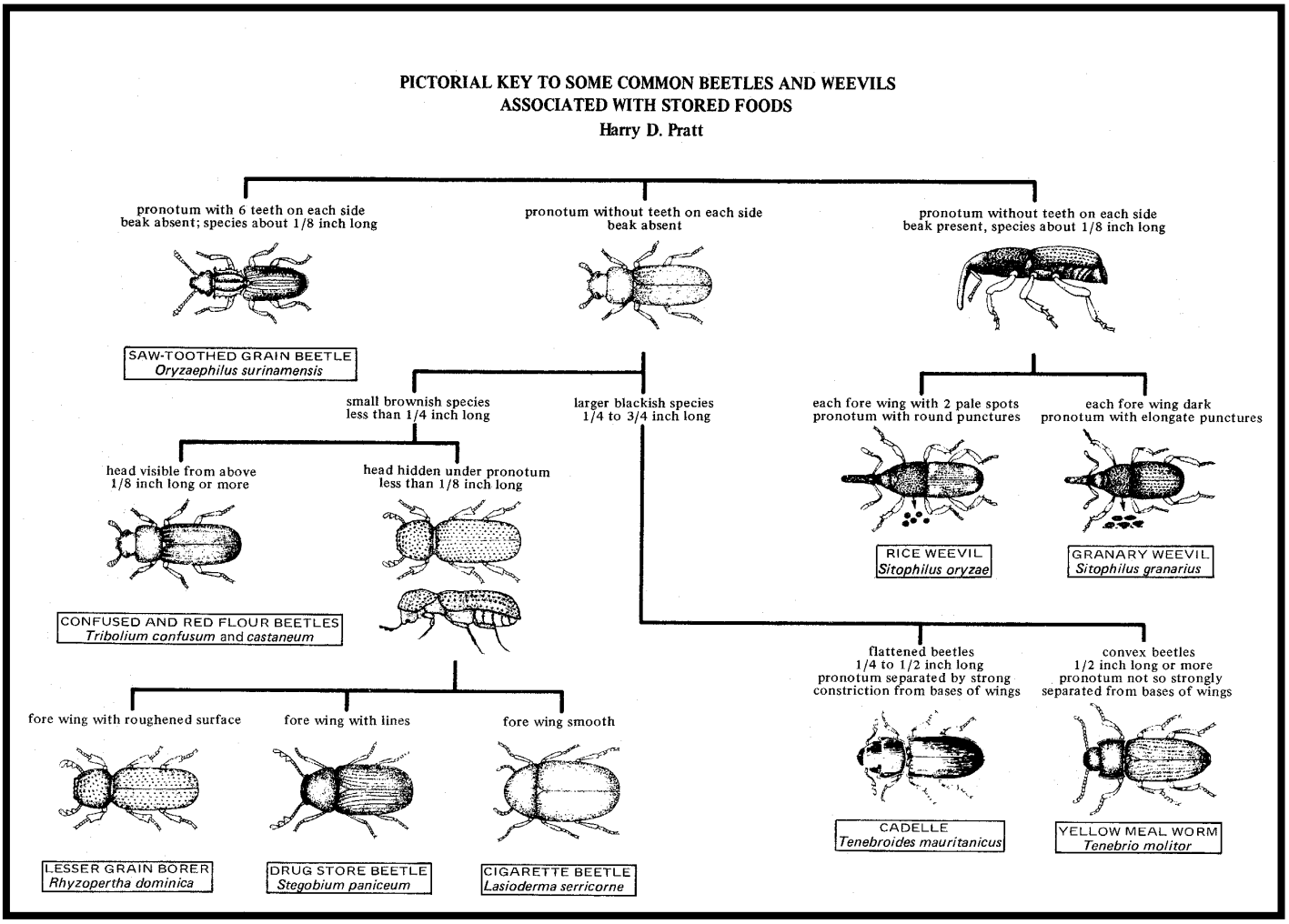
Fig. 23 A

Fig. 23 B

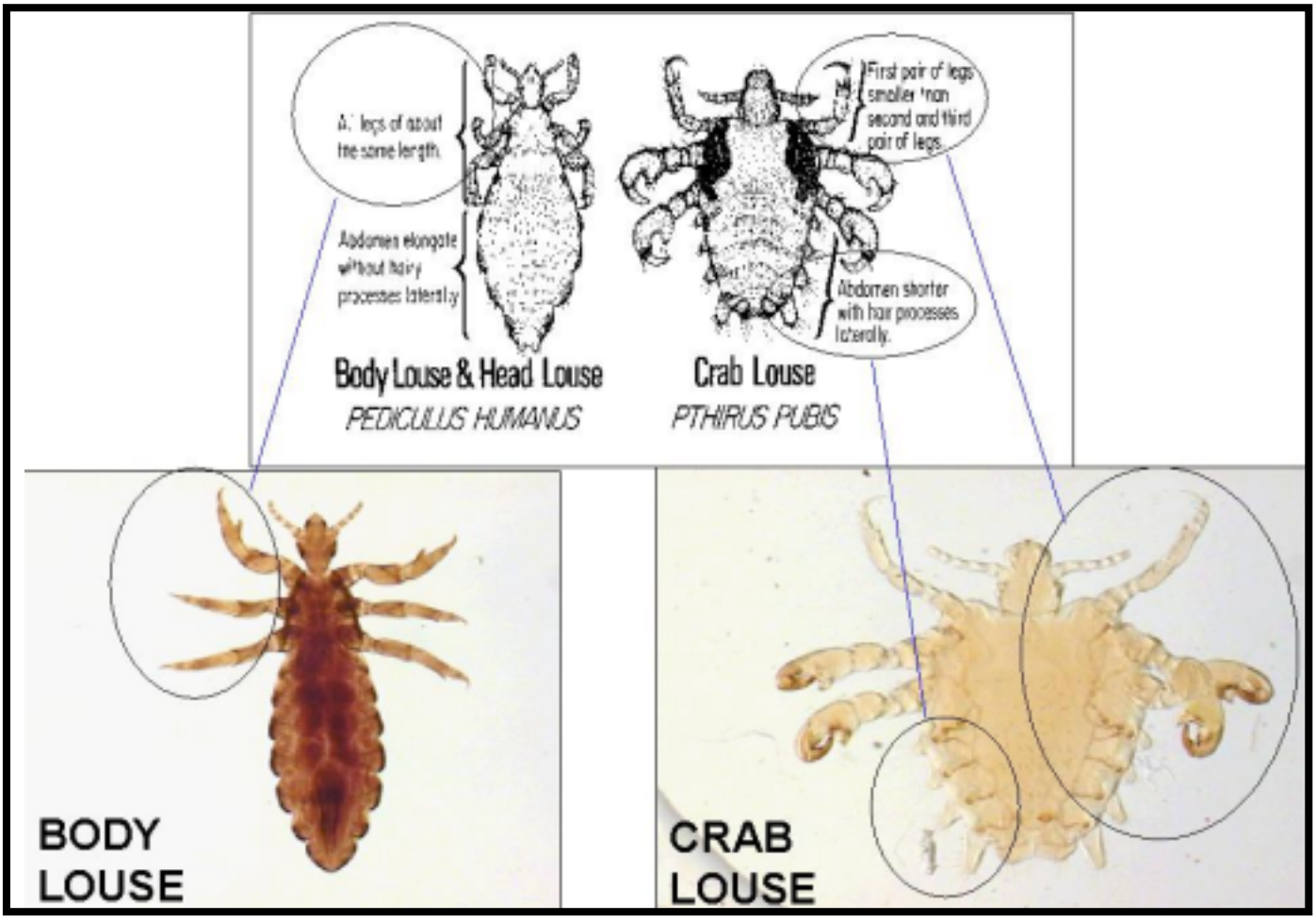
COCKROACHES



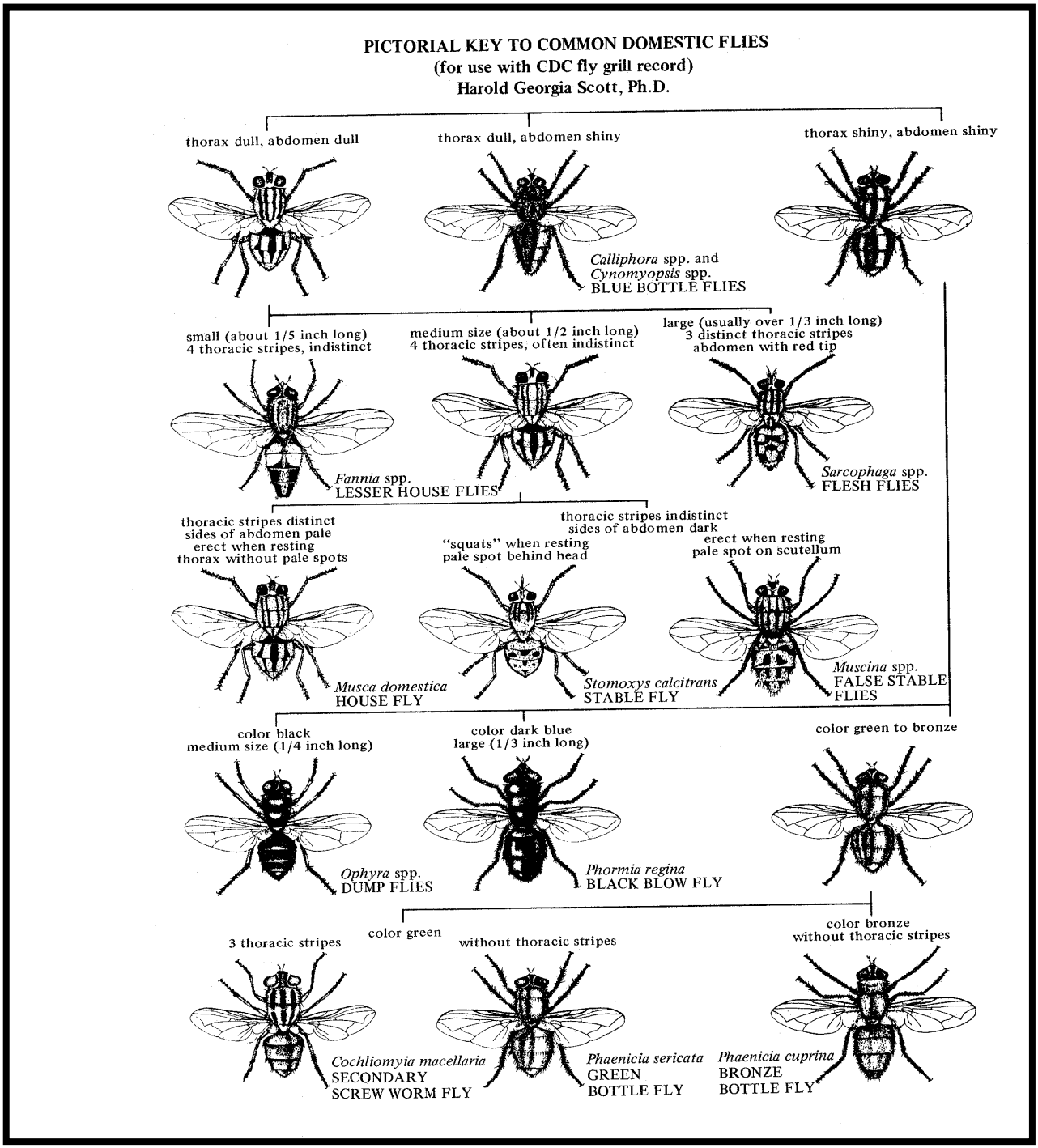
STORED PRODUCTS INSECTS



LICE


All legs of about the same length.
Abdomen elongate without hairy processes laterally
Body Louse & Head Louse
PEDICULUS HUMANUS
First pair of legs smaller than second and third pair of legs.
Abdomen shorter with hair processes laterally.
Crab Louse
PTHIRUS PUBIS
BODY LOUSE
CRAB LOUSE

COMMON DOMESTIC BITING & FILTH FLIES (EXCLUDING MOSQUITOES)



NOT MEASUREMENT SENSITIVE

MIL-STD-904B
10 MARCH 2000

SUPERSEDING
MIL-STD-904A
13 JAN 1984

DEPARTMENT OF DEFENSE STANDARD PRACTICE

DETECTION, IDENTIFICATION, AND PREVENTION OF PEST INFESTATION OF SUBSISTENCE

AMSC N/A FSC 89GP

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

FOREWORD

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense (DoD).

2. This Military Standard specifies technical requirements for inspection of subsistence and food service functions to ensure clean, wholesome food products that are free from chemical, microbiological, and physical contaminants and to prevent the transmission of food-borne disease to members of the Armed Forces. While the U.S. Code contains the regulations pertaining to these matters, the purpose of this standard is to select and compile the particular requirements and verification provisions, which have uniquely military applications.

3. This standard is applicable in all elements within the DoD involved in the inspection of subsistence items purchased with either appropriated or non-appropriated funds. The standard will not be used to determine the capability of an establishment to produce or furnish products or services that are in compliance with specifications or other purchase documents.

4. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Director, DoD Veterinary Service Activity, Office of the Surgeon General/HQDA, 5109 Leesburg Pike, Falls Church, VA 22041-3258 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

1. SCOPE

1.1 Purpose. This standard describes a set of practices that enable DoD personnel to effectively detect and prevent the infestation or contamination of subsistence items from exposure to insects, rodents, birds, or other animals, and to reduce the impact of infestation or contamination. These practices can be used to prevent, detect, and evaluate damage to subsistence items. The practices described in this standard delineate inspection procedures, evidence collection techniques and equipment, sampling methods, and disposition procedures.

1.2 Application. This standard is applicable to elements within the Department of Defense involved in the purchase, transportation, receipt, storage, and issuance of subsistence items.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, and 5 of this standard. This section does not include documents cited in other sections or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 4 and 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Other Government documents. The following Government document forms a part of this document to the extent specified herein. Unless otherwise specified, the issue is that cited in the solicitation.

Armed Forces Pest Management Board (AFPMB) Technical Information Memorandum (TIM) 11, Hydrogen Phosphide Fumigation with Aluminum Phosphide.

(Copies are available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307-5001; or download from web site: http://www.afpmb.org/.)

3. DEFINITIONS

3.1 Blacklight. An ultraviolet light used to detect rodent urine by virtue of its fluorescing properties, in order to validate other evidence of such contamination. (Since many substances fluoresce, this test should be used only for presumptive evidence.)

3.2 Contamination. The act or process of exposing a product to an adulterant or unwholesome material whether it be food pests, parts thereof, or their filth.

3.3 Dermestid. Any beetle belonging to the family Dermestidae.

3.4 Entomologist. An individual with a bachelor's or higher degree in entomology (the science dealing with insects and related animals) who may be employed or contracted by the Department of Defense (as a military officer or civilian) or a Federal/State Agency.

3.5 Food inspection personnel. Individuals from the Army Veterinary Service, Air Force Public Health, or Navy Preventive Medicine agencies whose duties include the inspection of food at depots, installations, or aboard ships.

3.6 Government-owned subsistence. Subsistence owned by either appropriated or nonappropriated Department of Defense activities/instrumentalities.

