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CENTRALIZED HAZARDOUS MATERIALS MANAGEMENT PROGRAM (CHMMP)

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FACILITIES ENGINEERING
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CENTRALIZED HAZARDOUS MATERIALS MANAGEMENT PROGRAM (CHMMP)

1. Purpose. The purpose of this Public Works Technical Bulletin (PWTB) is to transmit information on the implementation of centralized hazardous materials management programs (CHMMPs) for the improved management of hazardous materials at Army installations.

2. Applicability. This PWTB applies to all U.S. Army facilities engineering activities.

3. References.

a. AR 200-1, Environmental Protection and Enhancement

b. Air Force Center for Environmental Excellence. Facility Planning and Design Guide--Hazardous Material Pharmacy. 3d ed. October 1994.

c. FORSCOM Environmental Grapevine. Fort Campbell's Hazardous Material Control Center: Pollution Prevention Success. vol 2, No. 4. Winter 1996.

d. United States Navy. Consolidated Hazardous Material Reutilization and Inventory Management Program Manual. Naval Supply Systems Command. January 1994.

4. Discussion.

a. AR 200-1, paragraphs 4-2 and 4-3, contains policy for Army military and civil works activities that handle, use, or store hazardous material. It requires activities to:

(1) Apply best management practices throughout the life cycle of research, development, procurement, production, use, handling, storage, and disposition of the hazardous material.

(2) Avoid, reduce, or eliminate the use of hazardous material and the generation of solid or hazardous waste. Apply best management practices, improved procurement, production, use, handling, storage, and disposition of hazardous material.

(3) Implement a local hazardous materials management program that identifies hazardous materials management requirements, assigns responsibilities for management, and establishes local operating procedures.

(4) Manage excess or unserviceable hazardous material stocks emphasizing waste minimization techniques such as reuse, recycling, energy recovery, and detoxification.

b. Implementing a comprehensive hazardous waste material "pharmacy" system addresses each of these requirements. A pharmacy system essentially centralizes and regulates the procurement and distribution of hazardous materials.

c. Appendix A describes CHMMP in detail and gives several examples of CHMMP currently in use within the military.

d. Appendix B includes a Joint Service Pollution Prevention Opportunity Data Sheet for Centralized Hazardous Material/Hazardous Waste Management.

e. Appendix C gives illustrations of special equipment required by CHMMP.

5. Points of Contact. Questions and/or comments regarding this subject that cannot be resolved at the installation level should be directed to: U.S. Army Corps of Engineers, Installation Support Division, ATTN: CEMP-IS, 7701 Telegraph Road, Alexandria, VA 22315-3862. or: U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory ATTN: CEERD-CN-E/Stephen D. Cosper, Telephone: 1-800-USACERL, ext. 3430, or e-mail: Stephen.D.Cosper@erdc.usace.army.mil

FOR THE DIRECTOR:

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Chief, Installation Support
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APPENDIX A

Centralized Hazardous Materials Management Program

1. Introduction

a. History

(1) Traditionally, military units use multiple, independent procurement mechanisms. They have also enjoyed the authority to order any hazardous materials they required, in any quantity desired. In effect, without a centralized control point for hazardous materials, multiple bulk orders for a specific chemical might be ordered for jobs that require only a small quantity.

(2) Lack of acquisition, inventory, and management controls result in the generation and disposal of significant quantities of excess, expired, and unserviceable hazardous materials. In response to an increasingly stringent regulatory framework, DOD organizations applied pollution prevention concepts to hazardous waste management.

(3) The centralized concept for hazardous material control was first brought into practice at the Point Mugu Naval Air Warfare Station in California. The concept has spread throughout the Navy and Air Force, and is currently finding proponents in the Army.

b. Description

(1) A centralized hazardous materials management program could take many forms in both a physical and organizational sense. The basic concept behind a pharmacy program is to centralize, at some level, the ordering, dispensing, and disposal of hazardous materials.

(2) For example, a motor pool might need a gallon of grease. A soldier could go to the central ``hazmart'' to pick up the grease to take back to the unit. Because grease is a common item, the CHMMP is responsible for keeping an adequate supply in stock. The hazmart would label the container of grease, noting the soldier's unit--in a sense, checking it out to the unit like a library book. Finally, the unit is responsible for the final disposition of the container, which might mean simply turning it back in to the hazmart.

c. Drivers

(1) Regulatory

(a) While there are no regulations specifically requiring a CHMMP, AR-710-2 calls for ``best available'' business practices. The Resource Conservation and Recovery Act (RCRA) hazardous waste regulations and their State counterparts are the nearest indirect requirements for a CHMMP. Specifically, the regulations that require the safe storage and handling of hazardous materials at remote sites, e.g., a troop unit. These include regulations on accumulation points and 90-day storage areas.

(b) Related regulations include those from the Clean Water Act regarding hazardous material storage and its impact on stormwater.

(c) The reasoning behind this is that a properly run CHMMP will eliminate the incentives for remote units to accumulate and store excess materials which often end up as hazardous wastes.

(d) Other incentives include Executive Order 12856, which calls for a 50 percent reduction in hazardous waste by 1999 based on a 1994 baseline. The dramatic reduction of hazardous waste is one of the chief benefits of a pharmacy system.

c. Economic

(1) In the current system, there are many inefficiencies in ordering and storing materials and in waste disposal. A hazmart system will help eliminate costs associated with:

(a) Needlessly ordering surplus materials.

(b) Delays in getting materials to troop units, or other requesting activities.

(c) Hazardous material and waste storage requirements, especially at remote sites.

(d) Hazardous waste disposal costs, especially from surplus materials that have passed their expiration date.

(2) For example, Corpus Christi Army Depot invested $360,000 in the first year of their program, and showed a net recovery of $690,000. In FY 1995, the gross recovery was $2.58 million and the investment was $285,000, earning a net savings for the depot of $2.23 million.

2. Sources of Guidance and Support

a. AEC. The Army Environmental Center (AEC) has the Army lead for implementing CHMMP along with the Hazardous Substance Management System (HSMS). They provide many training opportunities for each stage of CHMMP implementation. They also have produced a host of guidance documents, which are available from AEC's HSMS webpage at the following URL:

http://aec-www.apgea.army.mil:8080/prod/usaec/et/p2/hsms_01.htm

These include:

(1) The HSMS/HMMP Resource Library. This is a compilation of information from various sources (Army, Air Force, Navy, installations, etc.) on HSMS, HMMP, HAZMART implementation, and more.

(2) HSMS Fielding Plan Version. The Fielding Plan outlines the responsibilities and activities required to field and support the HSMS. It outlines the tasks required to ensure successful fielding and support of the system.

(3) HSMS Business Practice Guide. The Business Practice Guide is a "recipe book" for centralized hazardous material management. It will help you analyze your current business practices and develop to revise these practices to improve your Hazardous Material Management Program.

(4) HSMS Initial Site Brief. The HSMS Initial Site Brief is the briefing provided to Installation Garrison Commanders and the Hazardous Material Management Control Group (HMMCG) to kick off HSMS implementation. It gives a program overview and describes the implementation process.

(5) HSMS Site Implementation Plan. The SIP is a guideline for HSMS implementation and includes ideal timelines for events such as, site visits, data collection, etc. It describes what the functional contractor is providing the installation in terms of implementation support.

(6) HSMS Bi-Weekly News. This publication highlights the experiences of Army installations implement CHMMPs.

(7) All of these publication, and any other information, is available from the HSMS Customer Assistance Office (CAO). CAO staff answer calls from 7 a.m. to 5 p.m. (Mountain Time), Monday through Friday, except Federal holidays. An answering service handles calls at all other times. Their phone number is COMM (520) 452-6679 or email hsms@saic.hqisec.army.mil.

b. AFCEE Documents. The Air Force Center for Environmental Excellence (AFCEE) has developed the pharmacy (CHMMP) concept for the Air Force. To educate the Air Force and larger DOD community on this issue, PRO-ACT, part of AFCEE, distributes a collection of pharmacy-related documents--some developed by AFCEE, and some written by individual Air Force bases. This chapter summarizes some of these documents. For the full texts or more information, contact PRO-ACT at DSN 240-4214 or (800) 233-4356.

(1) Facility Planning and Design Guide--Hazardous Material Pharmacy. This guide provides the basic criteria to evaluate, program, and plan the facility requirements for a Hazardous Material Pharmacy on Air Force Installations. It presents guidance for the development of a HAZMAT Pharmacy appropriate to each individual base and its local requirements.

(a) Pharmacy Functions. A pharmacy structure will have four main functions:

i. Control and Management.

(i) Receiving -- Inspecting, receiving all bulk shipments of hazardous materials.

(ii) Storage -- Bulk hazardous material storage. Must be able to segregate different classes of materials: flammable, combustible, reactive, corrosive, and toxic.