3.7 Infestation. The presence of insects, rodents, birds, other animals or parts thereof, and/or their wastes in or around subsistence such that the subsistence may be rendered unwholesome for human consumption.

3.8 Infestable subsistence. Items whose nature and method of packaging make them subject to actual or potential pest infestation (see Appendix).

3.9 Insect. All life stages of arthropods belonging to the class Insecta.

3.10 Insect-free. No insects, alive, dead, or parts thereof, able to be seen during inspection of the subsistence.

3.11 Intermediate package. A wrap, box, or bundle (that is, a container) that contains two or more unit packages of identical items (also called a secondary package). (See ASTM-D-996.)

3.12 Medical authority. Air Force Public Health personnel or Army Veterinary Service Officer whose duties include authorization to dispose of subsistence determined to be unfit for human consumption and approval of procedures for reconditioning subsistence.

3.13 Package, primary, or unit. A container providing means of protection and handling to a product. (See ASTM-D-996.)

3.14 Packaging. (1) The technique of preparing goods for distribution; (2) the design criteria, processes, and procedures used to protect material from deterioration and damage from the time manufacturing is completed until ultimate use or disposal; it includes cleaning, drying, preserving, packing, unitization, and marking; (3) the processes and procedures used to protect an item in a unit package. (See ASTM-D-996.)

3.15 Packing. The selection or construction of the shipping container and assembling of items or packages therein, including any necessary blocking, bracing, or cushioning, weatherproofing, exterior strapping, and marking of shipping container for identification of contents. (Compare packaging). (See ASTM-D-996.)

3.16 Pest. Any insect, rodent, bird, or other animal that may render subsistence partially or wholly unwholesome for human consumption through infestation or contamination.

3.17 Pest management personnel. Military or civilian personnel trained to manage undesirable pests and certified (licensed) to use or apply pesticide chemicals.

3.18 Recondition. Elimination of contaminated packaging by cleaning and sanitizing the container, as needed, and repackaging in order to permit the product to be issued.

3.19 Surveillance inspection. Inspections made to determine if Government-owned foods are wholesome and suitable for further storage, shipment, issue, sale, and consumption.

3.20 Unit package. The first tie, wrap, or container applied to a single item, a quantity of the same item, a set, or an item with all its components parts, that constitutes a complete and identifiable package containing the unit of issue of a product for ultimate use (also called a primary package). (See ASTM-D-996.)

3.21 Warranty action. Administrative steps taken by the responsible contracting officer to recover losses from a contractor for subsistence products which were accepted but for which evidence indicates infestation or contamination occurred prior to Government acceptance.

4. GENERAL REQUIREMENTS

4.1 Acceptance or rejection of contractor-owned subsistence. Any shipment of subsistence from a commercial source found to be infested/contaminated upon receipt shall be rejected, except under the conditions described in 4.1.1 and 4.1.2.

4.1.1 Packaging not breached. When food inspection personnel determine that the infestation/contamination has not breached the packaging of the product, and if the infestation/contamination is minimal, the accountable officer, with the concurrence of the medical authority, shall accept the shipment under the following conditions:

a. There is an immediate urgent need for this particular shipment that cannot be met if the delivery is rejected.

b. If food pest insects are found, the subsistence shall be fumigated at the contractor's expense prior to unloading or placement in the warehouse.

4.1.2 Contamination on packing. When contamination is detected on packing, the shipment shall be accepted under the following conditions:

a. The package or intermediate package can be removed in an uncontaminated condition.

b. It is possible to decontaminate packaging of contaminated units. Decontamination shall be done at the contractor's expense with prior approval of the proposed decontamination method from the medical authority and contracting officer.

4.2 Acceptance/rejection of Government-owned subsistence. Government-owned subsistence acquired from a commercial source shall be rejected and disposed of, condemned and disposed of, or accepted, under the conditions described in 4.2.1 through 4.2.2.4.

4.2.1 Infestation prior to receipt. If, within six months of receipt, Government-owned subsistence is found to be infested/contaminated, and the condition is determined to have existed at the time of receipt, the accountable officer shall initiate warranty action and immediately arrange with the contractor for disposition of the subsistence.

4.2.2 Infestation after receipt. If infestation/contamination of Government-owned subsistence is determined to have occurred after receipt, the requirements in 4.2.2.1 through 4.2.2.4 shall apply.

4.2.2.1 Insect infestation. The lot shall be condemned under the following conditions (see 5.4.3):

a. When at least one living or dead larval stage of an insect species belonging to the genus *Trogoderma,* or to other dermestid genera, is found within the product itself (not external).

b. When an average of three or more living or dead insects belonging to the genus *Tribolium* per pound of products is found within the packages inspected.

c. When an average of seven or more living or dead insects per pound of product is found involving insects other than those belonging to the genus *Trogoderma* (or other dermestid genera) or the genus *Tribolium.*

4.2.2.2 Rodent contamination. Contaminated units (boxes, cases, bags, bales) shall be condemned under the following conditions (see 5.4.4):

a. When any evidence of rodent infestation/contamination is found within product packaging.

b. When penetration of packaging by rodent feces/urine is detected by the presence of urine stains and/or feces visible under normal light or blacklight.

c. When the existence of one or more holes gnawed through the innermost layer of packaging is detected.

d. When external contamination of waterproof containers (e.g., cans) containing product is detected, unless it is possible to sanitize the container by cleaning, disinfecting, and rinsing it under the direction of the medical authority. The entire pallet shall be condemned when rework cost is estimated to exceed the value of the product salvaged.

4.2.2.3 Bird contamination. Any unit of product contaminated by bird parts/excreta shall be condemned unless the package has not been penetrated and can be cleaned and disinfected or repackaged.

4.2.2.4 Miscellaneous animal contamination. Any unit of product contaminated by the feces and/or urine, or penetrated by the teeth and/or claws, of dogs, cats, raccoons, or other animals shall be condemned. If the package has not been penetrated, the appropriate medical authority shall determine the wholesomeness of the product.

5. DETAILED REQUIREMENTS

5.1 Inspection of highly infestible subsistence. Inspection of subsistence items listed in the Appendix shall be performed before off-loading at arrival, before being reshipped, and at predetermined intervals during storage, as described in 5.1.1 through 5.1.2.3.

5.1.1 Sampling during inspection. During inspection, sampling for detection of infestation/contamination shall be conducted. The following documents provide guidance on determining sample size: Appendix S of DLAR 4155.37/AR 702-18/NAVSUPINST 4410.56/AFR 69-10/MCO 4450.13, AR 40-656, or AFI 48-116 as appropriate (see 6.6). Samples shall be taken as follows:

a. From products that have a history of frequent infestation/contamination (see Appendix).

b. From areas most likely to be infested/contaminated, such as the outermost containers on the top and bottom of a stack, or the areas closest to an established problem area.

c. From subsistence that has been stored near infested/contaminated products.

5.1.2 Inspection methods. Closed and open-package inspections shall be conducted, as appropriate, as described in 5.1.2.1 through 5.1.2.3.

5.1.2.1 Closed-package inspection. All seams, tucks, and open areas of all samples shall be examined for the presence of insects using a focused light source. The samples shall be scrutinized for small insect penetration holes and rodent, bird, or animal contamination or damage.

5.1.2.2 Open-package inspection. If insects or other infestation/contamination problems are suspected or discovered, an open-package inspection shall be performed to ascertain the nature of the problem, to determine the number of insects per pound inspected, and to obtain samples for laboratory identification.

5.1.2.2.1 Open-package method for units of 10 pounds or less. The entire contents of package units that weigh 10 pounds or less shall be opened and examined for infestation or damage.

5.1.2.2.2 Open-package method for units greater than 10 pounds. A three-pound sample shall be taken in an aseptic manner from the following package locations when package units weight 10 pounds or more:

a. Top of unit next to the opening.

b. Bottom of unit next to the seal or seam.

c. Adjacent to the tears or holes.

5.1.2.3 Screening products after open-package inspection. When an open-package examination method is used, the resulting sample shall be screened for insects and the insects prepared for laboratory identification as follows:

a. Spread the sample thinly on an examination table covered with light-colored disposable paper. Alternatively, shake the product through the proper size sieve (see 6.3) onto the paper.

b. Using a high-intensity light source, isolate any live or dead insects with forceps or a brush dipped in alcohol. Pick up immature or adult insects other than moths with the brush or forceps and place them in screw-top vials filled with alcohol. Place adult moths, and any other suspected contaminants, in screw-top containers, pillboxes, or petri dishes of an appropriate size, without alcohol. Use tissue paper to protect dry specimens. Additional information is available in DPSCM 4155.6, Subsection 218.2 (see 6.6.1).

5.2 Surveillance inspections of subsistence. Surveillance inspections shall be performed on Government-owned foods to determine suitability for further storage, shipment, issue, sale, and/or consumption. The classes of surveillance inspection as specified in 5.2.1 through 5.2.4 are defined in AR 40-657/NAVSUPINST 4355.4F/MCO P10110.31G.

5.2.1 Receipt of product, except purchase (Class 5). The conveyance, and the subsistence it contains, shall be closely examined to detect infestation/contamination which may have occurred during transport. Subsistence shipped long distances to or from tropical climates shall be subjected to especially thorough inspection. During warm periods of the year, subsistence shipped via rail car shall be fumigated while in transit if permitted by the label. The fumigation procedures contained in AFPMB TIM No.11, shall be followed. Upon arrival of fumigated rail cars, the receiving officer shall notify pest management personnel who shall ensure that the conveyance is detoxified prior to unloading.

5.2.2 Prior to shipment of product (Class 6). Government-owned subsistence that is to be shipped and the conveyance in which it will be shipped shall be inspected for infestation/ contamination before loading, prior inspection at receipt and during storage not withstanding. Guidance for naval vessels can be found in the US Navy Shipboard Pest Control Manual (see 6.6).

5.2.3 At issue or sale (Class 7). Subsistence shall be examined for infestation/contamination at time of sale or issue, prior inspection at receipt and during storage not withstanding.

5.2.4 During storage (Class 9). Subsistence in storage shall be examined for infestation/ contamination on a cyclical basis, giving special attention to the subsistence items listed in the Appendix. Inspection frequency may be determined by the local authority (Pest Management Professional) based on specific and/or changing environmental conditions, infestation history, and status of facility sanitation. General guidance follows:

a. Cool temperatures, negative findings for pests, and good sanitation practices are justification to reduce the frequency of inspection.

b. Warm storage temperatures shorten insect developmental time and are justification for more frequent inspection of infestible items.

c. Poor sanitation/facility maintenance and/or any recent pest infestation/activity either in subsistence, or the storage area, is justification to increase inspection frequency to monthly or shorter interval.

5.3 Inspection of storage areas. DLAM 4145.12 (see 6.6) provides guidelines for an effective stored products pest management program.

5.3.1 Frequency of inspection. Subsistence dry storage areas shall be routinely inspected at least monthly by Medical/Veterinary Service representatives and accompanied by pest management personnel at least quarterly. A log of inspections shall be maintained.

5.3.2 Detection of insects in storage areas. Since most insects have a very high reproductive potential and a relatively short life cycle, all shipments of subsistence items carry the potential to infest storage areas, even though there is no apparent evidence of insects. Inspections shall be performed as follows:

a. Warehouse windows shall be checked for flying insects.

b. Floors, walls, and pallets shall be examined for insects that have emerged from subsistence items.

c. Insect pheromone traps shall be utilized in the surveillance program where practical.

d. Sacked and boxed farinaceous items shall be checked around the end seals and stitching.

e. Grain-based rodent bait boxes shall be checked for infestation.

f. If insects are discovered, specimens shall be collected and prepared in accordance with paragraph 5.1.2.3.

g. If certain types of subsistence items are frequently infested, samples may be taken and incubated at higher temperatures in order to speed insect development and early detection.

5.3.3 Detection of rodents in storage areas. Storage areas shall be monitored for signs of rodent infestation, such as droppings (type and age), runways (along walls, steps, and rafters), rub marks (fresh or aged), burrows (fresh or old), gnawing (recent or weathered), and tracks (sharp and distinct or dust-covered).

5.3.4 Detection of birds in storage areas. Storage areas shall be monitored for the presence of birds. Even if birds are not seen, the topmost stacks of subsistence shall be routinely inspected for bird droppings.

5.3.5 Detection of other animals in storage areas. Signs of the presence of other animals in a subsistence warehouse include seeing the animals or finding droppings, hair, or damaged products. The animals shall be located and removed by the appropriate animal control activity. Potential animal entrances shall be located and sealed.

5.4 Procedures following detection of infested/contaminated Government-owned subsistence. When infested/contaminated Government-owned subsistence is detected, the procedures in paragraphs 5.4.1 through 5.4.4 shall be followed.

5.4.1 Identification and reporting of infestation. To enable DoD to accurately assess and manage stored subsistence losses, all insect infestations shall be identified and reported. The submission of specimens to a military or other laboratory for identification should be accompanied by a DD Form 1222 (see 6.8).

5.4.2 Fumigation. Infested subsistence that is not immediately destroyed, frozen, or removed shall be promptly fumigated by local pest management personnel in accordance with AFPMB TIM No. 11. Meal, Ready-to-Eat (MRE) rations and other operational rations packaged in foil or laminated pouches shall not be fumigated without prior approval by the command entomologist or the cognizant procurement office (see 6.7).

5.4.2.1 Procedures after fumigation. Once the fumigated subsistence is aerated and the area declared safe by certified pest management personnel, the effectiveness of the fumigation and the fitness of the subsistence for consumption shall be determined so that a disposition recommendation can be made. A statistically sound estimate of the degree of infestation shall be made based on the following criteria:

Lot Size (Primary Container)	Sample Size
2 to 15	2
16 to 50	3
51 to150	5
151 to 500	8
501 to 3200	13
3201 to 35000	20
35001 to 500000	32
500001 and over	50

5.4.2.2 Shipboard infestation. Fumigation of subsistence onboard ships is not authorized. Freezing of infested subsistence at 0° F for a minimum of two weeks, which kills the insects and their eggs, is an acceptable alternative to fumigation. If the insect levels exceed those required in paragraph 4.2.2.1, or if the appropriate authority elects not to recoup the infested subsistence, immediate disposition shall be made to prevent further infestation.

5.4.3. Disposition procedures for insect infested products. After the infesting insect has been identified, the requirements of paragraph 4.2.2.1 shall be followed. If these requirements are not exceeded, the infested subsistence shall be subject to the following disposition actions:

a. Infested subsistence, whether in depots or installations, shall not be shipped to another potential user. If not suitable for local use, it shall be destroyed.

b. If inspection reveals the product is within safe tolerances after it has been fumigated or held at 0° F for a minimum of two weeks (see 4.2.2.1), a recommendation may be made by Medical/Veterinary Service personnel to the accountable officer that the product may be issued, if needed.

c. The exterior of the troop issue shipping containers shall be marked in the following manner to inform the final users of the product's condition:

"This product has been found to contain a few insects which were killed by fumigation or freezing. Medical/Veterinary Service personnel have examined this product, and having found it to be in conformance with approved health standards as specified in MIL-STD-904 have declared it fit for human consumption. It is recommended that the product be sifted before use."

d. Known infested product will not be sold in retail stores.