(iii) Repackaging -- Breaking down bulk containers into quantities that more closely resemble individual job requirements.

(iv) Distribution -- Customer service, material pick-up area.

ii. Administration.

(i) Database tracking -- The computer database is the main tool in tracking hazardous materials. Adequate space is necessary for computer hardware, associated desk space, and filing cabinets for paper records, such as MSDS.

(ii) General administrative area with desk space for pharmacy staff.

iii. Material Reuse and Recycling Management. Turn-in -- A special area is needed for customers to turn in unused materials. The turned-in material must be inspected to determine if it is reusable. A receiving area is required, along with a small, separate storage area.

iv. Reduction of Hazardous Waste in Functional Organizations. The pharmacy may provide a satellite hazardous waste accumulation point.

(b) Space Requirements.

i. Development of space for a pharmacy should take into account any existing hazardous material supply or storage on base. The facility should be evaluated in terms of its ability to fulfill current and future needs, the potential for retention and retrofit of existing structures, adding on to an existing facility, or new construction.

ii. Figure A-1 shows a conceptual drawing of a pharmacy building. It has segregated storage bays with overhead doors, and some secure outdoor storage cabinets. Note the similarities to the actual building discussed in the Air Force section of Section 5.

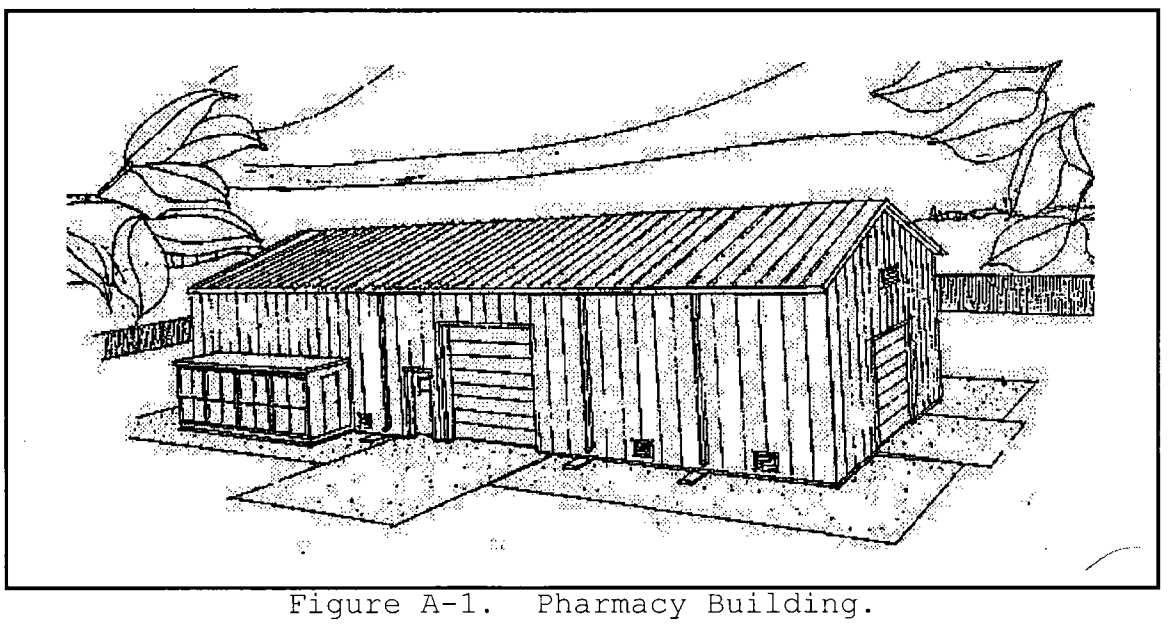

Figure A-1. Pharmacy Building.

(2) Guidelines for a Hazardous Materials Dispensing Facility (Hill Air Force Base)

(a) The overall goal of a pharmacy system is to dispense hazardous materiel in usable quantities to eliminate hazardous waste and disposal cost.

(b) A step-by-step summary of the process used to implement a hazardous materials dispensing facility (pharmacy) follows:

i. Choose a knowledgeable and experienced person to oversee the entire process.

ii. Establish a working group with the fire department, safety, bioenvironmental engineer (industrial hygienist), environmental management, civil engineer, and base supply to ensure each area's policies are followed.

iii. Send a letter to all Directorates requesting a list of hazardous chemicals used within each Directorate. This list will not be all inclusive, but it will give an idea of the chemicals that will be handled in the pharmacy. It is recommended to start with a small geographic area, or single unit, to work out any problems before bringing the rest of the base on line.

iv. Ensure that the building to be used for the pharmacy meets all building, safety, and fire codes for the storage and dispensing of hazardous materials. Building plans should be drawn up by engineering. Additional guidelines and information can be found in DOD Manual 4145.19-R-1.

v. Ensure that any equipment procured for the pharmacy has the capability to support all requirements. Take advantage of all stock that can be used and freely issued from the warehouse. Use equipment that is already available to minimize overhead costs and ensure to that a survey has been done to see if the equipment meets all ergonomic, safety, and servicing requirements.

vi. Suggestions for the types of equipment and supplies to be used includes:

(i) Forklifts, 55-gal drum adapters for forklifts, vehicles to transport materials from warehouse to pharmacy to customer. Use equipment that is already available, or inquire about the availability of resources from installations that are closing or downsizing.

(ii) Storage bins for bulk and courtesy storage. Flammable storage and other cabinets should be sized correctly to handle the types of materials in the quantities typically in demand.

(iii) Support equipment, such as desks, tables, chairs, scales, etc.

(iv) If breaking down bulk quantities, obtain appropriate measuring devices to ensure accurate dispensing.

(v) Chemicals being reduced from 55-gal drums require plumbing with metal construction, or metal reinforced hoses, capable of withstanding any internal pressures generated. Ensure that all connections, fittings, and hoses will be compatible with the chemicals they contact.

(vi) The exhaust system should be of a design that will allow vapors to condense and be removed from the exhaust system as a hazardous waste. Also, particulates should be passed through a filtration system.

(vii) Research all sources of supply for availability of small quantities that match demand.

(viii) Personnel protective equipment should be identified and reviewed by the bioenvironmental engineer and medical staff to ensure it will provide adequate protection against hazardous materials being used.

(ix) Purchase equipment and supplies for hazardous spill containment and clean up that can be used for all materials in the pharmacy. If different types of spill kits are procured, ensure they are adequately labeled as to their chemical compatibility.

(x) Install and test any special equipment well in advance of the scheduled opening.

vii. Ensure that computers and other hardware are properly configured and networked to run the selected tracking software. If password authorizations will be used, be sure to issue these in advance.

viii. Order all pertinent manuals, regulations, standards, and technical orders. Collect or order MSDSs for all materials know to be used and stored.

ix. Develop SOPs.

x. Ensure that staff has completed all classroom training.

c. Summarized Guidance from Other Sources.

(1) To begin a centralized hazardous materials management program, all participating activities are required to turn in currently held hazardous materials to a central facility. Further, the activities must agree to only procure hazardous materials through the central facility in the future. When unused portions are returned, trained staff evaluate whether the material is suitable for reissue to another activity, whether it can be recycled, or whether it must be disposed of as a hazardous waste.

(2) Three basic requirements for a successful program are:

(a) Command support at all levels.

(b) Personnel awareness and understanding of how hazardous material is to be managed.

(c) A comprehensive implementation plan.

(3) Some services that may be provided by the pharmacy are:

(a) Accept excess hazardous materials from all participating activities.

(b) Provide a pickup and delivery service.

(c) Tightly control hazardous materials using a computer tracking tool to monitor all issues and ensure return of unused portions.

(d) Establish a consumer level (base level) stock of hazardous materials to satisfy local demand. This is especially true for high turnover items. It is important to accurately forecast demand.

(e) Provide break bulk services to provide hazardous materials in the smallest unit of measure possible to satisfy immediate requirements, thereby avoiding the need for local caches of hazardous materials.

(f) Establish operating procedures that focus on ease of use for the customer, e.g., simple paperwork.

(4) Program managers must make some initial decisions about the physical space necessary to house the pharmacy. One can employ either a single, consolidated center, or multiple

satellite locations. This will depend on the variety of activities at the installation, as well as its geographic layout. However, experience shows that more centralized storage and control yields greater benefits in terms of hazardous waste minimization.

(5) To begin estimating the space required for a pharmacy facility, consider these three factors:

(a) Any hazardous material inventories regularly completed for regulatory purposes

(b) A year's history of hazardous material requisitions through the supply system.

(c) A survey of hazardous material users, allowing them to project their future needs.

(6) Please understand the total volume of materials discovered through this survey will serve as an absolute maximum in the amount hazardous materials used, barring a dramatic shift in mission. Once these materials are co-located, substantial consolidation will be realized. Figure A-2 shows the pharmacy layout at Point Mugu as an example. This center uses about 2,600 sq ft of indoor floor space for about 600 hazardous material line items.

(7) Staffing at the pharmacy depends entirely on the size and type of activities served as well as type of materials handled. The facility manager should have strong skills in material handling and control, and in financial and personnel management. Obviously, specialized training in hazardous materials handling and storage would be desirable. Other staff members should be skilled in inventory management, computer use, and warehouse operations.

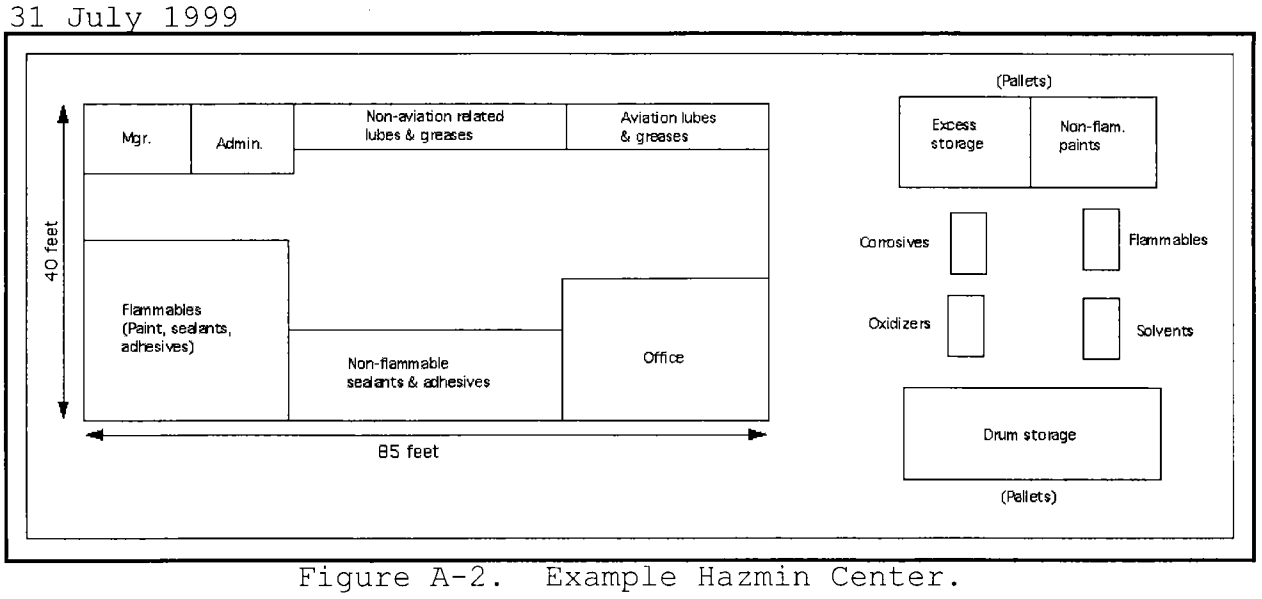

Figure A-2. Example Hazmin Center.

(8) Figure A-3 shows the steps each activity, or military unit, on an installation will go through as they are initiated into the pharmacy program. The key is getting any potentially large caches of hazardous materials out of work areas and into a controlled setting. Note that each activity receives a credit for the type and quantity of materials turned in. This way, at a later date, the activity may request that material back, as needed, without incurring a cost.

(9) As part of this process, Hazardous Material Control Center (HMCC) managers, military units, and civilian maintenance crews meet to decide the appropriate amount and type of hazardous materials each activity should have access to, and at what interval. These numbers are recorded at the pharmacy. For example, they may decide that a particular motor pool may go through 15 gal of antifreeze per month. Pharmacy staff will know that they must keep this much antifreeze on hand for this activity. On the other hand, if the activity later requests 100 gal during a given month the HMCC staff will know that something unusual is occurring and may want to check on it.

(10) Once all of the participating activities have turned in their excess materials, the HMCC operates as follows:

(a) The activity places an order for a hazardous materials at the HMCC. The HMCC now is the only possible avenue to acquire hazardous materials.

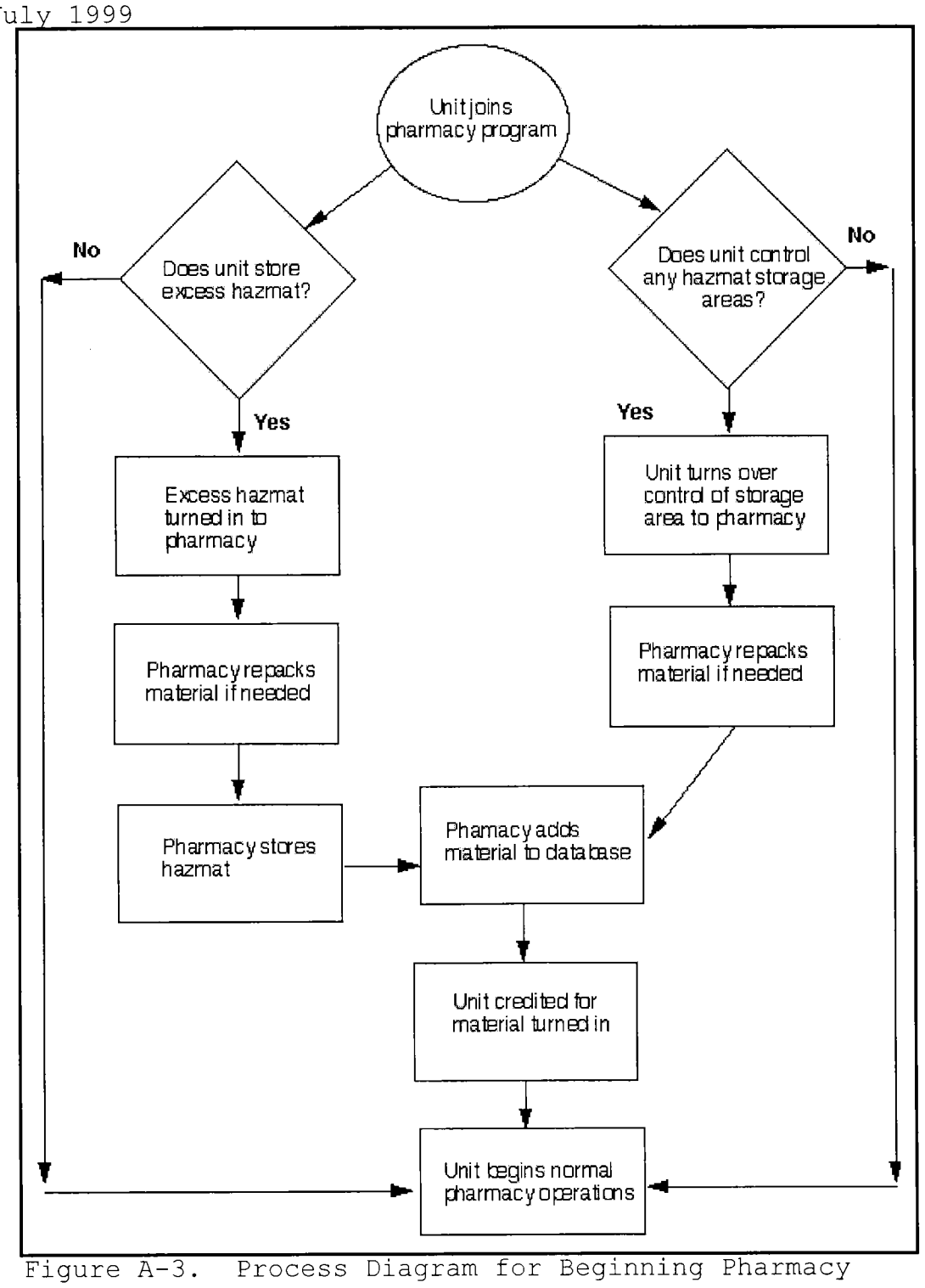

Figure A-3. Process Diagram for Beginning Pharmacy Program.

(b) The HMCC staff check the request (and requester) against a list of authorized materials. If the requesting activity is not authorized to receive this material, the pharmacy

staff may identify a suitable alternative product, arrange appropriate authorization for the requester, or simply refuse the request if all else fails.

(c) HMCC staff will then check the database of stored materials. Products not on hand are ordered. Partially used containers from storage are distributed first.

(d) The material is repackaged and labeled if necessary. The computer tracking system will then generate a bar code label for the container. The bar code contains information on the product, the user, and the proper disposal.

(e) Material is then issued.

(11) All unused materials or empty containers are returned to the pharmacy. If the material can be reused, it is returned to the inventory, both physically and in the database.

(12) If the material cannot be used, it is prepared for proper disposal.

(13) Figure A-4 graphically illustrates this process. A summary of the objectives of a pharmacy system follows:

(a) Centrally control all hazardous materials, managed separately from other supply items.