5.4.4 Disposition of rodent contaminated products. Care in handling rodent contaminated materials must be observed. (Note: The concern is for diseases associated with rodents, e.g. hantaviruses.)

a. Protective gloves shall be used to avoid direct contact with urine or feces.

b. Decontaminate the surface of infested packages with a household bleach solution (three tablespoons household bleach per gallon of water) or other sanitizer.

c. Seal any holes to prevent leakage or place damaged packages in a plastic bag.

d. If entire pallets are condemned, it is be desirable to seal them with plastic sheeting. Segregate damaged materials for reimbursement or dispose of them.

e. In warehouses where rodent infestations are extensive, it may be necessary to use a negative pressure respirator fitted with a High Efficiency Particulate Air (HEPA) filter. Issuance of this type of respirator mandates that the employee be included in a properly established respiratory protection program. Heavily contaminated areas should be treated with a 10% household bleach solution (one part bleach to nine parts water).

5.5 Preventing infestation/contamination in storage facilities. The control procedures in 5.5.1 through 5.5.3 shall be employed to decrease the incidence and severity of pest infestation of stored subsistence.

5.5.1 Sanitation procedures. Housekeeping and sanitation practices, such as immediate clean-up of spilled items, disposal or repair of damaged containers, daily sweeping of floors, and frequent cleaning of all shelving and equipment shall be routinely employed. Sanitary inspections shall be routinely performed.

5.5.2 Warehousing practices. Warehousing practices that reduce opportunities for infestation/contamination shall be employed, such as:

a. Subsistence items shall be stored off of the floor on pallets and/or shelves.

b. Pallets and shelves shall be located at least 18 inches from walls to allow access for cleaning and inspections and to reduce harborages.

c. Subsistence shall be stacked in a manner that minimizes crushing that may damage packages or packaging.

d. Subsistence items shall be rotated to prevent insects from completing enough life cycles to develop a heavy infestation.

e. New stocks of susceptible subsistence items shall be isolated, if possible from old stocks to prevent cross infestations.

f. Bagged animal foods shall be stored in a separate area from other subsistence items because of their propensity for infestation.

g. "First-In, First-Out" (FIFO) procedures shall be followed.

5.5.3 Pest-proofing storage facilities. All military subsistence storage facilities shall be constructed so that rodent, insect, and bird entry and harborage are minimized. All exterior openings larger than 1/4-inch shall be sealed with cement, 26-gauge or thicker sheet metal, or 1/4-inch hardware cloth. Structural harborages such as double walls, spaces between floors, drop ceilings, and boxed-in pipes or beams shall be completely sealed or eliminated.

6. NOTES
(This section contains information of a general or explanatory nature that may be helpful, but it is not mandatory.)

6.1 Intended use. This standard is intended to ensure that food products procured by DoD for use by Armed Forces personnel are safe and do not pose health risks.

6.2 Issue of DoDISS. When this standard is used in acquisition, the applicable issue of the DoDISS must be cited in the solicitation.

6.3 Equipment. The following equipment is recommended for pest surveillance by inspection personnel. Local supply personnel may be able to provide assistance in obtaining this or similar equipment:

a. A well-lighted (minimum 100 foot candles), 3-foot-by-6-foot work surface. This surface must be free of cracks or crevices and readily cleanable.

b. White or light-colored disposable paper in rolls at least 3 feet wide.

c. Flashlight, right angle (NSN 6230-00-264-826-1) or any portable high-intensity light source.

d. Magnifier (Reading Glass) (NSN 6650-00-252-6250).

e. Small brush to transfer insects (NSN 8020-00-503-0000).

f. Seventy percent ethyl or methyl alcohol to kill and preserve insects.

g. Screw cap vials, 9 ml (NSN 6640-00-408-2200) or 3 ml (NSN 664-000-408-2300).

h. Paperboard shipping containers (NSN 8115-00-511-5750).

i. Sieves (available through scientific products companies).

(1) For powdery products such as flour, use U.S. Standard Sieve Series Nos. 20, 30, 40, 50. The size of the sieve mesh should be large enough to allow the product to pass through while retaining the insects on the mesh.

(2) For granular products such as meals, use U.S. Standard Sieve Series Nos. 10, 20.

(3) For bulk products such as spaghetti, use U.S. Standard Sieve Series No. 5 and a ½-inch sieve. The product should be retained on the mesh while allowing the insects to fall.

j. Knife to open sample bags.

k. Tape to reseal sampled bags that are larger than 10 pounds.

l. Ultraviolet light, specimen examining (NSN 6530-00-663-2140), with two 45-volt batteries (NSN 6135-00-100-0464).

m. Balance, trip, 2000-grain capacity (NSN 6670-00-401-7195) and weight set, balance, 100 gram to 1000 gram (NSN 6670-00-401-8830).

6.4 Infested subsistence declared safe for use. There may be circumstances when infested subsistence declared safe by the medical authority can be used for issue by the accountable officer. These decisions must be mutually agreed to by the medical authority and the accountable officer and the subject subsistence must present no health threat to the consumer.

6.5 Entomological references. The references listed below are suggested for use by personnel involved in the inspection of subsistence. These references are for information only and should not be used as a substitute for qualified entomological guidance.

a. Buckle, A.P., and Smith, R.H. (Eds.). (1994). Rodent Pests And Their Control. CAB International, 10 East 40th Street, New York, NY 10016. Oxford University Press – USA. http://www.oup-USA.org/.

b. Timm, Robert M., (Ed.). Prevention and Control of Wildlife Damage. Cooperative Extension Service, University of Nebraska, Lincoln. Available from the Univ. of NE in print or CD-ROM format, approximate cost $40.00 each or $60 for both plus shipping and handling, http://www.ianr.unl.edu/pubs/wildlife/ or (402) 472-2188.

c. Gorham, J. Richard (Ed). Principles of Food Analysis For Filth, Decomposition, and Foreign Matter. FDA Technical Bulletin No. 1, Second Ed. (1981). Available from AOAC International, 481 North Fredrick Ave., Suite 500, Gaithersburg, MD 24486. http://www.aoac.org/.

d. Ecology And Management of Food-Industry Pests. (1991). 595 pages. Available from AOAC International, 481 North Fredrick Ave., Suite 500, Gaithersburg, MD 24486. http://www.aoac.org/.

e. Principal Storage Pests. (Illustrated guide, color). Available from Degesch America, Inc., P.O. Box 116, 275 Triangle Dr., Weyers Cave, VA 24486. (This is a large wall chart. There is also a fold guide available for a fee.)

f. Stored Grain Insects. (Agriculture Handbook No. 500). (1979). Available from Association of Operative Millers, 5001 College Blvd., Suite 104, Leawood, KS 66211, (903) 338-3377. http://www.trainingforum.com/ASN/AOM/index.html/.

g. U.S. Department of Agriculture. (1991). Insect and Mite Pests in Food: An Illustrated Key (USDA Agricultural Handbook No. 655). 767 pages. Out of print, copies may be available from BioQuip, (310) 324-0620.

h. Bennett, G., Corrigan, R., and Owens, J. (Eds.). (1997). Truman's Scientific Guide to Pest Control Operations. 5th Edition. Advantstar Communications, Inc., 522 pages. Available from numerous sources including Amazon.com.

i. Mallis, Arnold and Moreland, Dan (Eds.). (1997). Handbook of Pest Control: The Behavior, Life History, and Control of Household Pests, 8th Edition, Mallis Handbook & Technical Training Co. Can be ordered through most standard or on-line bookstores.

j. Military Pest Management Handbook, Chapter 8. Urban arthropods. Armed Forces Pest Management Board. (Available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307-5001; or download from web site: http://www.afpmb.org/.)

k. Military Pest Management Handbook, Chapter 10. Rodents, birds, bats and other nonarthropod pests. (Available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307-5001; or download from web site: http://www.afpmb.org/.)

6.6 Guidance documents. The documents in 6.6.1 and 6.6.2 are non-mandatory. These citations are provided for information only.

6.6.1 Guidance documents cited in text of this standard.

a. ASTM-D-996, Standard Terminology of Packaging and Distribution Environments. (Available from American Society for Testing and Material, 100 Bar Harbor Drive, West Conshohocken, PA 19428-2959; or from website: http://www.astm.org/sitemap.html/.)

b. AR 40-656, Veterinary Service Surveillance Inspection of Subsistence. (Document No. AR40-656 available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; 1-800-553-6847; or download from internet at http://www.usapa.army.mil/.)

c. AR 40-657/NAVSUPINST 4355.4F/MCO P10110.31G, Veterinary/Medical Food Inspection and Laboratory Service. (Document No. AR40657 available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; 1-800-553-6847; or download from web site: http://www.usapa.army.mil/.)

d. DPSCM 4155.6, Subsection 218.2, Defense Personnel Support Center, Subsistence Inspection Manual, Destination (Surveillance) Inspection, Entomological Laboratory Identification Services. (Available from Defense Supply Center Philadelphia, ATTN: DSCP-HS, 700 Robbins Avenue, Philadelphia, PA 19111-5092.)

e. US Navy Shipboard Pest Control Manual. (Available from Navy Disease Vector Ecology and Control Center, Bangor, 19950 Seventh Ave. NE, Suite 201, Poulsbo, WA 98370-7405; (360) 315-4450; or download from web site: http://164.221.226.57/.)

f. DLAR 4155.37/AR 702-18/NAVSUPINST 4410.56/AFR 69-10/MCO 4450.13, Defense Logistics Agency Material Quality Control Storage Standards. (Available from Defense Logistics Agency Publishing System, 8725 John J. Kingman Drive, Ft. Belvoir, VA 22060; (703) 767-3506.)

g. AFI 48-116, Food Safety Program. (Available only from website: http://afpubs.hq.af.mil/.)

h. DLAM 4145.12/TM 38-400/NAVSUP PUB 572/AF MAN 23-210/MCO 4450-14, Joint Service Manual (JSM) for Storage and Materials Handling. (Available from Defense Logistics Agency Publishing System, 8725 John J. Kingman Drive, Ft. Belvoir, VA 22060; (703) 767-3506.)

i. AFPMB Technical Information Manual (TIM) 11, Hydrogen Phosphide Fumigation of Subsistence with Aluminum Phosphide. (Available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307 - 5001; or download from web site: http://www.afpmb.org/.)

6.6.2 Guidance documents not cited in text of this standard.

a. Food Code 1999, Department of Health and Human Services, Food and Drug Administration, Food Service Sanitation Branch, Washington, DC 20204. (Document No. PB99-115925 available printed, on CD ROM, and on diskette from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; 1-800-553-6847; or download from web site: http://vm.cfsan.fda.gov/~dms/foodcode.html/.)

b. AFPMB Technical Information Memorandum (TIM) 27, Stored Product Pest Monitoring Methods. (Available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307 - 5001; or download from web site: http://www.afpmb.org/.)

c. AFPMB Technical Information Memorandum (TIM) 38, Protecting Meal, Ready-to-Eat Rations (MREs) and Other Subsistence during Storage. (Available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307 - 5001; or download from web site: http://www.afpmb.org/.)

d. AFPMB Technical Information Memorandum (TIM) 41, Protection from Rodent-borne Diseases with Special Emphasis on Occupational Exposure to Hanta Virus. (Available from the Armed Forces Pest Management Board, Forest Glen Section, Walter Reed Army Medical Center, Washington, DC 20307-5001; or download from web site: http://www.afpmb.org/.)

6.7 Cognizant procurement office. The DoD procuring activity for subsistence products is Defense Logistics Agency, Defense Supply Center Philadelphia, ATTN: DSCP-HROS, 700 Robbins Avenue, Philadelphia, PA 19111 - 5092.

6.8 Identification of specimens. Copies of DD Form 1222, Request For and Results of Tests, can be obtained from the point of contact identified on the following web site: http://web1.whs.osd.mil/icdhome/fman.htm/ or downloaded from the following web site: http://web1.whs.osd.mil/icdhome/FORMSPUBS.HTM/.

(DoD activities may obtain a copy of the form from the DoD Forms Points of Contact identified in web site: http:web1.whs.osd.mil/icdhome/fman.htm or download from web site: http://web1.whs.osd.mil/icdhome/FORMSPUBS.HTM/.)

6.9 Subject term (key word) listing.
Contamination
Food inspection
Entomologist
Insect
Rodent
Bird
Animal
Fumigation

6.10 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue because of the extent of the changes.

Custodians:
Army - MD2
Navy - SA
Air Force - 03

Review activities:
Navy - MS, MC
DLA - SS

Preparing Activity:
Army - MD2
Project No. 89GP-0002

APPENDIX

1. Scope. This appendix identifies items that have a high potential for infestation. Items packaged in glass or cans are not susceptible to infestation unless infested prior to or during packaging. This appendix is intended to provide useful information and does not contain mandatory requirements.

2. Subsistence items with high potential for infestation:

(1) Operational rations not packaged in cans, including assembled and unitized rations

(2) Dry pet food, including bird seed and laboratory animal food

(3) Grains (flour, cornmeal, grits, rice, barley, rolled oats, wheat base, popcorn, farina, and com starch)

(4) Pasta products (macaroni, spaghetti, noodles, & vermicelli)

(5) Bakery and fry mixes

(6) Coffee beans

(7) Dry beans and peas

(8) Dried fruits and nuts

(9) Cocoa & cocoa beverage powder

(10) Dry milk and powdered dairy drinks

(11) Spices

(12) Tea (especially herbal types)

(13) Yeast food

(14) Prepared breakfast cereals

(15) Bakery products

(16) Cookies and crackers

(17) Granola bars

(18) Prepared coconut

(19) Candy (especially chocolate and nuts)

(20) Dehydrated soups, vegetables, and gravy mixes

(21) Dried meats and fish

(22) Grated cheese

(23) Tobacco products

(24) Fresh fruits and vegetables

Appendix H

DD Form 1222: Instruction Sheet, Blank and Sample Forms

INSTRUCTION SHEET FOR DD FORM 1222

BLOCK NO. SECTION A (Completed by activity submitting specimens for identification)

1. Laboratory or Entomologist to which specimens are being submitted.
2. Name and address of submitting activity, and telephone number (where mail and messages are normally received). Also enter veterinary activity code number.
3. Complete name and address of contractor, and contract no. (as stated in contract).
4. Manufacturing plant, if different from Block 3. If identical, state, "same as Block 3."
5. Complete nomenclature of end item as stated in contract, with NSN if listed.
6. Assign sample numbers consecutively for all samples submitted to the laboratory during this calendar year, preceeding each sample number with veterinary activity code number.
7. Contractor's lot number.
8. Enter "Insect Identification."
9. Date specimens are shipped for identification.
10. Mark out "TESTED," and add "IDENTIFIED." Enter "Insects" in block.

10a. Number and type of containers holding insects. Example, "2 vials," "1 box," "1 bottle."