(b) Store all hazardous materials in containers or compartments reserved and configured exclusively for hazardous materials.

(c) Promptly supply hazardous materials to all customers around the clock.

(d) Establish a ``consumer level'' stock of hazardous materials sufficient to satisfy local demand with a sufficiently high fill rate to eliminate the need for caches of hazardous materials at customer activities.

(e) Provide break-bulk services that will provide hazardous materials in the smallest unit of issue practical to satisfy immediate requirements and eliminate excess material that results when only large units of issue are available from the supply system.

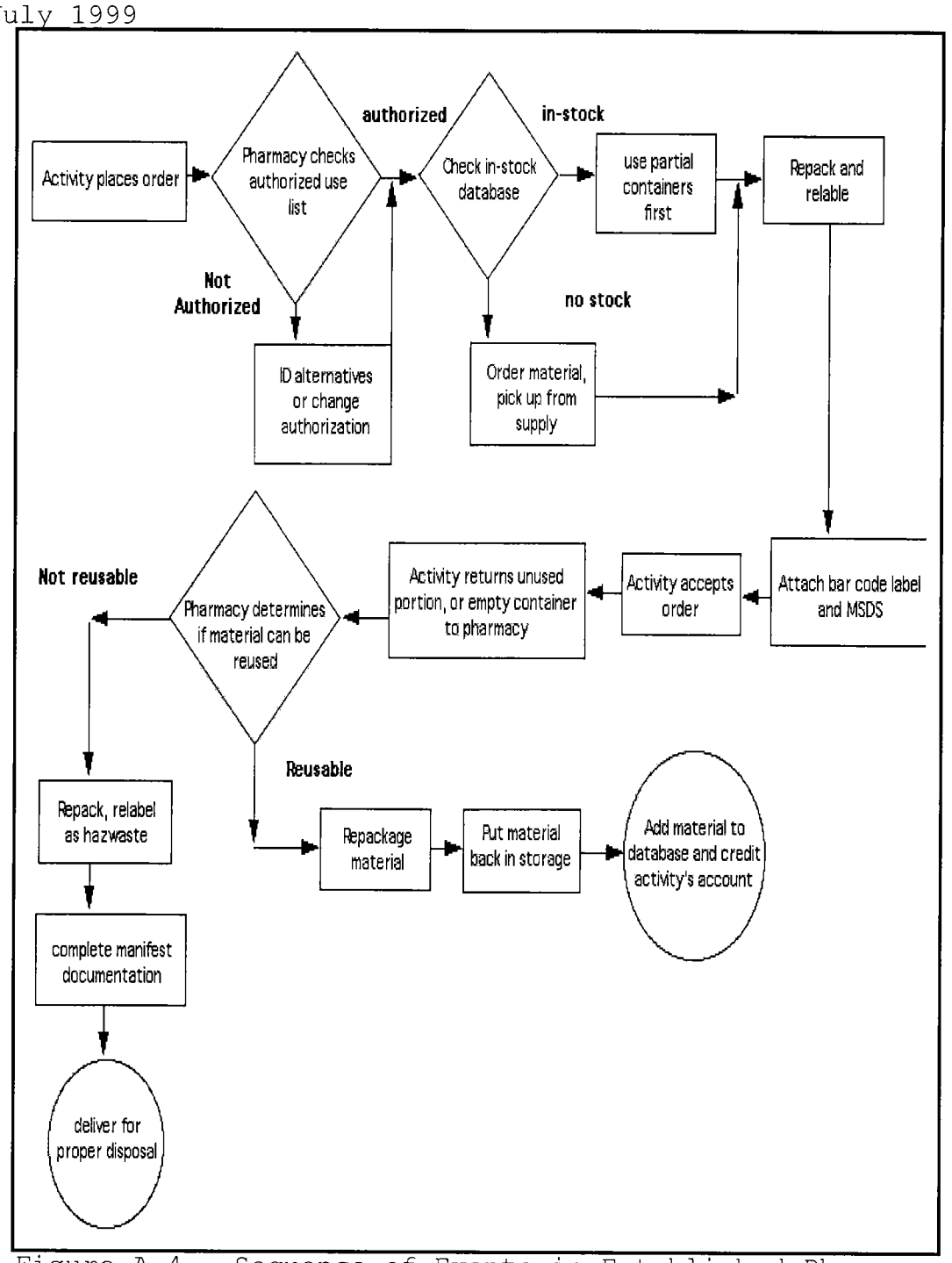

Figure A-4. Sequence of Events in Established Pharmacy Operation.

(f) Establish operating procedures for issue and return of material that requires a minimum of paperwork by the customer.

(g) Issue hazardous materials in a manner to facilitate tracking and auditing.

(h) Restrict the amount of hazardous materials stored at using activities to the minimum amount necessary for the work performed.

(i) Ensure that hazardous materials are used in accordance with proper and safe procedures.

(j) Establish operating procedures for issue and return of material that requires a minimum of paperwork by the customer.

(k) Consolidate previously issued, unused hazardous materials for either reuse or re-categorizing for alternate use.

(l) Properly process hazardous materials for disposal by authorized disposal agency.

3. Hazardous Material Management Program.

a. Planning Committee

(1) Many groups or individual positions are involved in the procurement and use of hazardous materials--perhaps more than initially meet the eye. When planning a pharmacy program, it is important to involve the most important parties at the outset. Of course, involving *everyone* at the beginning might make for too large a committee. If you plan to begin the pharmacy program at one military unit, or in just one geographic section of an installation, solicit input only from those users, and postpone the involvement of the units on the other side of the installation.

(2) Below is an all inclusive list of persons with an interest in hazard materials, or who will have an interest in the pharmacy. A core group should formulate a preliminary plan then present it to the larger group for comments and approval. The core group might be composed of the environmental directorate, military unit(s) involved, and logistics or other supply activity.

(3) The following groups or individuals should be involved in pharmacy planning and implementation at some point in the process:

(a) Supply, DOL, supporting military units. A pharmacy system is still a supply function with need to supply customers

in a timely fashion. Personnel from these activities will be instrumental in integrating the pharmacy into existing supply lines.

(b) Contracting. At most installations, the Directorate of Contracting (DOC) has the responsibility for issuing International Military Purchase and Agreement Cards (IMPAC), and for establishing the procedures for IMPAC usage. At some time during the HMMP implementation planning, the core group and representatives from the DOC should consider establishing policy to the effect that all IMPAC purchase of HM will be made only by the HMMP unless special permission is granted on a case-by-case basis.

(c) Environmental Directorate. The environmental directorate (DPW or DEQ, etc.) has the responsibility for the safe management of hazardous materials, in compliance with Federal and state regulations. As such, they may wish to take the lead on the pharmacy project. This is especially appropriate at larger, complex installations.

(d) Major users of hazardous materials (e.g., major military commands, tenants, civilian maintenance activities). The material users must be involved at all steps in the process. One of the goals of the pharmacy should be to minimize perceived procedural changes, and delays or other inconvenience to the users. Getting the unit command to ``buy in'' to program will ease implementation. Also, the units themselves will be able to accurately predict their real hazardous material needs, which may not correspond to their past procurement record.

(e) Fire Department. The fire department should obviously be involved in the process, as they have an interest in any new hazardous material storage facility.

(f) Information Management (computer) directorate. Often called DOIM, this directorate should be involved because most pharmacy programs are accompanied by sophisticated software tracking/inventory tools. These may require specialized hardware or networking.

(g) Human resources. The personnel group should be involved because the pharmacy will need to be staffed. It could be by contractors, new government hires, or reassigned government staff. Reassigning government staff means moving staff to the pharmacy from other activities. Theoretically, this should not be a problem because the workload associated with hazardous materials should decrease. One person might be moved from DPW-E, another from the warehouse, etc. Using currently employees assures that they will be familiar with the base, and perhaps,

the military unit's requirements, thereby increasing the chances of the pharmacy's success.

(h) DRMO. The Defense Reutilization and Marketing Office associated with each installation is usually charge with the final disposal of hazardous wastes. Hopefully, the pharmacy program will substantially reduce the amount of waste.

(i) MACOM representative. A representative from your major command will be able to share information on the successes and failures at other installations.

b. Tracking

(1) When setting up a pharmacy program, a natural question to ask is, ``What materials should we track?'' In other words, which materials should be considered hazardous for the for tracking purposes? There are a few ways to think about this.

(a) First, the USEPA and States with primacy, have described in detail what constitutes a hazardous waste under RCRA regulations. One can assume that, if a waste material is hazardous, the material could also be considered hazardous before it becomes a waste. Part 261 of Title 40 of the Code of Federal Regulations (40CFR261) spells out these criteria for hazardous wastes. Using this criteria would require some judgment and interpretation in determining what to track. Therefore, someone on the staff would have to have a good chemical and regulatory background.

(b) A second, similar method would be to examine the material safety data sheet (MSDS) of each material ordered or received to determine its hazardous nature. The MSDS should list hazardous properties of any product, such as flashpoint, appropriate handling procedures, and first aid. The MSDS should also list ingredients. The MSDS could be used in conjunction with the CFR to determine the regulatory status of a particular product.

(c) A third way to look at this is by Federal supply classes (FSC). For a given material, the FSC is the first four digits of the national stock number (NSN). Materials of all types are usually ordered by NSN. When repairing vehicles or equipment, the technical manual specifies necessary materials (e.g., grease) by NSN. Certain classes of materials (FSCs) are inherently hazardous, even if every single NSN in that FSC is not technically hazardous by the USEPA's definitions. See Table A-1 for a list of hazardous FSCs. Contact the Defense Logistics Agency (DLA) for a more detailed list.

Table A-1
Hazardous Federal Supply Classes

Federal Supply Class	Title (Type of Material)
6810	Chemicals
6820	Dyes
6830	Gases: compressed and liquefied
6840	Pest control agents and disinfectants
6850	Miscellaneous chemical specialties
7930	Cleaning and polishing compounds and preparations
8010	Paints, dopes, varnishes, and related compounds
8030	Preservatives and sealing compounds
8040	Adhesives
9110	Fuels, solids
9130	Liquids, propellants and fuels (petroleum base)
9135	Liquid propellant fuels and oxidizers (chemical base)
9140	Fuel oils
9150	Oils and greases: cutting, lubricating, and hydraulic
9160	Miscellaneous waxes, oils, and fats

(2) Tracking by FSC is perhaps the easiest method because the information is already captured and is very objective.

(3) Note that the SARSS (standard Army supply system) uses FSC in it's day-to-day transactions. Tapping the data collected by this system would give planners a good historic record of what each unit orders. Of course, this may be quite different from the amounts of materials actually used.

c. Working Within the Military Framework. This section briefly outlines some of the concepts and possible strategies one can use to integrate a pharmacy program into the military system. Section 5 gives some specific examples.

(1) Command Support.

(a) Garnering Command support early is perhaps the single most important step in implementing a pharmacy program. The military command structure has both positive and negative aspects. On the negative side, there is typically much institutional inertia. A pharmacy might be viewed as a radical departure from business as usual, and could encounter resistance. Also, with the potentially complex hierarchy of subcommands, depending on the installation, several separate individuals might need convincing of a pharmacy's merits.

(b) Conversely, the main advantage of the military structure is that the ultimate authority resides with the

Garrison Commander. This is the one person necessary to sell on the pharmacy program, perhaps under the auspices of the Environmental Quality Committee.

(2) Implementation Scenarios.

(a) There are many different scenarios one can envision for a pharmacy system, in terms of number of sites, personnel, and interaction with military customers. For the most part, interaction with civilian activities will be similar.

(b) One method is to have everything under one central control and geographically co-located. That is, materials are stored at one place, all orders processed through a single office, and all deliveries made by the same group. This situation is especially suited to smaller troop installations, or industrial operations by virtue of their well defined processes.

(c) The advantage to this setup is that the central control allows for excellent accounting. Management can be fairly certain that materials are handled appropriately through the entire process of procurement, storage, and use. A single location is conducive to staffing by a permanent group of civilian personnel. This means potentially low turnover, and retention of special training and job experience.

(d) The disadvantage of a central facility is that it has the potential to develop into a bureaucratic bottleneck, causing delays in material requisition and distribution. Careful attention should be paid to ensure adequate staff levels and response time.

(e) Another way to conceptualize a pharmacy would be to house the administration functions in a central location, but install remote sites for material and distribution. This could take the form of hazardous material storage buildings assigned to a motor pool (or group of motor pools), or a directorate. The amount of materials stored could be more than a week supply or ``bench stock.'' Items stored would be bar-coded as ``checked out'' to the particular unit. A trusted individual would have access to check inventory, and to order more as needed. Pharmacy staff members could also check the supply periodically.

(f) The advantage to this method is that pharmacy personnel are less heavily involved, requiring perhaps fewer employees. There would be a larger buffer supply easily accessible to the end user, which would avoid delays in material delivery.

(g) The disadvantage from a management perspective is that there is less control/tracking of who is using how much of

what substance. Also, a greater amount of materials are out of the pharmacy's direct control, possibly stored in less than optimal conditions.

(h) On the military side, an untested idea with much potential is to integrate a pharmacy into the existing supply system. That is, the soldier who picks up the requisitioned materials notices little if any change from business as usual. The materials physically move, and are distributed just as before (e.g., from the Forward Supply Battalion), but the power of the pharmacy concept lies in the tracking information. Tracking the information could be implemented transparently to the end user. When the order comes in through the supply system, the FSC number will indicate if the material is considered hazardous. If yes, then some checking would occur, such as:

i. Is the material on the units authorized list?

ii. Is the rate of ordering this material out of line with the agreed upon usage rate?

iii. Is their any excess stock of this material available for reissue?

(i) When the material arrives for issue, it is bar-coded, then taken for end use. The goal would be to make the service efficient enough so that the units would not feel the incentive to hoard materials against a shortage. The only difference for the unit would be that they would have to return empty container so that it could be rescanned to indicate appropriate disposal.

(j) The advantage is this scheme is mainly transparent to the end user. Therefore, its implementation would likely encounter less resistance. The ultimate goal is to serve the soldiers in carrying out their mission, so a new system that does not change standard practice is a good thing. It would also require less training. Each of the supply activities could be networked such that they could share excess, free issue materials.

(k) The potential problem with this system is the question of staffing. The existing supply points are military units with their own set of SOPs. The pharmacy-related activities would certainly require more effort. The military supply points may be unwilling or unable to assume extra duties. It is possible to integrate some civilian staff members into this process to perform the pharmacy-related duties, and to provide needed continuity.

4. Pharmacy Information Management Systems.

a. Bar Coding.

(1) The pharmacy concept calls for eliminate large unnecessary stocks of materials, and instead, relying on carefully managed small quantities of material to achieve the same results. It is widely accepted that bar coding is necessary to effectively track and manage small quantity containers.

(2) Bar coding is a universally known system. Bar codes can be read by a variety of electronic hardware, some of which are portable, which is important for field inventory work. In essence, a bar code makes portable much information about a product that is not on the label.

(3) In simple terms, a bar code reflects a serial number which refers back to a record in a computer database. This record can contain much information about a product, such as contents, date of issue, responsible party, etc. A bar code:

(a) Documents the chain of custody of hazardous materials from the point of issue to final disposal.

(b) Maintains data on relevant physical, chemical, and safety-related characteristics of the product.

(c) Provides an automated tracking and inventory system that can reduce staff time and paperwork.

(4) A bar code is applied directly before a product is issued. Therefore, at any time between issue and turn in, lots of information about that product is easily available, should the container become misplaced. At turn-in time, the bar code is rescanned which ``completes the circle'' for that product. Pharmacy managers know that quantity of that material has been used and the container will be disposed of properly. The information captured in a bar code can be used to:

(a) Analyze and reduce hazardous material use.

(b) Generate regulatory-mandated reports.

(c) Accurately allocate hazardous waste disposal costs.

(5) The DOD's officially sanctioned system that incorporates bar codes is know as the Hazardous Substance Management System(HSMS).

b. HSMS.

(1) The DOD's HSMS is an automated tracking system designed to provide "cradle-to-grave" tracking not only of the hazardous

materials, but also of the chemical constituents of those materials. It uses a menu-driven, windows-based software application using a relational database. The HSMS tracking system generates reports to satisfy Executive Order 12856 of 3 October 1993, the Pollution Prevention Act, and the Emergency Planning and Community Right to Know Act (EPCRA).

(2) HSMS is designed to provide a quick, secure, and accurate means of receiving, distributing, and tracking hazardous materials and tracking the accumulation and disposition of hazardous waste at an installation. The system maintains an inventory of all hazardous chemicals on station. The system produces Federal environmental reports, prints bar code labels for material received and waste containers, and maintains the required information for State/local environmental security management reports by means of site-configurable software that is available from commercial sources.

(3) HSMS is used in many ways at DOD installations. Some areas in which HSMS is used are to:

(a) Maintain material chemical constituent information.

(b) Maintain chemical hazard information.

(c) Maintain an Authorized Use List (AUL) for hazardous materials.

(d) Maintain local Material Safety Data Sheets (MSDS) information.

(e) Maintain information on all processes that use hazardous materials and/or generate hazardous waste.

(f) Authorize the use of all hazardous materials based on processes.

(g) Calculate chemical release information for all processes.

(h) Track chemicals through their life cycle at the facility based on material transactions.

(i) Maintain an on-line hazardous materials and chemical inventory.

(j) Print hazardous waste manifests and the DOD Single Line Item Release Documents (e.g., DD1348s).