11. Number pounds of product involved, if known. If the medical authority has put a product on medical hold, enter total amount on hold.
12. Enter "DLAM 4155.5, App 2," or other appropriate reference.
13. Name and address of supplier, or "Same as Block 3," if applicable. In parentheses, state the immediate source of the product. Example, (DLA Depot, Memphis, TN").
14. Means of specimen transmittal. (Surface mail, Air mail, Hand-carried, Express.)
15. Inspector's name, grade, and signature, and date sample was collected.
16. Enter any necessary clarification of entries made in this request. As a minimum:

    a. Exact location insects were found. Examples, "inside sealed packages," "crawling on shelf near product," "on outside of bag, near small penetration holes."

    b. Request immediate telephonic notification of identification. Insure correct telephone number is in Block 2.

    c. Point of contact at your activity. Two or three names if possible.

17. Enter, same as Block 2, and copy to: (if purchased by DPSC), DPSC, ATTN: DPSC, STQX (Med Entomol), 2800 20th St., Philadelphia, PA 19101; HQ, AAFES, ATTN: Staff Veterinarian, Dallas, TX 75222 (if purchased by AAFES); or the appropriate accountable officer (if purchased by other than DPSC or AAFES).

BLOCK NO. SECTION B. (Completed by laboratory or activity providing identification)

1., 2., 3. Self-explanatory

4. State how identification was made (usually "microscropic identification"), List number of specimens used in identification, scientific name(s), and stage of develop-

ment. Common name may also be included. When species is uncertain, identify to genus. Pertinent comments may be included.

SECTION B must be signed by an entomologist. If listed in the American Registry of Professional Entomologist, indicate by adding, "R.P.E." after typed name.

REQUEST FOR AND RESULTS OF TESTS	PAGE NO	NO. OF PAGES

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*	2. FROM: *(Include ZIP Code)*
3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)* CONTRACT NUMBER	4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)* P. O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.

Please send telephonic or message report of specimen identification.

17. SEND REPORT OF TEST TO

Address in Block #2 with copy to:

COMMANDER
Defense Personnel Support Center
ATTN: DPSC-STPX, 2800 South 20th St.
Philadelphia, PA 19101-8419

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER

4 TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE

DD FORM 1 FEB 62 1222 REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

REQUEST FOR AND RESULTS OF TESTS

PAGE NO.	NO. OF PAGES

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*
Navy Disease Vector Ecology and Control Center, Bangor
19950 7th Ave. N. E., Ste 201
Poulsbo, WA 98370

2. FROM: *(Include ZIP Code)*
HM1 James J. Smith
Medical Department
USS RUSSELL (DDG-59)
FPO-AP 66312-2477

3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)*
Paddyland Rice Corp.
123 East Avehue
Atlanda, GA 30333

CONTRACT NUMBER

4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)*
Same as Block 3

P.O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED
Rice, bleached, enriched (5 lb bag)	1300-22	56	Insect Identification	3 Dec 01

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE
Insects	2 vials (#1, #2)	2400 lbs(on MedHold)	DLAM 4155.5, App S

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY
(DLA Depot, Memphis, TN Same as Block 3	Surface Mail	LT John J. Jones. 2 Dec 01

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.

a. Insects in #1 vial were inside packaged product, but no penetration holes or other visible means of entry into the package were found. Insects in vial #2 were crawling inside the cardboard shipping carton, and on shelf near product.

b. Request immediate telephonic notification of identification on DSN 396-1234/5.

c. Points of contact: LT J. Jones, HM1 J. Smith, HM2 B. Andrews.

17. SEND REPORT OF TEST TO
Defense Supply Center, DSCP-HROS, 700 Robbins Ave. - Bldg. 6, Philadelphia, PA 19111-5092

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER
6 Dec 01	7 Dec 01	E-12-345

4. TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS
Microscopic identification: Vial #1	a. *Triboluim confusum* (confused flour beetle) 6 larvae, 12 adults		
	b. *Oryzaephilus surinamensis* (saw-toothed beetle) 5 adults		
Vial #2	*Trogoderma sp.* (dermestid beetle), 1 adult		

Note: Presence of 2 species (Vial#1) in the same visible-sealed package may indicate that infestation occurred during manufacturing, and warrants further inspection. *Tribolium* in Vial#1, and *Trogoderma* in Vial #2 have special condemnation levels.

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE
7 Dec 01	LT THOMAS T. THOMPSON, MSC MEDICAL ENTOMOLOGIST	

DD FORM 1222, FEB 62 (EG) REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

Appendix I
NAVSUP P - 486 Volume I Food Service Management
5301, Hazardous Food Items (Selected Pages)

19A Name of Verifying Officer	Name of accountable food service Officer.
19B Grade	Grade of accountable food service Officer.
19C Signature	Signature of accountable food service Officer.
19D Telephone Number	Telephone number of accountable Food Service Officer (include commercial and DSN numbers).
19E Title	Title of accountable Food Service Officer.
19F Date	(YYMMDD) date the report is signed and forwarded.

d. Distribution. After initial preparation, distribution will be made as follows:

(1) Standard Form 364

(a) Original plus 1 copy - Food Service Division (SUP) 51

(b) Copy - Report of Discrepancy File.

(c) Copy to TYCOM,

(d) Supplying activity, and

(e) Supporting VET SERVICE UNIT

(2) DD Form 1608

(a) Original plus 1 copy - Food Service Division (SUP) 51

(b) Copy - Unsatisfactory Material Report File

(c) Copy to TYCOM,

(d) Supplying activity, and

(e) Supporting VET SERVICE UNIT

5301 HAZARDOUS FOOD ITEMS

1. GENERAL. Hazardous food items are products which would certainly or possibly cause, or are suspected to have already caused, harm when consumed. Such items may be unfit for human consumption, suspected of being unfit for human consumption, or suspected to be the source of an outbreak of food-borne illness. Determination of "fitness for human consumption" is the responsibility of the medical officer or the appointed representative. Likewise, the medical officer will determine the suspected causes of the food-borne illness. Place the item on medical hold and submit samples for laboratory analysis in accordance with subpara. 3. Listed below are a few examples of potentially hazardous food items.

a. Widespread presence of swollen or leaking cans. (The contents of bulged or swollen cans should never be consumed)

b. Products with offensive or unusual odors and colors and/or any other evidence of deterioration, spoilage, or contamination. (Again, try to determine whether or not the hazardous condition is due to an isolated instance of excessive storage or mishandling prior to reporting the item as hazardous)

c. Food items containing foreign objects such as glass, dirt, pieces of metal, etc. (Forward a sample of the contaminant to HQ, DSCP, ATTN: DSCP-HQS (CDCFP), by the most expedient means. Also indicate when the problem appears to involve only a single unit/container of product or report the estimated percentage of units/containers involved when possible)

d. Any apparently wholesome food items which, based on the best medical knowledge available, is suspected or known to harbor disease causing agents; and

e. Insect infestation.

Food items that have become hazardous due to overage, mishandling while in the custody of the user, or other isolated instances of abuse will not be reported under these procedures.

2. DISPOSITION. Items that are suspected to be hazardous will be separated and suspended from issue subject to determination by medical representative that they are unfit for human consumption. Items determined to be unfit for human consumption will be surveyed and disposed of under the supervision of the responsible supply and/or medical personnel by burning, burial, or dumping at sea. Hazardous products will be completely disposed of to prevent any possibility of consumption. Samples, as noted in subpara. 3 should be retained. Prior to destruction, all available identifying information, including contract numbers, will be obtained. If possible, photographs of the defects should be taken. When the medical authority cannot make a positive determination that an item is unfit for human consumption, destruction will be delayed pending the results of laboratory tests.

3. SAMPLES AND TESTS

a. Ashore Activities. Samples of the product (both normal and abnormal) will be supplied when considered necessary by the medical or veterinary representative (Figures 5-10 and 5-11). Contact the local veterinary service for assistance in sampling procedures, completion of test request forms, and shipment of the samples to the laboratory.

b. Afloat Activities. At the direction of the medical representative, samples of the food product (both normal and abnormal) will be turned into the nearest Navy shore activity, which will arrange for veterinary inspection of the product in accordance with subpara. 3a. In the event that local Veterinary Service personnel are not available, send samples to the nearest facility as listed below:

Commander
DOD Veterinary Laboratory
ATTN: MCVS-SCL
Building 2630
Ft. Sam Houston, TX 78234-6200
DSN: 429-7904/7761
Comm: (210) 916-7904/7761
Fax: (210) 270-2559

US Army Veterinary Laboratory
10th Medical Laboratory
Building 3810
Landstuhl, Germany
APO AE 09180-3619
ETS 486-8300/7241
Comm: 06371-86-8300/7241

Food Analysis Laboratory
Tripler Army Medical Center
Schofield Barracks, HI 96857-5460

Samples will be sent with an original and four copies of the Request for/and Results of Tests (DD Form 1222) (see figure 5-10). If a DD Form 1222 is not available, a letter request will be submitted containing all the pertinent data contained on the form. A representative number of backup samples will be retained until test results are known, provided that retention will not constitute a health or sanitary hazard. Test results will be transmitted expeditiously - usually by telephone.

Data Block and Caption	Instruction for Entry
1. To	See Note #1.
2. From	Activity requesting results of test.
3. Prime Contractor and address	Obtained from unit container and/or shipping container.
Contract Number	Obtained from unit container and/or shipping container.
4. Manufacturing Plant Name and Address	Obtained from unit container and/or shipping container.
5. End (Food) Item and/or Project Name.	Item nomenclature or brand
6. Sample Number	The number of items that are being shipped for sampling.
7. Lot No.	Obtained from unit container and/or shipping container.
8. Reason for Submittal	Insert "Special Testing"
9. Date Submitted	Date forwarded for sampling.
10. Material to be Tested	Same as block 5.
10a. Quantity Submitted	Same as block 6.
11. Quantity Represented	Total quantity of the item that is being sampled.

12. Spec. & Amend.	Obtained from unit container and/or shipping container, if available.
13. Purchased from or Source	Where the item was received from.
14. Shipment Method	(Fastest Method).
15. Date Sampled and Submitted by	Name, rank and signature of the Food Service Officer and date.
16. Remarks	Enter "Test for Suitability and for Human Consumption". (Include any special tests, analysis, or examinations for suspected conditions that are required).
17. Send Report of Test to	Enter "Same as Block #2" or designate otherwise. In addition send to the following addresses: Commander Defense Supply Center Philadelphia Attn: DSCP-HQ 2800 S. 20th St. Philadelphia, PA 19101-8419 Commander Naval Supply Systems Command Support Services Directorate Food Service Division (SUP 51) 5450 Carlisle Pike P.O. Box 2050 Mechanicsburg, PA 17055-0791 Commander Naval Supply Systems Command Food Service Division Attn: 51V 5450 Carlisle Pike P.O. Box 2050 Mechanicsburg, PA 17055-0791

4. REPORTS. The discovery of a valid hazardous food item will be immediately reported by priority message to the Defense Supply Center, Philadelphia (DSCP-HQS (CDCFP)). (See Figure 5-11) This message report is in addition to the information provided in the laboratory analysis request. The message will be prepared in the following format:

Data Block and Caption	Instruction for Entry
From	Activity sending the message.
To	DSCP PHILADELPHIA PA// DSCP-HQ//

Info	COMNAVSUPSYSCOM MECHANICSBURG PA //51V/51//
	BUMED WASHINGTON DC//JJJ//
	Activity that supplied the material
	Service Force Commander (if material was supplied by supply ship)
	Closest Navy Environmental and Preventive Medicine Unit (NEPMU) (see Note #1 for list) and/or Closest Navy Disease Vector, Ecology And Control Center (DVEEC) (if material is infested) (see Note #2 for list)
Subj	SUSPECTED HAZARDOUS FOOD ITEM
1A	Nomenclature of item being reported.
1B	Prime Vendor Catalog #
1C	Prime contractor/subcontractor/manufacturer/ distributor and addresses.
1D	Government inspection plant code, i.e., USDA establishment number.
1E	Contract/purchase order/delivery order number(s).
1F	Source of item, i.e., specific depot, supply point, direct vendor delivery, supply ship, etc.
1G	Date item received.
1H	Quantity of item received.
1J	Manufacturer's lot number(s), production code(s), or other coded information on unit containers and/or cartons.
1K	Date of manufacture/pack from unit container and/or cartons.
1L	Quantity of product on hold.
1M	Reason item is suspected to be hazardous.
1N	Symptoms of illness or death attributed to or suspected to be caused by the item, numbers of persons affected, and contact point for medical authority cognizant of the incident.
1O	Laboratories to which samples have been submitted for test. N/A for infestations (unless samples sent to NEPMU or DVEEC).

NOTE #1
List of Navy Environmental and Preventive Medicine Units are as follows:
NAVENPVETMEDU SEVEN NAPLES IT
NAVENPVETMEDU TWO NORFOLK VA
NAVENPVETMEDU SIX PEARL HARBOR HI
NAVENPVETMEDU FIVE SAN DIEGO CA

NOTE #2
List of Navy Disease Vector, Ecology and Control Centers are as follows:
NAVDISVECTECOLCONCEN ALAMEDA CA
NAVDISVECTECOLCONCEN JACKSONVILLE FL

The symbol "NA" will be used to indicate nonavailability or nonapplicability of information. Every effort will be made to include an identifying contract number so that the item can be traced through the supply system.

5302 ALFOODACTS

Headquarters, Defense Supply Center, Philadelphia, is designated as sole worldwide agent for the Department of Defense to coordinate all hazardous food and non prescription drug recalls which may involve the services. All food items, including brand name procured by appropriated or nonappropriated fund activities, are involved in this recall system. The Consumer Safety Officer (CSO) transmits ALFOODACT messages only when an item is known to be a threat to public health, and is suspected or known to be in government supply channels WORLD WIDE. NAVSUPINST 10010.8 sets policy and guidance and assigns responsibilities. HQ, DPSC, issues a written message via AUTODIN transmission using a designator code ALFOODACT when advising food activities of status of a particular food item. Suspected items are to be identified and separated as quickly as possible. If required by the ALFOODACT message, reply to ALFOODACT messages by priority message to DSCP PHILADELPHIA PA//DSCP-HQ//. Ensure that all information transmitted is provided in the ALFOODACT message. This information is important to determine the scope/magnitude of the problem before warranty/recovery action begins and disposition instructions are issued by DSCP.

5303 FOOD ALERT MESSAGES

Food Alert messages are transmitted by the CSO to a localized area or customer group, i.e. Navy ships, Navy Exchanges, etc. The purpose of these messages is to keep the customers informed of ongoing hazardous food investigations or to provide information and disposition instructions on products which possess minimal health risk but are aesthetically unacceptable. When a product is known to be in supply channels and if short lists of military customers are involved, these locations will be notified by a FOOD ALERT MESSAGE. When there is any doubt about the distribution of a potentially hazardous item, an ALFOODACT will be transmitted. Food Service Officers and their representatives will respond to Food Alert messages in the same manner as ALFOODACTS. Instructions for the product disposition and reporting procedures will be transmitted in each Food Alert message.