(k) Collect and tabulate running weight totals by chemical, for Tier I, II, and Form R reports.

(l) Provide hazardous waste container inventory.

(m) Calculate hazardous materials costs by installation/base level "Cost Center."

(n) Display hazardous substance inventories by location.

(o) Support the authorization shelf life and expiration date extensions; optional use of manufacturer lot batch number to adjust shelf life.

(p) Generate serialized bar-code and general purpose labels.

(4) HSMS is comprised of sub-modules, which are used to record, track, and report on every stage of a product or chemical's existence as it moves through the cycle of procure, store, move, issue, use, dispose/recover.

c. Safety Sub-Module. The Safety Sub-Module maintains MSDS Physical Properties records on each product tracked in HSMS. These records provide characteristics of the material to be used, and data for weight calculations. The chemical breakdown of the product provides the percentages required for determining the chemical constituencies and quantities of specific chemicals in hazardous materials located on the facility. The stored data are later used for reporting purposes.

d. Pollution Sub-Module. The Pollution Sub-Module supports the definition, establishment, and maintenance of site specific work/job processes and is used as the primary control for tracking materials, chemicals, and waste streams, as hazardous materials are used or consumed. Jobs (activities in which hazardous materials used) are categorized as generic or specific processes within the system. Each process describes what a job/activity uses (material input) and what it creates (work products, emissions, and waste stream outputs) as the result of actually implementing the process and performing the process tasks. The Generic Process Codes and Site Specific Process IDs of HSMS are combined to form the Task ID that HSMS uses as the control mechanism for tracking material usage, and emission, and waste generation by each process.

e. Materials Sub-Module. The Materials Sub-Module is used to establish, maintain, and track the products and materials, before use, that are linked to the work processes documented in the Pollution Sub-Module. The primary focus of the module is to track material inventory and the waste generation that results from material used in the work processes. This is accomplished using "Transactions" that affect material inventory and material usage in specific jobs. The Master Inventory, Manufacturers', and

National Stock Numbers (NSN) and locally assigned stock numbers that comprise the Authorized Use List (AUL) are defined and established here, as are location restrictions on material receiving, storage, and handling.

f. Waste Sub-Module. The Waste Sub-Module is designed to identify all waste stream products created or generated during the use of hazardous materials. Chemical and by-product wastes from particular job/work processes are characterized by waste stream, then tracked by waste containers. The weight of each hazardous chemical is calculated using the constituent percentage data tied to each waste stream. Each in-use container may be associated with single or multiple waste streams and the process that created each waste stream. Container status is set to reflect the current situation for each container as it moves through the various steps from creation to disposal. Containerized waste is tracked by monitoring storage times, locations, and disposal methods.

g. Bar-code Sub-Module. The bar-codes sub-module give the user the capability to reprint material bar-codes, by document number or serial number, and waste container bar-codes, generate descriptive bar-code labels, and print bar-code labels for personnel using the HSMS system. HSMS uses a commercial software package to manage the bar-code printing processes.

h. Reference Sub-Module. The Reference Sub-Module provides maintenance functions on information used as reference data throughout the system. The module also records and tracks HAZMAT-related training given to facility personnel. Other function categories in this sub-module include Facility Cost Centers, all Cost Centers, Reporting Facility, Locations, Addresses, Personnel, Course and Equipment Training, Equipment, and Courses.

i. Future Versions. HSMS Version 2.2, scheduled for release to the Military Services for fielding in September 1997, will include:

(1) Mandatory Expiration Date and Shelf Life Code fields on material screens

(2) Options for tracking EPA Threshold Planning Quantities (TPQ)

(3) Ability to identify EPCRA reporting exemption (Tier II or TRI).

j. HSMS Version 2.3, scheduled for fielding by the Services in March 1998 will include a format change to MSDS to comply with new Occupational Safety and Health Act (OSHA) format.

k. For more information on HSMS, contact:

The HSMS Customer Assistance Office
(520) 452-6679
0700 - 1700 Mountain Time, Mon -Fri (except Federal holidays)
hsms@saic.hqisec.army.mil

5. Examples of Centralized HMMPs Implemented at Military Bases

a. Army -- Fort Bragg

(1) Guidance documents from the other services do not adequately address how to implement a pharmacy in the case of very large installations with many activities. This situation describes the Army more than it describes the other services. Some think this will be an impediment to the long term success for implementing pharmacies at large installations.

(2) Fort Bragg is a good test for the pharmacy concept on a large scale. Fort Bragg is home to the headquarters for the XVIII Airborne Corps, the 1st Corps Support Command (COSCOM), the 82nd Airborne Division, a Special Operations group, Simmons Army Airfield, the associated military subordinate units, and the usual assortment of civilian directorates. The Directorate of Logistics (DOL) supplies tenants and reserve activities. With such a complex organizational structure, where different military hierarchies geographically co-located, hazardous materials can arrive at the installation through a variety of pathways. Figure A-5 gives an overview of the various routes hazardous materials can take to get to the end user. This is important because the more possible routes exist, the more that must be somehow controlled or monitored in a pharmacy situation.

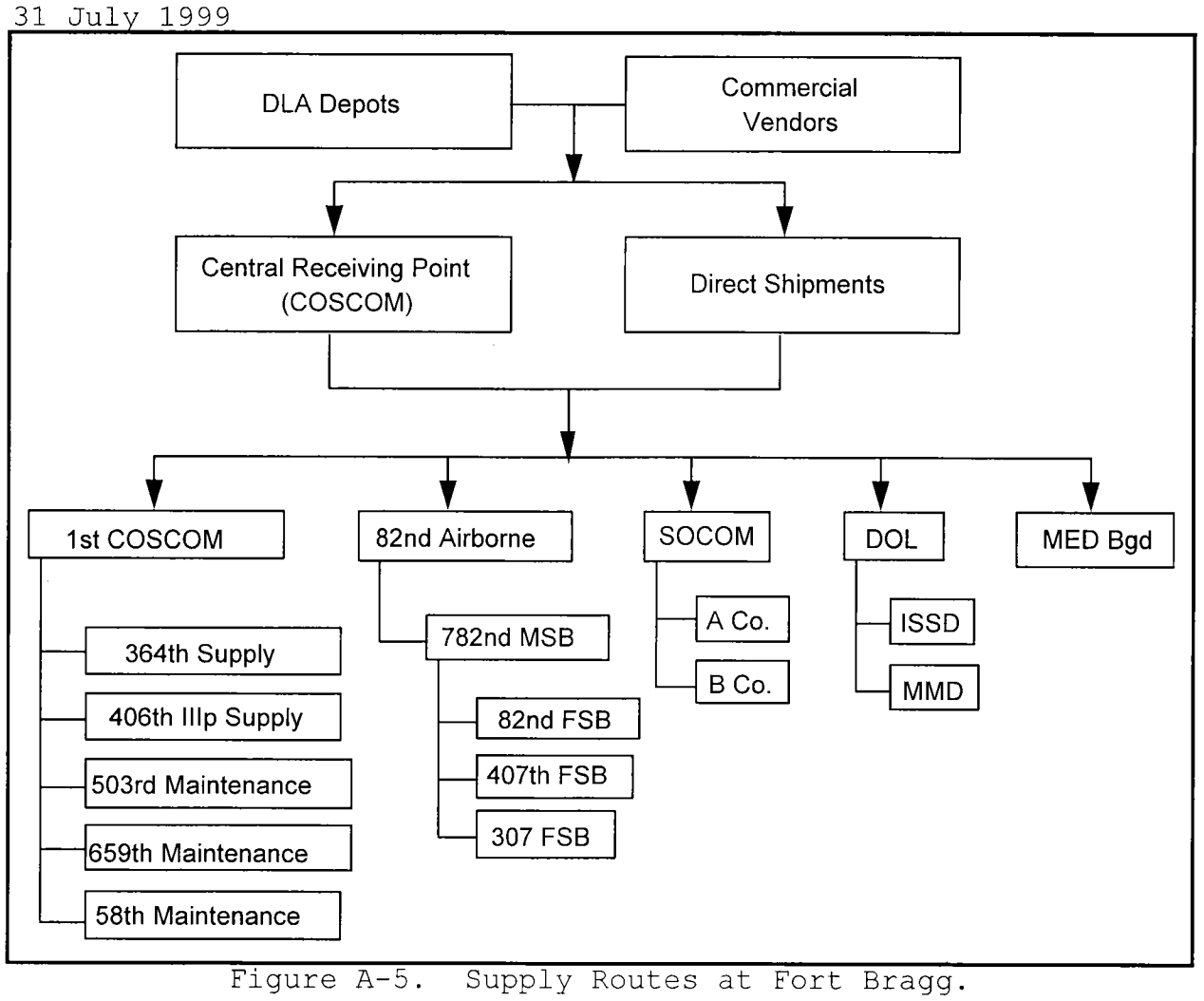

Figure A-5. Supply Routes at Fort Bragg.