REPORT OF DISCREPANCY (ROD)
(STANDARD FORM 364)

PAGE 1 OF 4

REPORT OF DISCREPANCY (ROD)
[X] SHIPPING [X] PACKAGING

1. DATE OF PREPARATION
06/29/98

2. REPORT NUMBER
001/98

3. TO (Name and address, include ZIP Code)
COMMANDER, DEFENSE PERSONNEL SUPPORT CENTER
ATTN: DPSC-HQS (CDCFP)
2800 S. 20TH STREET
PHILADELPHIA, PA 17055-0791

4. FROM (Name and address, include ZIP Code)
USS DUARTE (DDG 90)
COMMANDING OFFICER
USS DUARTE (DDG 90)
FPO-AE 28882-1888

5a. SHIPPER'S NAME
HEINTZ
208TH STREET
PHILADELPHIA, PA 17055

5b. NUMBER AND DATE OF INVOICE

6. TRANSPORTATION DOCUMENT NUMBER (GBL, Waybill, TCN, etc.)

7a. SHIPPER'S NUMBER (Purchase Order/Shipment, Contract, etc.)
DLA-134-98-C-444

7b. OFFICE ADMINISTERING CONTRACT

8. REQUISITIONER'S NUMBER (Requisition, Purchase Request, etc.)
V2111181809H05

9. SHIPMENT, BILLING, AND RECEIPT DATA — 10. DISCREPANCY DATA — 11.

NSN/PART NUMBER AND NOMENCLATURE (a)	UNIT OF ISSUE (b)	QUANTITY SHIPPED/ BILLED (c)	QUANTITY RECEIVED (d)	QUAN-TITY (a)	UNIT PRICE (b)	TOTAL COST (c)	1 CODE (d)	2 ACTION CODE
8950013893825 HOT SAUCE, PEPPER SAUCE, EXT HOT,12	BT	120	120	48	1.24	59.52	C2	1E

12. REMARKS (Continue on separate sheet of paper if necessary)

APPROXIMATELY TWO THIRDS OF THE PRODUCTS HAVE RUSTED CAPS

364-101 7540-00-159-4442 (Previous edition is obsolete.) STANDARD FORM 364 (REV. 2-80)

REPORT OF DISCREPANCY (ROD) PAGE 2 OF 4

1 DISCREPANCY CODES

CONDITION OF MATERIAL
C1 - In condition other than that indicated on release/receipt document
C2 - Expired shelf life
C3 - Damaged parcel post shipment
SUPPLY DOCUMENTATION
D1 - Not received
D2 - Illegible or mutilated
D3 - Incomplete improper or without authority (Only when receipt cannot be properly processed)
MISDIRECTED MATERIAL
M1 - Addressed to wrong activity
OVERAGE/DUPLICATE SHIPMENTS
O1 - Quantity in excess of that on receipt document
O2 - Quantity in excess of that requested (Other than unit of issue pack)
O3 - Quantity duplicates shipment
PACKING DISCREPANCY
P1 - Improper preservation
P2 - Improper packing
P3 - Improper marking
P4 - Improper unitization

PRODUCT QUALITY DEFICIENCIES
Q1 - Deficient material (Applicable to Grant Aid and FMS shipments only)
SHORTAGE OF MATERIAL
S1 - Quantity less than that on receipt document
S2 - Quantity less than that requested (Other than unit of issue pack)
S3 - Non-receipt of parcel post shipments
ITEM TECHNICAL DATA MARKINGS (i.e., Name Plates, Log Books, Operating Handbooks, Special Instructions, etc.)
T1 - Missing
T2 - Illegible or mutilated
T3 - Precautionary operational markings missing
T4 - Inspection data missing or incomplete
T5 - Serviceability operating data missing or incomplete
T6 - Warranty data missing
WRONG ITEM (Identify requested item as a separate copy in item 9 above)
W1 - Incorrect item received
W2 - Unacceptable substitute
OTHER DISCREPANCIES
Z1 - See remarks

2 ACTION CODES

1A - Disposition instructions requested (Reply on reverse)
1B - Material being retained (See remarks)
1C - Supporting supply documentation requested
1D - Material still required expedite shipment (Not applicable to FMS)
1E - Local purchase material to be returned at supplier's expense unless disposition instructions to the contrary are received within 15 days (Reply on reverse) (Not applicable to FMS)
1F - Replacement shipment requested (Not applicable to FMS)
1G - Reshipment not required. Item to be re-requisitioned.
1H - No action required. Information only
1Z - Other action requested (See remarks)

13. FUNDING AND ACCOUNTING DATA

14a. TYPED OR PRINTED NAME, TITLE, AND PHONE NUMBER OF PREPARING OFFICIAL
ELLIS, WILLIAM B FSO
564-2290 (757)444-2290

14b. SIGNATURE
W.B. Ellis USN

15. DISTRIBUTION ADDRESSEES FOR COPIES
COMMANDING OFFICER
NAVAL SUPPLY SYSTEMS COMMAND SUP51
5450 CARLISLE PIKE
PO BOX 2050
MECHANICSBURG, PA 17055-0791

364-101 7540-00-159-4442 (Previous edition is obsolete.) STANDARD FORM 364 (REV. 2-80)

Figure 5-8

UNSATISFACTORY MATERIAL REPORT (SUBSISTENCE) (DD FORM 1608)

UNSATISFACTORY MATERIAL REPORT (Subsistence)

1. DATE PREPARED (YYMMDD): 980629

PAGE 1 OF 2

2A. NAME OF RECEIVING ACTIVITY
NAVAL SUPPLY SYSTEMS COMMAND SUP51V

3A. NAME OF ORIGINATING ACTIVITY
USS DUARTE(DDG 90)

2B. ADDRESS (Include Street, City, State and ZIP Code)
COMMANDING OFFICER
NAVAL SUPPLY SYSTEMS COMMAND SUP51
5450 CARLISLE PIKE
PO BOX 2050
MECHANICSBURG, PA 17055-0791

3B. ADDRESS (Include Street, City, State and ZIP Code)
COMMANDING OFFICER
USS DUARTE(DDG 90)
FPO-AE 28882-1888

4A. ITEM NOMENCLATURE
HOT SAUCE, PEPPER SAUCE, EXT HOT,12

4B. SIS EVALUATION
[ ] YES [X] NO

5. NATIONAL STOCK NUMBER
8950013893825

6. SPECIFICATION NUMBER/IMPS NUMBER

7a. NAME OF CONTRACTOR
HEINTZ

7B. PLANT ADDRESS (Include Street, City, State and ZIP Code)
101 MAIN STREET
NEW YORK, NY 99887-2233

8. SOURCE OF SHIPMENT (Depot, Distrobution Point, Direct Delivery, etc.)
PRIME VENDOR

9. CONTRACT NUMBER
DLA-134-98-C-444

10. CONTRACTOR LOT NUMBER
LOT #4, CODE D

11. PRODUCT CODE
9272, 9235, 924

12. DATE OF PACK (YYMMDD)
930412

13. REQUISITION NUMBER
V2111181809H05

14. DATE SUPPLIES RECEIVED
06/13/98

15. SIZE OF LOT/SHIPMENT
A. CASES 20.0
B. UNITS 120

16. QUANTITY ON HAND
48

FOR ALL USERS (Food Service, Commissary, Veterinary, Troop Issue Subsistence, Etc.)

17. NARRATIVE DESCRIPTION OF UNSATISFACTORY QUALITY AND IDENTIFICATION OF DEFECTS
PRODUCT IS WEAK TASTING, HAS LITTLE FLAVOR, IS THIN, WITH WATERY APPERENCE.
SOLIDS AND LIQUIDS IN PRODUCT HAVE SEPERATED AND WILL NOT MIX. APPROXIMATE
LY TWO THIRDS OF THE PRODUCTS HAVE RUSTED CAPS.

18. RECOMMENDATIONS
PRODUCT HAS BEEN SURVEYED. RECOMMEND THAT OLD AGE STOCKS NOT BE ISSED TO
SHIPS.

19A. NAME OF VERIFYING OFFICIAL (Last, First, MI)
ELLIS, WILLIAM B.

19B. GRADE
LTJG

19C. SIGNATURE

19D. TELEPHONE NUMBER (A-AUTOVON C-COMM.)
(A)564-2290 (C)(757) 444-2290

19E. TITLE
FFSO

19F. DATE (YYMMDD)
980629

DD Form 1608
82 SEP

EDITION OF 1 APR 77 IS OBSOLETE

S/N 0102-LF-001-6082

UNSATISFACTORY MATERIAL REPORT (Subsistence)

PAGE 2 OF 2

INSPECTION RESULTS (When appropriate, report can be forwarded by users without this section being completed)

20A. TYPE OF EXAMINATION	20B. INSPECTION LEVEL	20C. AQL	20D. CLASS OF DEFECT	20E. ACCEPTANCE NUMBER	20F. REJECTION NUMBER	20G. SAMPLE SIZE	20H. NUMBER OF DEFECTS OR DEFECTIVES	20I. SAMPLE UNIT

21A. TYPED NAME OF AUTHORIZED INDIVIDUAL

21B. GRADE

21C. SIGNATURE

21D. TELEPHONE NUMBER (A-AUTOVON C-COMM.)

21E. TITLE

21F. DATE (YYMMDD)

DD Form 1608
82 SEP

EDITION OF 1 APR 77 IS OBSOLETE

S/N 0102-LF-001-6082

Figure 5-9

REQUEST FOR RESULTS OF TESTS
(DD FORM 1222)

REQUEST FOR AND RESULTS OF TESTS | PAGE NO. 1 | NO. OF PAGES 1

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*
COMMANDER
DOD: VETERINARY SERVICE ATTN: MCVS-SCL
BUILDING 2630
FT SAM HOUSTON TX 78234-6200

2. FROM: *(Include ZIP Code)*
FOOD SERVICE OFFICER
USS DUARTE (DDG 90)
FPO-AE 28882-1888

3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)*
HEINTZ
101 MAIN ST
NEW YORK, NY 99887-2233
CONTRACT NUMBER DLA-134-98-C-444

4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)*
HEINTZ
2008 PARKWAY PL
SPRINGFIELD ILL. 38790
P.O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED
HOT SAUCE	2	LOT #4 CODE D	SPECIAL TESTING	06/30/98

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE
HOT SAUCE	2 BOTTLES	48	

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY
PRIME VENDOR(MONARCH)	(FASTEST METHOD)	W. B. ELLIS, LTJG, SC, USN

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.
TESTED FOR SUITABILITY AND FIT-FOR-HUMAN CONSUMPTION

17. SEND REPORT OF TEST TO
SAME AS BLOCK 2, ALSO COMMANDER, NAVAL SUPPLY SYSTEMS COMMAND, FOOD SERVICE DIVISION ATTN: SUP 51V,, AND COMMANDER DEFENSE SUPPLY CENTER PHILIDELPHIA, DSCP-HQ.

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER

4. TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE

DD FORM 1222, FEB 62 (EF) REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

Figure 5-10

SUSPECTED HAZARDOUS FOOD ITEM MESSAGE
SAMPLE

UNCLASSIFIED

PAAUZYUW 0011400-UUUU-RULSTGX
ZNR UUUUU
P R 011400Z JAN 93 ZYB
FM USS DUARTE
TO DSCP PHILADELPHIA PA / / DSCP-HQ / /
INFO COMNAVSUPSYSCOM MECHANICSBURG PA/ / 51V/51 / /
BUMED WASHINGTON DC / / JJJJ / /
FISC SAN DIEGO CA / / JJJ / /
NAVENPVNTMEDU FIVE SAN DIEGO CA / / JJJ / /
BT
UNCLAS / / N06260 / / BUMED PASS TO 314 / 3112
MINIMIZE CONSIDERED
MSGID / GENADMIN / DUARTE / /
SUBJ / SUSPECTED HAZARDOUS FOOD ITEM / /
REF / A / DOC NAVSUP P-486 / 30JUN90 / /
AMPN / VOL I, PARA 5301-3 / /
POC / ENS W.B. ELLIS / FSO /-/-/TEL: DSN 526-1234 / TEL: COMM 619-556-1234 / /
RMKS / 1. IAW REF A, INFORMATION ON THE FOLLOWING SUSPECTED HAZARDOUS FOOD
ITEM IS FORWARDED:
A. SALAD DRESSING
B. 8950-00-205-0936
C. S&S SALAD DRESSING. 1205 5TH AVE., NY, NY 09591
PLANT ADDRESS: 28 S. ST., NEWARK, NJ 09900
D. N/A
E. DLA 13H-78-C-29A4
F. DDDC SAN DIEGO, CA
G. 10 MAY 92
H. 240 CANS
I. TYPE II, CLASS I,NO. 2.5, 24 CANS PER CASE
J. A3550, A3551
K. LOT #3550-MAR 92, LOT #3551-APR 92
L. LOT #3551-192 CANS
M. CANS OF SUSPECTED SALAD DRESSING APPEAR ABNORMAL
N. 25 OF 350 CREW HAVE SEVERE STOMACH CRAMPS, VOMITING, DIZZY,
SYMPTOMS DISAPPEAR WITHIN 24 HOURS, CDR JONES, FLT MED
LIAISON OFF. NAVREDMEDCOM SAN DIEGO, DSN 526-9876
O. ANALYSIS / LETTERMAN ARMY MEDICAL CENTER, PRESIDIO OF SAN
FRANCISCO, CA / /

BT

Figure 5-11

Appendix J

DoD Hazardous Food and Nonprescription Drug Recall System (NAVSUPINST10110.8C)

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

DLAR 4155.26
AR 40-660
NAVSUPINST 10110.8C
AFR 161-42
MCO 10110.38C

DLA-QL

DLA REGULATION
NO. 4155.26

15 Aug 86

DoD HAZARDOUS FOOD AND NONPRESCRIPTION DRUG RECALL SYSTEM
(Supplementation is permitted by primary level field activities.)

I. PURPOSE AND SCOPE. To prescribe policy guidance and assign responsibilities within DoD to be followed when recalls of hazardous, tampered or suspected tampering of foods or nonprescription drugs, nonprescription medical devices, and health and beauty aids (hereinafter collectively called hazardous food and nonprescription drugs) are issued by the Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), U.S. Department of Commerce (USDC), Defense Personnel Support Center (DPSC), or other Government or non-Government agencies which concern foods or nonprescription drugs that are or may be expected to be in military accounts. As commissaries, exchanges, and other activities stock and distribute nonprescription drugs, nonprescription medical devices, and health and beauty aids, this recall system will be utilized to disseminate information on Class I and Class II recalls concerning these types of products in accordance with Defense Medical Standardization Board (DMSB) policy. Such notification is designed to supplement the customary recall information notices issued by the Military Medical Field Offices. This publication is applicable to HQ DLA; DPSC; Defense Supply Centers (DSCS) with depot operations; Defense Depots (DDs); Army, Navy, Air Force, and Marine Corps communications facilities; and those activities of the Military Services including Reserve Forces (hereinafter referred to as the Services) involved in the contracting, inspection, administration, shipment, storage, distribution, issue, sale, preparation for feeding of food supplies, and use or sale of nonprescription drugs, nonprescription medical devices, and health and beauty aids. This publication implements policy of the Office of the Under Secretary of Defense for Research and Engineering for the establishment of a hazardous food and nonprescription drug recall system. It has been coordinated with and concurred in by the DMSB and the Services.

II. POLICY. HQ DLA, through its primary level field activity, DPSC, will act as the sole agent for DoD to coordinate all hazardous, tampered or suspected tampering of food and nonprescription drug recalls which may involve the Services. In this role, the agent will evaluate hazardous food and nonprescription drug recalls for DoD involvement, taking appropriate actions to protect the health of military personnel and their dependents, as well as the financial interests of DoD. DPSC will also advise the Military Medical Field Offices and DDs, as appropriate, of recall information on medical items. Retail activities, in addition, will be notified of Class I and Class II food and nonprescription drug recalls when there is definite knowledge that the items were procured for the exchanges and commissaries.

III. DEFINITIONS

A. Authorized Medical/Food Inspection Personnel

1. Army - Assigned veterinary service food inspection personnel.
2. Air Force - Assigned environmental health service personnel.

This DLAR supersedes DLAR 4155.26, AR 40-660, NAVSUPINST 10110.8B, AFR 161-42, MCO 10110.38B, 4 Feb 85.

3. Navy and Marine Corps - Assigned medical inspection personnel in the absence of Army veterinary service support.

B. Class of Recall

1. Class I - A Class I Recall is a situation in which there is a reasonable probability that the use of, or exposure to, a violative product will cause serious adverse health consequences or death.

2. Class II - A Class II Recall is a situation in which there is a reasonable probability that the use of, or exposure to, a violative product may cause temporary or medically reversible adverse health consequences, or where the probability of serious adverse health consequences is remote.

C. Communicators. Individuals responsible for the receipt, transmission, and delivery of messages from one person or place to another.

D. Food and/or Drug Accountable/Responsible Personnel. Individuals having accountability and/or responsibility for food and/or nonprescription drugs and their proper custody, care, and safekeeping while in the accounts of troop feeding facilities; while located at DDs, DSCs, and Supply Points; also those individuals with similar obligations at commissary stores, exchanges, clubs, and other appropriated or nonappropriated fund activities.

E. Food and Nonprescription Drugs Recalls. Announcements or alerts of emergency or priority situations involving the removal from the marketplace of hazardous foods or nonprescription drugs or suspect hazardous foods or nonprescription drugs, the consumption or use of which could produce consequences that would be immediate or long-range, life threatening, or hazardous to health.

F. Hazardous Foods or Nonprescription Drugs. Foods or nonprescription drugs not free or suspected of not being free from disease or noxious elements, or conditions which would render them a health hazard or unfit for human consumption or use.

G. Military Medical Field Offices. The U. S. Army Medical Materiel Agency (USAMMA), Frederick, MD 21701-5001; the Naval Medical Materiel Support Command (NAVMEDMATSUPCOM), Philadelphia, PA 19145; and the Air Force Medical Logistics Office (AFMLO), Frederick, MD 21701 -5001.

H. Nonprescription Drugs. Over-the-counter drugs, health and beauty aids, and nonprescription medical devices that do not require a physician's prescription.

I. Tampering. Deliberate introduction or subtitution of an adulterant, unwholesome material, or toxic substance to or the alteration of a food or nonprescription drug or health and beauty aid or its packaging or labeling, the consumption or use of which may result in death or serious bodily harm.

IV. SIGNIFICANT CHANGES. This publication has been updated to include tampering of food and nonprescription drugs, and current terminology.

V. RESPONSIBILITIES

A. HQ DLA

1. The Executive Director, Quality Assurance, DLA (DLA-Q) will provide policy for and exercise staff supervision of the recall of DLA-managed food and nonprescription drug supplies.

2. The Chief, Depot Operations Division (DLA-OH), and the Chief, Supply Management Division (DLA-OS), Directorate of Supply Operations (DLA-O), will assure that the supply aspects of this regulation pertaining to the recall of DLA-managed items are administered efficiently and effectively.

B. Field Activities

1. The Commander, DPSC, will:

a. Be the sole point of contact with FDA, USDA, USDC, and other sources for all matters pertaining to recalls in furtherance of the policy stated in paragraph II above.

b. Determine if any DLA-managed stocks are involved by the recall.

c. Determine location of involved food/nonprescription drug items managed by DLA.

d. Determine whether or not the hazardous item may be in the accounts of food/nonprescription drug accountable/responsible personnel.

e. Evaluate, in conjunction with responsible Federal agencies, reports of hazardous foods or nonprescription drugs or suspected hazardous food or nonprescription drug items received from food or nonprescription drug accountable/responsible personnel, authorized military inspection personnel, medical personnel, or other sources; determine whether or not a hazardous food and nonprescription drug recall message should be dispatched to all users; and coordinate with FDA to determine if a military recall should be expanded to include the civilian community.

f. Prepare initial message for transmission by Automatic Digital Network (AUTODIN) which will be routed direct to user installations and activities worldwide, or only to specific location(s) stocking the item when this is known. As a minimum, these messages will contain the following:

(1) The Defense Communications Agency (DCA) approved collective address designator code - All Food/Drug Activities (ALFOODACT).

(2) The applicable message serial number as taken from a sequence that begins and ends within a calendar year; e.g., the first message during CY 1984 would be numbered 1-84. The first message of the calendar year will summarize the previous calendar year ALFOODACT message activity and list open/unresolved recalls.

(3) Specific description of hazardous food or nonprescription drug and National Stock Number (NSN), if applicable.

(4) Brand name, if applicable.

(5) Name and address of processor/manufacturer, and country of origin if an imported item.

(6) Contract number, if applicable.

(7) Date of pack, container code or product code.

(8) An advisory statement to users to place the hazardous food/nonprescription drug immediately in a "hold status" which will suspend its sale, issue, and use. If appropriate, advise Base/Post Public Affairs Office to notify general population of the installation to return the suspected hazardous food/nonprescription drug items to place of purchase.

(9) Final disposition instructions if known at this time; e.g., return product to recalling firm through local distributor.

g. Assign priority precedence to ALFOODACT messages.

h. As necessary, prepare interim messages to users to advise of the progress of recall actions or status of the hazardous items involved.

i. Advise users by message of final disposition of the recalled item.

j. Maintain a summary log of hazardous food/nonprescription drug recalls that as a minimum will include the following:

(1) Message number/ALFOODACT number.
(2) Item identification.
(3) Contract number, if applicable.

k. Prepare and transmit ALFOODACT test messages whenever a 90-day period of time has elapsed during which no recall has caused use of the system.

2. Technical and Quality Assurance Division, Subsistence (DPSC-ST) will:

a. Act as DPSC focal point for all recalls.

b. Determine the necessity of issuing recalls. Obtain advice from DPSC-AT on nonprescription drug matters.

c. Prepare recall messages. Coordinate with DPSC-AT in preparing recall messages for nonprescription drugs.

3. Technical Operations Division, Medical (DPSC-AT) will provide assistance and advice to DPSC-ST in determining necessity for issuing recalls and in preparation of messages involving nonprescription drug items.

C. Communicators will assure:

1. That ALFOODACT messages are processed in a manner appropriate to the "priority" communications precedence assigned.

2. Delivery of ALFOODACT messages to food or nonprescription drug accountable/responsible personnel of DDs, DSCs, supply points, commissary stores, food service offices, exchanges, clubs, open messes, authorized military inspection personnel, and veterinary/medical personnel.

3. Maintain a file of ALFOODACT messages by message serial number for a minimum of 1 year and provide a copy of messages to supported activities on request.

D. Food and/or Drug Accountable/Responsible Personnel will:

1. Upon notification, immediately act to identify stocks of hazardous food or nonprescription drugs that may be on hand, segregate those present, and secure the items in a hold status to preclude their immediate further issue, sale, and use. Responsible depot/supply point/nonappropriated fund activity personnel will notify the end users of hazardous food or nonprescription drug items in those instances when issue has been made prior to receipt of a DPSC message that has been directed only to that specific depot/supply point. Authorized food inspection or medical personnel may be requested to assist in all of these matters involving food recalls. In cases of nonprescription drug recalls, advice may be obtained from the responsible medical activity.

2. As appropriate, notify parent commands of the amounts of hazardous items on hand.

3. Retain hazardous food or nonprescription drug item in a hold status until final disposition instructions have been received from DPSC.

4. Notify the Commander, DPSC, ATTN: DPSC-ST whenever hazardous foods or nonprescription drugs have been identified through local determination as being on hand in a local supply account. An information copy of such notification will be forwarded to the department headquarters of the Service which originates the notification, and will be noted to the attention of medical and food service staff at department level.

5. In the event any DoD activity finds a condition of food that may require a hazardous recall, the local authorized food inspection or medical personnel will be contacted. In addition, all food and nonprescription drugs which are found that may require a hazardous recall will be reported to DPSC-ST via priority message which is to contain, as a minimum, the following:

a. Specific description of hazardous item, and NSN, if applicable.
b. Brand name, if applicable.
c. Name and address of manufacturer/processor.
d. Contract number, if applicable.
e. Lot numbers (from case) or package/can codes.
f. Activity that supplied material (Depot/Supply Center, DoD).
g. Date material received at using activity.
h. Amount received and amount in stock.
i. Description of hazardous condition.
j. Symptoms of illness or death attributed to or suspected to be caused by the item, number of persons affected, and contact point for medical authority cognizant of the incident.
k. Laboratories to which samples have been submitted for test/analysis, date shipped, and mode of shipment.
l. Laboratory test/analysis results when available.
m. Where necessary, send samples to nearest laboratory with a request to furnish DPSC-ST with one copy of results on a priority basis.

6. In addition to the above procedure for reporting a suspected hazardous nonprescription drug item, report and process medical materiel complaints in accordance with the appropriate Service regulations (DLAR 4155.28: BUMEDINST 6710.63; AR 40-61; AFM 67-1, Vol V, Chap 19).

7. In addition to the above procedures for reporting a suspected hazardous food item, report and process subsistence material complaints in accordance with the appropriate Service regulations (DLAR 4155.3/AR 30-12/NAVSUPINST 4355.2/ AFR 74-5/MCO 10110.21).

8. Retain copies of ALFOODACT messages for a minimum period of 1 year or until final disposition, whichever is later.

9. Conduct inspections and submit samples to laboratories for testing as required.

BY ORDER OF THE DIRECTOR

for JAMES J. SINGSANK
Colonel, USA
Staff Director, Administration

COORDINATION: DLA-KS, DLA-LP, DLA-LR, DLA-PP, DLA-OW, DRSO-M, Army (DALO-TST), Navy (NAVFSSO(SV)), Air Force (SGPA), Marine Corps (LFS-4), DMSB

Appendix K

Maritime Health Declaration Form

Maritime Health Declaration
USS NEVERPORT (CVX-100)

Port of _____
Date _____

Voyage from: _____ To: _____

Nationality: _____Description: Warship Registered Tonnage: _____

Deratting Exemption Certificate: Date _____ Number of Crew _____

Issued at _____ Number of Passengers _____

LIST OF ALL PORTS OF CALL SINCE COMMENCEMENT OF VOYAGE, WITH DATES OF DEPARTURE

_____
_____
_____

Has there been on board during the voyage any case or suspected case of plague, Cholera, yellow fever, smallpox, Typhus or relapsing fever? _____

Is there on board or has there been during the voyage any case of disease suspected to be of an infectious or quarantinable nature? _____

Are there any persons on board now who have at any time during the voyage been in contact with another person known or suspected to have a quarantinable disease? _____

Has any person died on board during the voyage other than as a result of accident _____

Has plague occurred or been suspected among rats or mice on board, or has there been any abnormal mortality among them? _____

Is there any other condition on board which may lead to infection or the spread of disease? _____

For any question above answered YES, the particulars are indicated on the Schedule on the reverse side of this form.

I HEREBY DECLARE that the particulars and answers to the questions given in this declaration of health are true and correct to the best of my knowledge and belief.

Date:_____ _____
Commanding Officer

_____
Medical Officer

Schedule
Particulars to every case of disease or illness described in Questions 1-4

Name	Class Or Rating	Age	Sex	Nationality	Port Of Embarkation	Nature Of Illness	Date Of Onset	Results[1]	Disposition[2]

NOTE: If necessary, amplify this Schedule on a separate sheet of paper
[1]State whether recovered, still ill, or died.
[2]State whether still on board, landed at (give name of port), or buried at sea.

Time of mooring ☐ anchoring ☐ of vessel _____ Time boarded by Quarantine Official _____

Provisional ☐ Free ☐ Pratique granted to vessel
at _____, on _____ 19_____
(time) (date)

Comments of Quarantine Official
_____

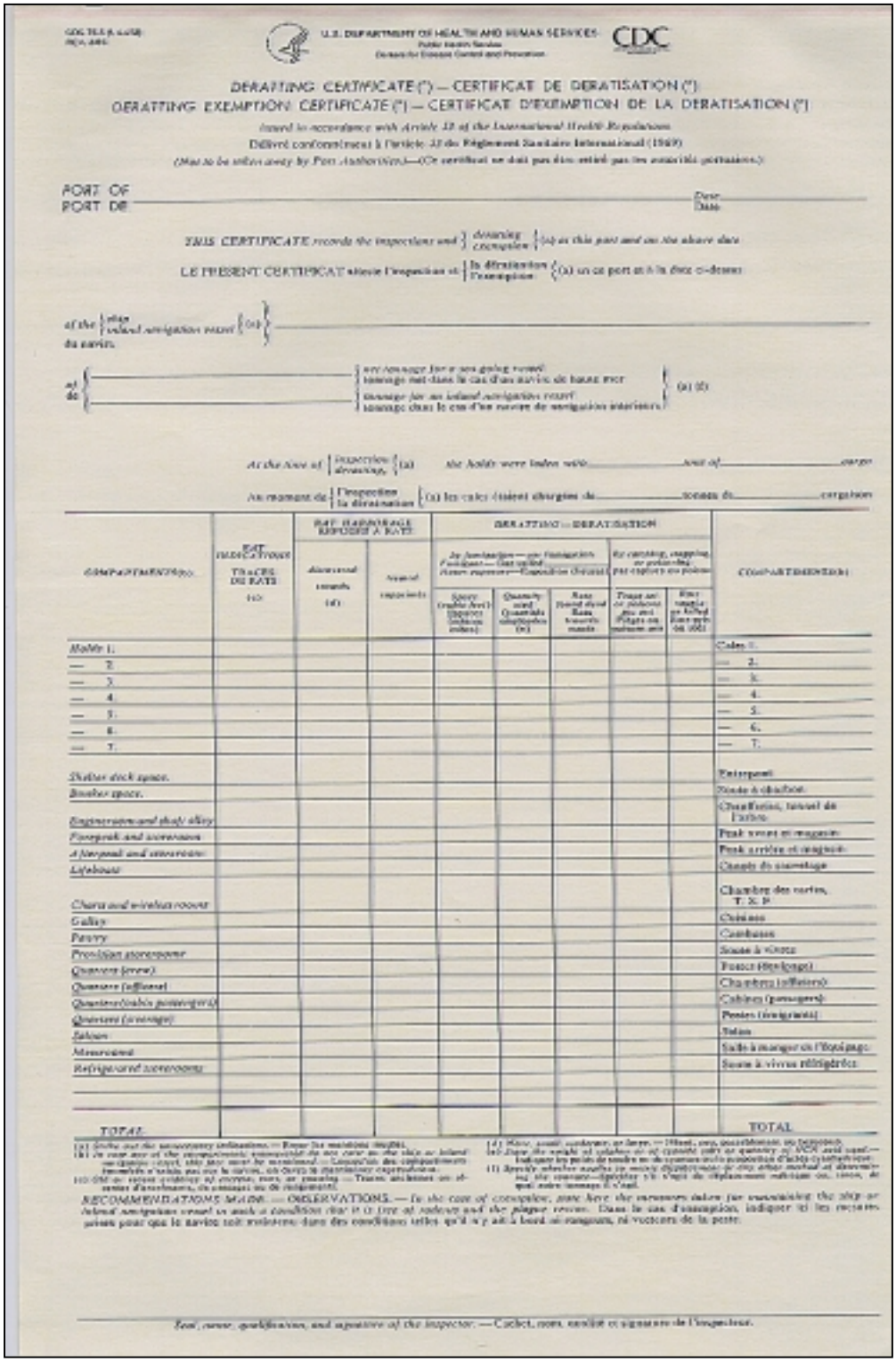
_____

_____

_____
Signature of Quarantine Official

Appendix L

Sample Deratting/Deratting Exemption Certificate



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES — CDC

DERATTING CERTIFICATE (*) — CERTIFICAT DE DÉRATISATION (*)
DERATTING EXEMPTION CERTIFICATE (*) — CERTIFICAT D'EXEMPTION DE LA DÉRATISATION (*)

Issued in accordance with Article 22 of the International Health Regulations
Délivré conformément à l'article 22 du Règlement Sanitaire International (1969)
(Not to be taken away by Port Authorities.—(Ce certificat ne doit pas être retiré par les autorités portuaires.)