(3) Problems related to hazardous materials at Fort Bragg include lack of appropriate storage space (especially at older facilities) and poor shelf life management, which generates much waste though expiring materials. Some of the largest components of the hazardous waste stream at Fort Bragg include:

(a) Components of chemical defense kits.

(b) Batteries of all types.

(c) Photographic chemicals.

(d) Paints.

(e) Sealants.

(f) Adhesives.

(g) Grease.

(4) Over the past year, a cross section of environmental, military, and logistics staff have begun to consider the pharmacy concept and potential schemes for implementing it at Fort Bragg. Two scenarios have taken shape as likely contenders that are workable, support the mission, and have command backing.

(5) The first idea is to use the existing supply system as outlined in Figure A-5. Each Supply Support Activity (SSA) would act as an independent pharmacy. These SSAs might include Special Forces, 82nd Airborne, COSCOM, and DOL. By setting up separate pharmacies, this will avoid having to overcome some organizational barriers. However, the database systems would be networked to facilitate sharing materials and installation-wide reporting requirements. It is envisioned that this system would be largely transparent to the end user, as outlined in Section 3. Figures A-6 and A-7 show existing supply points that may be adapted to serve as pharmacies.

(6) The second proposal involved establishing an intermediate facility between hazardous waste turn-in points and final disposal at DRMO. This facility would handle all hazardous waste turned in, with the goal of segregating potentially reusable material from that which is truly a waste. This facility has the potential to realize great cost savings in terms of avoided disposal costs and the avoided cost of reordering materials. Much hazardous waste comes from products with expired shelf life.

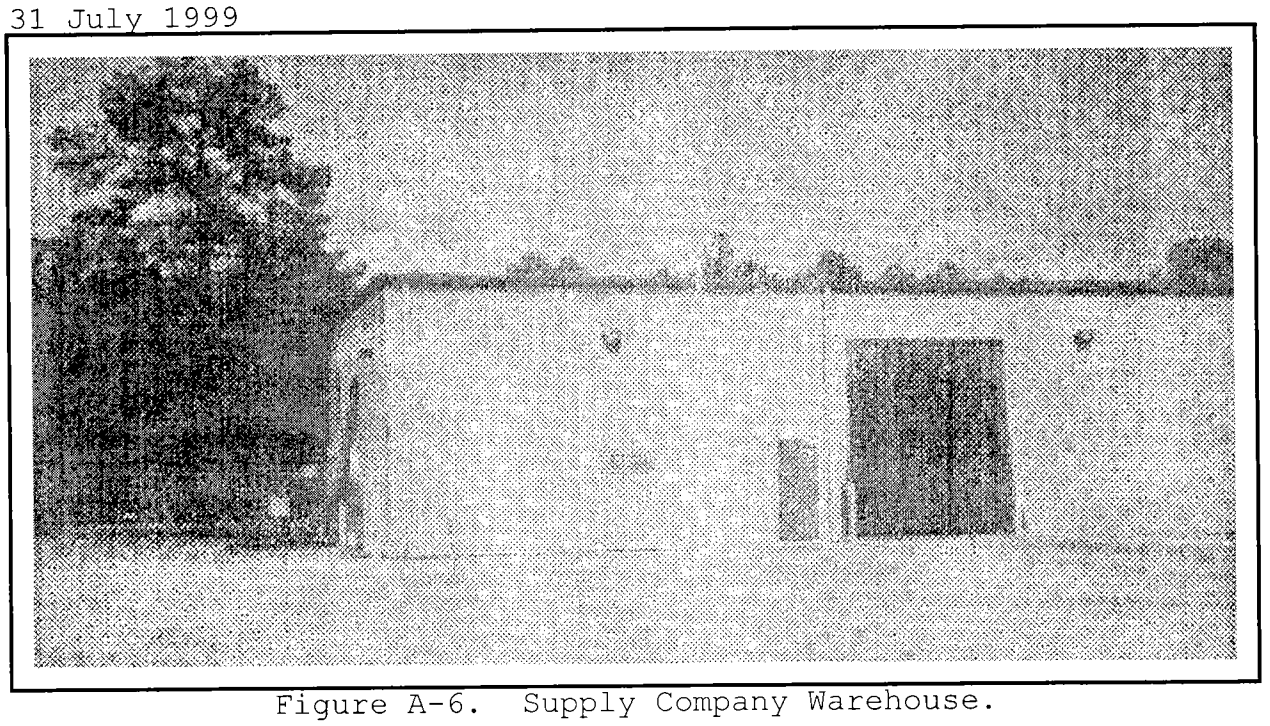

Figure A-6. Supply Company Warehouse.

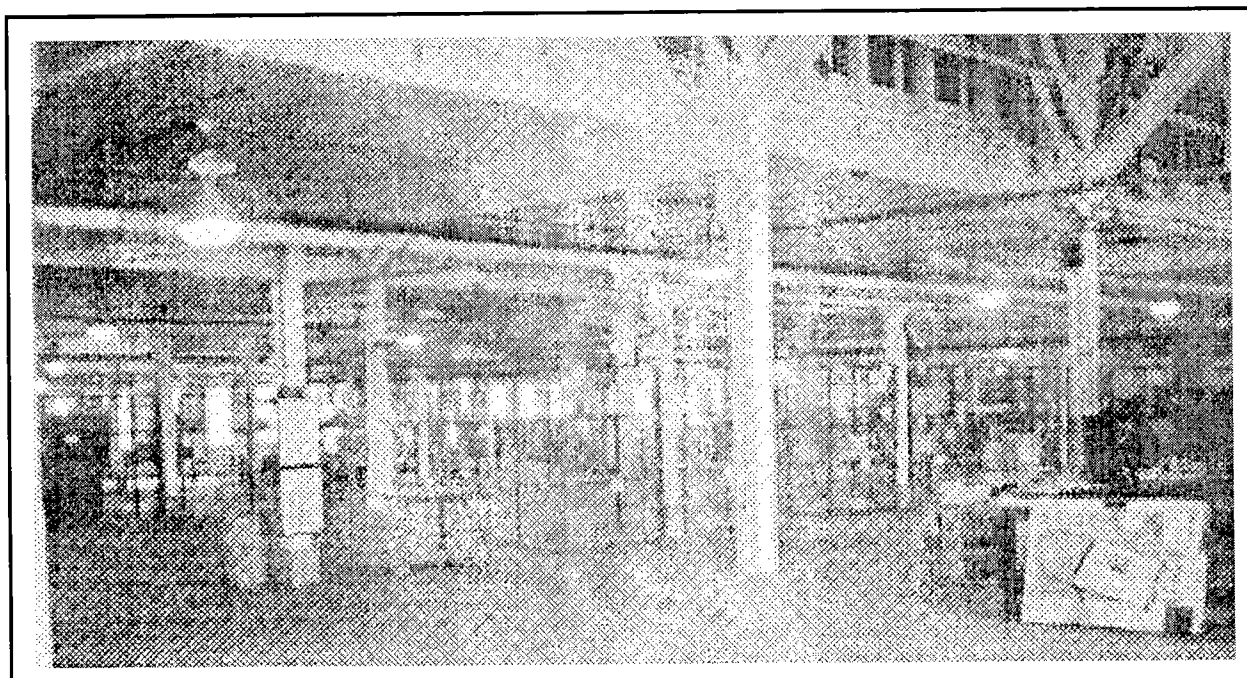

Figure A-7. Inside Supply Warehouse.

(7) Material received at this facility would first be inspected to see if it potentially reusable. The shelf life will be checked. Staff will consult with DLA and manufactures to determine if shelf life can be extended. Reusable products will become ``free issue,'' meaning any unit can use it free of charge.

(8) This facility will require a few employees, a building (probably adapted), and a vehicle.

(9) These proposals are currently under development and staff are trying to secure funding.

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b. Army -- Fort Campbell

(1) The pharmacy system at Fort Campbell is run by the environmental division of the DPW and by a contractor, DynCorp. Fort Campbell is a very large and diverse installation. The staff decided to introduce the pharmacy concept to the post by implementing it fully at one activity, and then by spreading out as time and experience allow. The first activity selected was the Sabre Heliport, the smaller of two airfields on the installation. Maintenance of Apache helicopters is the primary work at this site requiring hazardous materials.

(2) The Garrison Commander issued a memorandum in December 1996, affirming his support for the program. After securing initial agreement from unit commanders, they began to implement the program. The first step was to discuss with commanders and maintenance chiefs the needs for hazardous materials in the maintenance process. For each maintenance procedure, they needed to know the types of materials required, the amount required to do the job, and the frequency that the job is performed, thus developing a demand history. This information was collected and put into a database structure. All of the maintenance tasks combined called for 330 specific supply stock numbers.