PORT OF / PORT DE _____ Date: / Date: _____

THIS CERTIFICATE records the inspection and { *deratting* / *exemption* } *(a) at this port and on the above date.*

LE PRÉSENT CERTIFICAT atteste l'inspection et { la dératisation / l'exemption } (a) au ce port et à la date ci-dessus.

of the { *ship* / *inland navigation vessel* (b) } _____
du navire.

at / de { _____ } { *sea-going vessel* / navire mer / *inland navigation vessel* / navire de navigation intérieure } (b) (c)

At the time of { *inspection* / *deratting* } (a) *the holds were laden with* _____ *tons of* _____ *cargo*

Au moment de { l'inspection / la dératisation } (a) les cales étaient chargées de _____ tonnes de _____ cargaison

COMPARTMENT(S)	RAT INFESTATION / TRACES DE RATS (c)	RAT HARBOURAGE / REPUTED A RATS		DERATTING — DÉRATISATION					COMPARTIMENT(S)
		Abnormal vermin	*Normal vermin*	*By fumigation — par fumigation* (Fumigant — Gaz utilisé / Amount expended — Dépensé (litres))			*By catching, trapping, or poisoning — par capture ou poison*		
				Space (Cubic feet / litres / cubic meters)	*Quantity used* / Quantité employée (g)	*Rate* (Fluid ounces / litre / grams / kilograms)	*Traps set* / *or poisons* / *pièges ou appâts*	*Rats caught or killed* / *Rats pris ou tués*	
Holds: 1.									Cales: 1.
— 2.									— 2.
— 3.									— 3.
— 4.									— 4.
— 5.									— 5.
— 6.									— 6.
— 7.									— 7.
Shelter deck space.									Entrepont.
Boiler space.									Soute à chaudière.
Engine-room and shaft alley.									Chaufferie, tunnel de l'arbre.
Forepeak and accommodation.									Peak avant et magasin.
Afterpeak and accommodation.									Peak arrière et magasin.
Lifeboats.									Canots de sauvetage.
Chart and wireless room.									Chambre des cartes, T. S. F.
Galley.									Cuisine.
Pantry.									Cambuse.
Provision storeroom.									Soute à vivres.
Quarters (crew).									Postes (équipage).
Quarters (officers).									Chambres (officiers).
Quarters (cabin passengers).									Cabines (passagers).
Quarters (steerage).									Postes (émigrants).
Saloon.									Salon.
Messroom.									Salle à manger ou réfectoire.
Refrigerated storerooms.									Soute à vivres réfrigérée.
TOTAL:									TOTAL

(a) *Strike out the unnecessary words.* — Rayer les mentions inutiles.
(b) *In case one of the compartments, enumerated on one side as inland navigation vessel, this port must be mentioned.* — Lorsque les compartiments énumérés d'un côté sont ceux de navires, on devra le mentionner expressément.
(c) *Not to be taken evidence of excess, rats or vermin.* — Traces, présumées ou certaines d'envahissement, de rongeurs ou de vermine.

(d) *Have, small, moderate, or large.* — Petites, moyennes, ou importantes.
(e) *Indicate the weight of cylinder or of cylinder and or quantity of HCN and used.* — Indiquer les poids de vapeur ou de quantité de l'acide cyanhydrique.
(f) *Specify whether sulphur or methyl chloroformate or any other method or chemical the contents—Spécifier s'il s'agit de dégazage au soufre, ou, ceux, de quel autre mélange il s'agit.*

RECOMMENDATIONS MADE. — OBSERVATIONS. — *In the case of exemption, state here the measures taken for maintaining the ship or inland navigation vessel in such a condition that it is free of rodents and the plague vector.* Dans le cas d'exemption, indiquer ici les mesures prises pour que le navire soit maintenu dans des conditions telles qu'il n'y ait à bord ni rongeurs, ni vecteurs de la peste.

Rank, name, qualifications, and signature of the inspector. — Grade, nom, qualité et signature de l'inspecteur.

Appendix M
Ship's Pesticide Inventory and Pierside Inspection Log Entry Samples

Pesticide Inventory					
Log entry number	Location	Date	Item	Uses	Amount on hand
1.	Paint locker	29DEC00	D-Phenothrin (2%) aerosol. NSN 6840-01-412-4634	Cockroaches and mosquitoes	(10) 12-oz cans
2.	Paint locker	29DEC00	Whitmire Micro-Gen PT® Engage®, 0.5% chlorpyrifos, aerosol. NSN 6840-01-338-2487	Cockroaches	(8) 20-oz cans
3.	Paint locker	29DEC00	Whitmire Micro-Gen PT® Perma-Dust®, 35.5% Boric acid, aerosol. NSN 6840-01-287-3938	Cockroaches	(12) 9-oz cans

Pierside Inspection						
Log entry number	Location	Date	Item	Type of pest	Action taken	Name of inspector
1.	Pier 7, San Diego, CA	28DEC00	Bag of onions	German cockroach. 2 NYMPHS, 3 ADULTS	Informed SUPPO, filled out DD1222, removed bagging and took onions to galley for washing.	HM2 Jones
2.	Pier 4, Sasebo, Japan	10JAN-01	Bag of Flour	1 -Trogoderma beetle larva.	Informed SUPPO. Sample with DD1222, msg to DSCP, Phil., PA. Refused loading.	HM2 Jones
3.	Pier 8, Everett, WA	26FEB-01	Farina (Crème of Wheat)	Saw-toothed grain beetle; Twelve adults per pound	Informed SUPPO, Filled out DD1222, refused loading.	HM2 Jones

Appendix N
Recording and Archiving Pesticide Use During Military Operations Memorandum, DASN (I & E)

DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
(INSTALLATIONS AND ENVIRONMENT)
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

APR 27 1999

MEMORANDUM FOR CHIEF OF NAVAL OPERATIONS (N4)
COMMANDANT OF THE MARINE CORPS (LF)

Subj: RECORDING AND ARCHIVING PESTICIDE USE DURING MILITARY OPERATIONS

Ref: (a) DODINST 4150.7

Reference (a) requires that pesticide use during all military operations be recorded and archived. This requirement includes all pesticides except arthropod skin and clothing repellents. In most cases, Active and Reserve Component Medical Department personnel accomplish pesticide application during operational deployments.

In order to comply with reference (a), all personnel who apply pesticides during military operations ashore and afloat will record and report pesticide applications utilizing DD Form 1532-1, "Pest Management Maintenance Record", or a computer-generated equivalent. Commanders are reminded that only those pesticides approved by the Armed Forces Pest Management Board for contingency operations are authorized for use.

Each month, these records will be consolidated by the Commander, Commanding Officer, Officer in Charge, or Master of Military Sealift Command ships and forwarded directly to the Navy Environmental Health Center (NEHC), ATTN: Preventive Medicine, 2510 Walmer Avenue, Norfolk, VA 23513-2617, for archiving. Major claimants are free to determine whether or not local reporting and archiving is necessary.

My point of contact for further information on this matter is LCDR Jason A. Jackson at (703) 588-6675; DSN: 425-6675; Fax: (703) 588-8428. The point of contact at NEHC is LCDR Stanton E. Cope, MSC, USN at (757) 462-5593; DSN: 253-5593; Fax: (757) 444-1345; or e-mail copes@nehc.med.navy.mil.

E Daniel Poulad Jr
for ELSIE L. MUNSELL
Deputy Assistant Secretary of the Navy
(Environment and Safety)

Copies to:
BUMED 02
BUMED 24
Armed Forces Pest Management Board
Navy Environmental Health Center (Code PM)

Appendix O

Instructions for the Use of the Pest Management Use Record, DD Form 1532-1

1. Value of Records. The Pest Management Maintenance Record (DD Form1532-1) provides a standard method for recording pesticide use and pest management operations.

a. Use of the record complies in part with Federal Regulations 40 CFR 171-11(c)(7) of the Federal Insecticide, Fungicide and Rodenticide Act as amended.
b. It is used as permanent record and history of pest control operations at a particular site (structure or area).
c. The record also provides continuity in the management and performance of pest control operations.
d. Use and analysis of these records will identify structures, designs and areas that have significantly more pest problems than others.
e. Historical pest control data can be used to correlate sites and treatment and to facilitate tracking soldier and environmental exposure to pesticides. These data also facilitate monitoring the health and safety of soldiers who apply pesticides.
f. Archival of pesticide use data facilitates development of answers to inquiries regarding pesticide use occurring during deployment operations.

2. Maintaining Records. These records shall be maintained and permanently archived at the designated Military Service's archival sites (Navy Environmental Health Center, Norfolk).

3. Report Language. Since pest management information is machine processed; all report data must adhere to a uniform system of "report language." Standard report terms have been developed for describing and reporting most pest control techniques and materials.

a. The terms are arranged in functional groups or categories.
b. Both the descriptive terms used to look up and classify any given operation and the report terms for actual entry on the DD Form 1532-1 are listed in section "**6. Descriptive and Report Terms**," below.
c. Where standard units are required, such as for acres, pounds, gallons, etc., report units are also listed.
d. Only report terms and report units listed in this instruction shall be used on the form.
e. The processing unit will reject all other terms.
f. In many cases the descriptive term and the report term are similar, while others may differ by only one letter, so it is necessary to carefully check the report terms.
g. Descriptive terms and report terms are listed in three principal categories: (1) Target Pests; (2) Operations; (3) Pesticides.

4. Top Line Data Entry on DD Form 1532-1.

a. BUILDING/AREA. On the top of the record form, in the space marked "BLDG/Area," enter the name of the U.S. naval vessel.

b. SIZE. Enter the size of the BLDG/Area (U.S naval vessel) to be maintained. Size should be recorded as linear feet (LLF; See the "Measurement Units" in the bottom legend of DD Form 1532).

c. TYPE OF CONSTRUCTION. In the space marked "Type of Construction," enter a code letter from the legend to designate the major type of construction (e.g., steel, sheet metal = ST). More than a code letter may be used if desired (See "Type of Construction Codes," in the bottom legend of DD Form 1532-1).

d. USE DESIGNATION. In the last space marked "Use Designation," enter information to identify the major use of the vessel (U.S Navy Warship or U.S. Navy Submarine).

5. Pest Control Operation Information Data Entry on DD Form 1532-1.

a. RECORDING OPERATIONS. Each line of DD Form 1532-1 can be used to record a complete pest control operation.

(1) Most operations using a single pesticide can be entered without difficulty.

b. FIELDS AND COLUMNS OF THE FORM. DD Form 1532-1 is divided into specific fields and columns. Use the most appropriate descriptive term and report terms from section "**6. Descriptive and Report Terms**," below, for each pest or vector. For certain fields and columns, use the codes from the bottom legend of the front page of DD Form 1532-1 (e.g., "Work Origin," "Measurement Units"). These fields and columns are further described, in the order they appear on the form, as follows:

(1) Date. Enter the date of the Pest Management Operation.

(2) Units Serviced. Enter the part of the vessel involved, including the designated "space" number and brief description of the "space."

(3) Work Origin. Enter the codes (See "Origin of Work," in the bottom legend of DD Form 1532-1).

(4) Unit of Measure. Enter the numerical size of the area treated (See "Measurement Units," in the bottom legend of DD Form 1532-1).

(5) Target Pest. Find the most appropriate descriptive term from the section for the pest and enter the corresponding report term on the form. In some cases you will need to use a generic report term such as OTH (Other), ODV (Other disease vector), etc., and then add the name of the pest for which no descriptive report term is listed.

(a) Example. For mosquito control, find "Mosquitoes" in the descriptive terms and enter the corresponding report term "MOSQUITOES" in the TARGET PEST column. If there is no suitable descriptive term, find the general grouping, which is most appropriate, and use the "Other" designation.

(6) Control Operation. Find the most appropriate descriptive term listed in Category 2, Operations, below, and enter the corresponding report term. Note that operation names are paired with area units (e.g., AC, MSF, LFF, etc.). Only the indicated area unit can be used.

(7) Pesticide Use. If a Pesticide is used, record the following.

(a) Name. Enter the report term for the pesticide used in the control operation, if any. If two or more pesticides are simultaneously used, they must be reported separately.

(b) EPA Registration Number. Enter the EPA Registration number (Appendix A of the "U.S Navy Shipboard Pest Control Manual" or the actual "Pesticide Label").
(c) Percent Concentration. Enter the % concentration of the finished pesticide formulation.

(d). Amount. Enter the total amount or quantity used. Record the actual amount of pesticide used (lbs as PDW; gallons as ZGL, and oz. as FLO), not active ingredient, and not finished spray quantity. These codes are paired with the pesticide formulation report terms (Appendix O, "Category 3, Pesticides").

1) Aerosol Formulations:

a) Example 1: For a cockroach crack and crevice application using PT® Permadust®, if 120 linear feet of a ship's bulkhead were treated at the recommended rate of 1 second (rate = 0.05 oz./sec) of spray per 3 linear feet rate, then 2.0 oz. of product would be required. Therefore, 0.2 can AERFLO would be recorded in the amount column. Use a dispersal rate of 0.067 oz/sec for Whitmire Micro-Gen PT® Engage® and 0.057 oz/sec for Whitmire Micro-Gen PT® 565 Plus XLO®, respectively. For the Airosol Company's "D-phenothrin," apply at the rate of 1 sec (=1gm or 0.035 oz) per 2 linear feet).

2) Solid Formulations (Bait Stations and Gels):

a) Example 1: Record the number of cockroach bait stations used (e.g., 10 "Combat® Quick Kill Bait Stations") as 10 BTSPDW (assume as a starting point for control, 1 bait station per 10 ft^2).

b) Example 2: Record gels, such as "Siege® Gel Insecticide" or Maxforce Roach Killer Bait Gel, as lbs. For example, if the maximum rate of 1 gram/yd^2 were used to treat 120 ft^2 (10 feet x 12 feet), then 13.3 grams or 0.029 lbs of gel would be required. Therefore, 0.03 POGPDW would be recorded in the amount column on DD Form 1532-1.

3) Liquid Formulations:

a) Example 1: Dow AgroSciences Empire 20 Microencapsulated Insecticide (Dursban) is applied as a crack and crevice treatment against a light cockroach infestation along the bottom of a 100 ft bulkhead, at a 0.2% rate of 1.33 fl oz dispersed from a hand compressed sprayer equipped with a 0.1 gal per minute pinstream tip attachment. If a total of 1.33 oz of pesticide were applied, then 1.33 oz. (= 0.01 gal) was used. Therefore, 0.01 SUSZGL of insecticide would be reported in the amount column.

(e) Labor Time. This is not a mandatory field. However, logging time spent on pest management operations provides historical records on time spent on specific pest management operations, as well as providing general information on time spent on pest management operations during various periods of a deployment.

(f) Applicator Initials (back side of DD Form 1532-1). In the left-hand column, enter the pesticide applicator's name and initials.

(g) Pesticide Certification Numbers (back side of DD Form1532-1). In the center columns, enter the DoD Pesticide Applicator Certification Number, and/or Shipboard Pest Control Number (including certification expiration dates) for each DoD and/or BUMED certified pesticide applicator.

(h) Ship's Unit Identification Code (UIC) (back side of DD Form 1532-1). In the far right-hand column, enter the ship's UIC.

6. Descriptive and Report Terms

a. CATEGORY 1 - TARGET PESTS

DISEASE VECTORS – FLIES, GNATS AND MOSQUITOES	
Descriptive terms	**Report terms**
Culicoids (sand flies, punkies, no-see-ums)	CULICOIDS
House flies and other filth flies	FILTHFLIES
Mosquitoes (culicids)	MOSQUITOES
Filter flies, drain flies (psychodids)	PSYCHODA
Black flies, buffalo gnats (simuliids)	SIMULIIDS
Stable flies, dog flies, biting house flies (muscids, Stomoxys)	STOMOXYS
Horse flies, deer flies (tabanids)	TABANIDS
Other Diptera (Miscellaneous flies, gnats, etc)	OTH (add name)

HOUSEHOLD, NUISANCE, AND MISCELLANEOUS ARTROPOD PESTS	
Descriptive terms	**Report terms**
Ants	ANTS
Bedbugs	BEDBUGS
Centipedes	CENTIPEDES
Cockroaches	ROACHES
Fleas	FLEAS
Lice	LICE
Mites and chiggers	MITES
Scorpions	SCORPIONS
Spiders	SPIDERS
Ticks	TICKS
Urticating insects (caterpillars, etc.)	URTICATING
Wasps, bees, and hornets	WOB
Other disease vectors and venomous arthropods	ODV (add name)
Other arthropod pests	OAR (add name)

STORED PRODUCTS PESTS	
Descriptive terms	**Report terms**
Arthropod pests of stored foods	FOODPESTS
Arthropod pests of fibers and fabrics	FIBFABPST

VERTEBRATE AND MISCELLANEOUS PESTS OTHER THAN ARTHROPODS	
Descriptive terms	**Report terms**
Rats	RATS
Mice	MICE
Bats	BATS
Birds	BIRDS
Fish	FISH
Snails and slugs	SNAILSLUGS
Snakes	SNKES
Other miscellaneous pests	OTP (add name)

b. CATEGORY 2 - OPERATIONS

INTERIOR CONTROL OPERATIONS		
Descriptive terms	**Report terms**	**Report units**
Indoor residual treatment (report area treated); for crack and crevice treatment (report area protected)	RESIDTR	MSF, LFF
Baiting (chemical or biological control only (report area protected)	INBAIT	MSF, LFF

INDOOR SITES AND STRUCTURES		
Descriptive terms	**Report terms**	**Report units**
Food handling buildings (preparation and serving only)	FHB	MSF
Barracks and BOQs	BRQ	MSF
Hospitals and medical laboratories	HOL	MSF
Recreation buildings and chapels	RCH	MSF
Office and administrative buildings	OFF	MSF
Industrial buildings, shop areas, and nonmedical laboratories	IND	MSF
Storage buildings and warehouses	WHS	MSF
Exchanges and commissaries	EXC	MSF
Brigs or prison cells	BRG	MSF

MISCELLANEOUS SITES		
Descriptive terms	**Report terms**	**Report units**
Trucks and vans	TRV	MSF
Aircraft	ACF	MSF

c. CATEGORY 3 - PESTICIDES

INORGANIC INSECTICIDES AND ACARICIDES	
Descriptive terms	**Report terms**
Boric acid crystals	BRICACID
Other inorganic insecticides and acaricides	OII (add name)

ORGANIC INSECTICIDES AND ACARICIDES	
Descriptive terms	**Report terms**
Dursban (Chlorpyrifos)	DURSBAN

MISCELLANEOUS INSECTICIDES	
Descriptive terms	**Report terms**
D-Phenothrin	D-PHENOTHRIN
Pyrethrin	PYRETHRIN
Hydramethylnon	HYDRAMETHYLNON
Fipronil	FIPRONIL

DRY FORMULATIONS	
Descriptive terms	**Report terms**
Baits	BTSPDW

LIQUIDS, PASTES, GREASES, GASSES, AND MISCELLANEOUS FORMULATIONS	
Descriptive terms	**Report terms**
Emulsions	EMLZGL
Solutions	SLNZGL
Suspensions	SUSZGL
Pastes and greases (include invert emulsions)	POGPDW
Aerosols	AERFLO
Other liquid Forms	OLPZGL

Appendix P

Pest Management Use Record, DD Form 1532-1

BUILDING / AREA:	SIZE:	TYPE OF CONSTRUCTION:	USE DESIGNATION:

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		

Form Approved OMB No. 07404-0188 **REPORT CONTROL SYMBOL**: **PEST MANAGEMENT MAINTENANCE RECORD**

The public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for information Operations and reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control Number. PLEASE DO NOT RETURN YOUR FORM TO THIS ADDRESS.

MEASUREMENT UNITS

MSF = 1,000 Sq. Ft.
MCF = 1,000 Cu. Ft
LFF= Linear Feet
Ac = Acres

ORIGIN OF WORK

SW = Scheduled work
WR = Work Request
SC = Service or Trouble call
R = Routine Inspection

TYPE OF CONSTRUCTION

CO = Concrete
BL = Block
BV = Brick Veneer
ST =Steel, sheet metal
WO = Wood
OT = Other

DD FORM 1532-1, AUG 96 (EG)

Designed using Perform Pro, WHS/DIOR, Aug 96

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		

REMARKS

Name (Initials)	Rate	DoD Pesticide Applicator Certification Data		Shipboard Pest Control Certification Data		Ship's Unit Identification Code (UIC)
		Certification Number	Expiration Date	Certification Number	Expiration Date	

DD FORM 1532-1 (BACK), AUG 96

(Attach additional card to continue record)

Appendix Q

Sample Pest Management Use Record, DD Form 1532-1

BUILDING/AREA: USS AIRCRAFT CARRIER (CVN - 000)					SIZE: 1200 LFF	TYPE OF CONSTRUCTION: ST	USE DESIGNATION: U.S WARSHIP				
Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		
00-06-25	Dry store room (05-58-4-L)	SW	0.10 MSF	ROACHES (GERMAN)	INBAIT	Combat® Quick Kill bait station, regular size	64240-33	0.03	10 BTSPDW	0.25	RS, PJ
00-06-26	Dry store room (05-58-4-L)	SW	0.10 MSF	ROACHES (AMERICAN)	INBAIT	Combat® Quick Kill bait station, large size	64240-34	0.03	10 BTSPDW	0.25	RS, PJ
00-06-28	Food preparation area (01-66-2-L)	SW	120 LFF	ROACHES (GERMAN)	RESIDTR	Whitmire Micro-Gen PT® Perma-Dust® (Boric acid)	499-384	35.50	0.2 can AERFLO (= 2.0 oz)	1.00	RS
00-07-02	Forward galley (01-66-2-L)	SW	120 LFF	ROACHES (GERMAN)	RESIDTR	Whitmire Micro-Gen PT® Engage® (chlorpyrifos)	499-292	0.50	0.1 can AERFLO (= 2.7 oz)	1.00	RS, PJ
00-07-04	Aft galley scullery (01-66-2-L)	SW	100 LFF	ROACHES (GERMAN)	RESIDTR	Dursban, micro-encapsulated (Empire 20; chlorpyrifos)	62419-88	20.00	0.01 SUSZGL (= 1.3 oz)	1.00	PJ
00-07-14	Ship's store (01-78-7-Q)	WR	120 LFF	ROACHES (GERMAN)	RESIDTR	D-phenothrin	901-82	2.00	0.2 can AERFLO (= 2.1 oz)	1.00	RS
00-07-18	Breakout store room (01-58-2-L)	WR	120 LFF	ROACHES (GERMAN)	RESIDTR	Whitmire Micro-Gen PT®565 Plus XLO® (pyrethrins, d-trans allethrin piperonyl butoxide, n-octyl bicycloheptene dicarboximide)	499-310	2.50	0.2 can AERFLO (= 2.3 oz)	1.00	PJ
00-07-19	CPO mess 6-190-0-A	SC	0.12 MSF	ROACHES (GERMAN)	RESIDTR	Siege® gel insecticide	241-313	2.00	0.01 lbs POGPDW (=5.6 grams)	1.00	RS
00-10-29	Galley admin office (01-70-2-L)	SW	0.12 MSF	ROACHES (GERMAN)	RESIDTR	Maxforce Roach Killer Bait Gel	64248-14	0.01	0.03 lbs POGPDW (= 13.3 grams)	1.00	RS

Form Approved OMB No. 07404-0188 **REPORT CONTROL SYMBOL**: **PEST MANAGEMENT MAINTENANCE RECORD**

The public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for information Operations and reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control Number. PLEASE DO NOT RETURN YOUR FORM TO THIS ADDRESS.

MEASUREMENT UNITS

MSF = 1,000 Sq. Ft. LFF= Linear Feet
MCF = 1,000 Cu. Ft Ac = Acres

ORIGIN OF WORK

SW = Scheduled work SC = Service or Trouble call
WR = Work Request R = Routine Inspection

TYPE OF CONSTRUCTION

CO = Concrete BV = Brick Veneer WO = Wood
BL = Block ST =Steel, sheet metal OT = Other

DD FORM 1532-1, AUG 96 (EG)

Designed using Perform Pro, WHS/DIOR, Aug 96

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		

REMARKS

Name (Initials))	Rate	DoD Pesticide Applicator Certification Data		Shipboard Pest Control Certification Data		Ship's Unit Identification Code (UIC)
		Certification Number	Expiration Date	Certification Number	Expiration Date	
Robert E. Smith (RS)	HM1	NB-056-97-0200	04JUN00	B-0012	02JUN00	62987
Paul B. Jones (PJ)	HM2	NB-001-97	02FEB03	B-0027	14APR00	62987

DD FORM 1532-1 (BACK), AUG 96

(Attach additional card to continue record)

Appendix R
REFERENCES

1. Armed Forces Pest Management Board (AFPMB). 1992. Stored-product pest monitoring methods. Technical Information Memorandum No. 27. Defense Pest Management Information Analysis Center, Wash., D.C. 20 p. (Also available as download from AFPMB web site: http://www.afpmb.org).
2. Armed Forces Pest Management Board (AFPMB). 1998. Technical Information Memorandum No. 38. Protecting meal, ready-to-eat rations (MRE's) and other subsistence during storage. Defense Pest Management Information Analysis Center, Wash., D.C. 20 p. (Also available as download from AFPMB web site: http://www.afpmb.org).
3. BUMEDINST 6250.12C, May 22, 1999. Pesticide applicator training and certification for medical personnel.
4. BUMEDINST 6250.14. July 09, 1991. Procurement of deratting/deratting exemption certificates.
5. BUMEDINST 6250.15. (In Press). Shipboard pest management program.
6. CINCLANTFLTINST 5400.2M. February, 1996. U.S. Atlantic fleet regulations.
7. CINPACFLTINST 6250.1. January 09, 1992. Agriculture quarantine inspections of naval vessels.
8. CINCPACFLTINST 5440.3H. January 24, 1985. U.S. Pacific fleet regulations.
9. COMSUBLANT/COMSUBPACINST 6000.2B CH-2. October 20, 1997. Standard submarine medical procedures manual.
10. DoDINST 4150.7. April 22, 1996. DoD pest management program.
11. DoD 4150.7-P. September 30, 1996. DoD plan for the certification of pesticide applicators.
12. DoD 4150.7-M. April 24, 1997. DoD pest management training and certification.
13. MIL-STD-904B. March 10, 2000. DoD standard practice: detection, identification, and prevention of pest infestation of subsistence.
14. Munro, J.W. 1966. Pests of stored products. Hutchinson & Co. LTD. London. 234 pp.
15. NAVMED P-117. February, 1996. Manual of the medical department.
16. NAVMED P-5010-1. June, 1991. Manual of naval preventive medicine food service sanitation.
17. NAVMED P-5010-8. September, 1987. Manual of naval preventive medicine - medical entomology and pest control technology.
18. NAVSUP P-485. October 21, 1997. Naval supply procedures, vols. 1 & 2: afloat supply.
19. NAVSUP P-486. November, 1998. Food service management.
20. NAVSUPINST 10110.8C. August 15, 1986. DoD hazardous food & nonprescription drug recall system.
21. OPNAVINST 5100.19C. January 19, 1994. Navy occupational safety and health (NAVOSH) program manual for forces afloat (NOTAL).

22. OPNAVINST 5100.23E. January 15, 1999. Navy occupational safety and health (NAVOSH) program manual.
23. OPNAVINST 6250.4B. August 27, 1998. Pest management programs.
24. Pratt, H.D. and K.S. Littig. 1960. Introduction to arthropods of public health importance. HEW Publ. No. (CDC) 79-8139.
25. Pratt, H.D., Littig, K.S. and H.G. Scott. 1975. Household and stored-food insects of public Health importance and their control. HEW Pub. No. (CDC) 76-8122.
26. Pratt, H.D., Littig, K.S. and H.G. Scott. 1973. Lice of public health importance and their control. HEW Publ. No. (CDC) 74-8265.
27. Pratt, H.D., Littig, K.S. and H.G. Scott. 1973. Fleas of public health importance and their control. HEW Publ. No. (CDC) 76-8267.
28. Pratt, H.D., Littig, K.S. and H.G. Scott. 1975. Flies of public health importance and their control. HEW Publ. No. (CDC) 77-8218.
29. SECNAVINST 6210.2A. January 24, 1992. Medical service quarantine regulations of the armed forces.
30. Wirtz, R.A. 1991. Food pests as disease agents. Chapter 36, pages 469-475 *in* Ecology and management of food-industry pests. J. R. Gorham, editor, FDA Tech. Bull 4, AOAC, Arlington, VA.
31. World health assembly international health regulations. January, 1983. International health regulations.