(3) The next step was to collect and remove the excess material stored in the maintenance hangers. Data analyzed from logistic, supply, and environmental records revealed that 60 to 80 percent of the hazardous waste generated at Fort Campbell is a

direct result of shelf-life expiration, damaged containers, and improper storage.

(4) Technical manuals on aircraft repair list required materials by national stock number (NSN). Often, a particular item is only sold in 5-gal quantities. This creates a problem when the task at hand only requires a few drops. The excess material must be stored or disposed of as a hazardous waste--a very expensive problem. This situation contributes to the tendency for maintenance crews to develop large excess stocks of hazardous materials.

(5) However, under the pharmacy program crews are left with only a 1-week supply in the work area. Each work area has three cabinets, lockers, or controlled storage areas: one for hazardous material products, one for POL, and one for waste products. Each is kept locked and very few people have access to the key.

(6) At Fort Campbell, the facility is called the HMCC. The HMCC consists of an office trailer and six hazardous material storage buildings (Figure A-8). These storage buildings cost from $15,000 to $20,000 each. The trailer houses the database tracking system. Here hazardous materials requests are taken (Figure A-9).

(7) All hazards material requests from Sabre are now handled through the HMCC. Each workday, HMCC staff check the hazardous material and POL cabinets in each work area to assure that there is an adequate supply. If the stock of an item is depleted, the staff replenishes it. HMCC staff also check the waste cabinet daily and removes any waste found to the HMCC facility. Figure A-10 gives a simplified flow diagram.

(7) HMCC also help maintains contingency stock, or ``go to war'' supplies. These are typically stored in connex boxes to speed loading on a truck under a rapid deployment situation (Figure A-11). Similar to the supplies for routine maintenance, upon investigation, staff found that the contingency stocks kept were much greater than the amounts actually used. For example:

(a) The amount of acid turned in was enough to last 50 years.

(b) One unit reduced their number of storage lockers from 14 to 4.

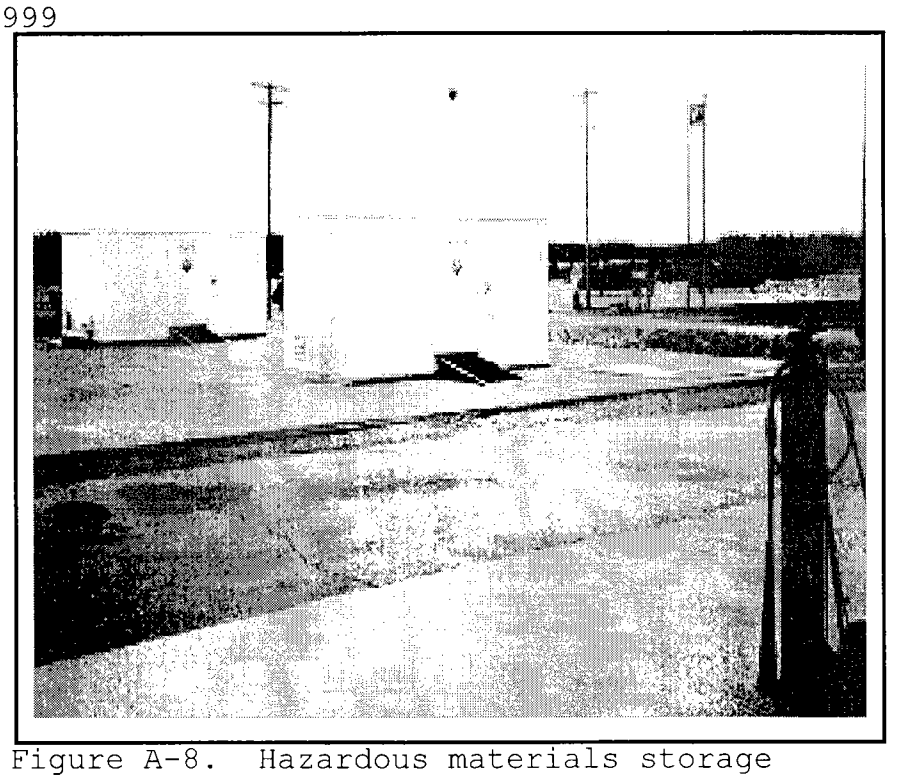

Figure A-8. Hazardous materials storage buildings at Fort Campbell.

(c) Another unit kept a stockpile of 136 gal of MEK, while they actually used only 2 gal over 8 months.

(d) For future expansion, program managers at Campbell are exploring some options. The pharmacy program as expanded into other types of activities on post will work differently. Each motor pool will be assigned a special hazardous material storage building. HMCC staff will service these daily to ensure that they have an adequate stock and to remove any hazardous wastes accumulated. New materials are kept in containers separate from wastes.

(e) The civilian directorates on post will also be part of the program. They will also receive a satellite hazardous material storage box. However, civilian employees will be responsible for keeping the storage containers adequately stocked, and for removing any wastes. Of course, the civilians do not need contingency pallets. Setting up the civilian side will be similar to the military in that they must have an initial clean up of excess materials, and an assessment of the types and quantities of materials used.

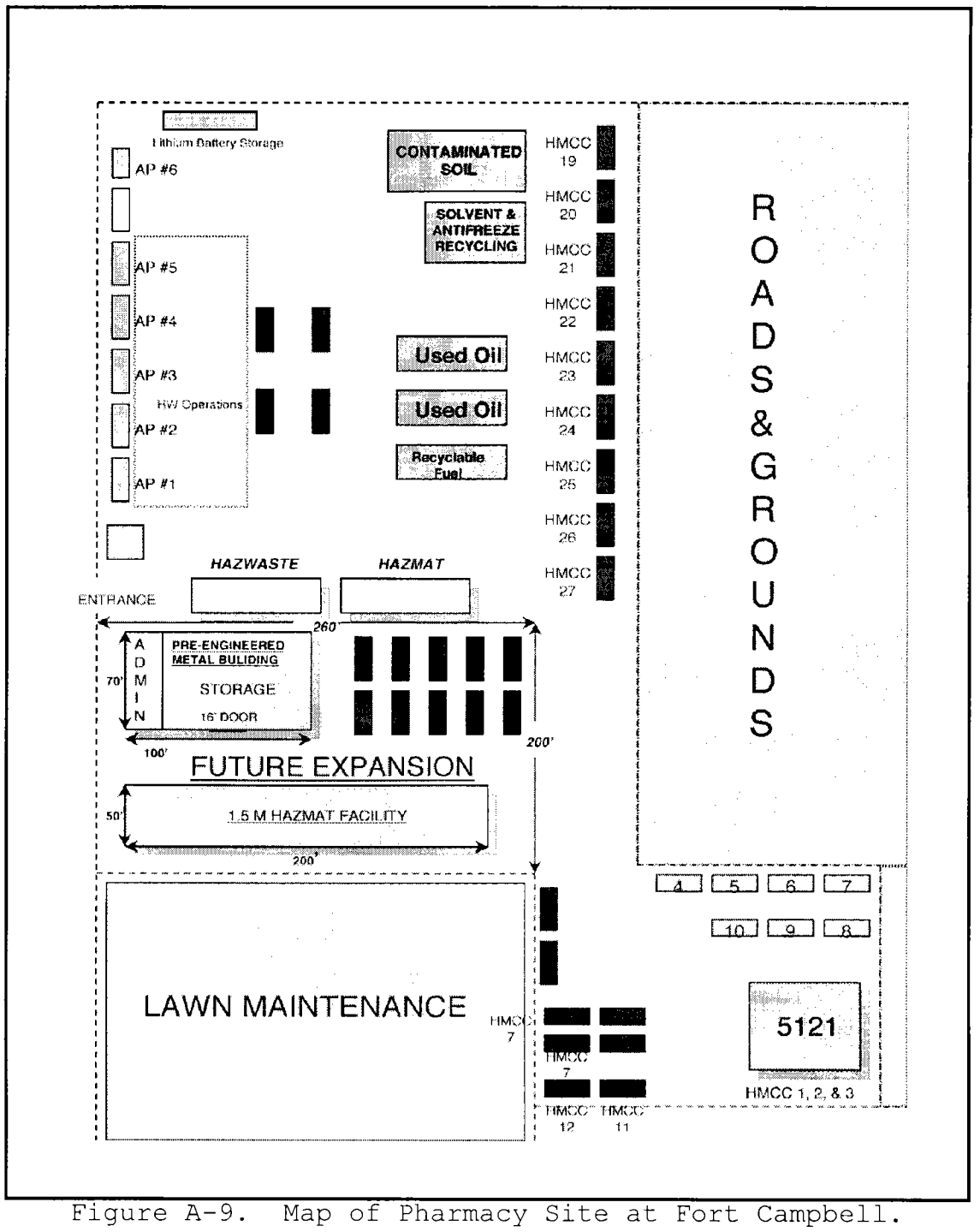

Figure A-9. Map of Pharmacy Site at Fort Campbell.

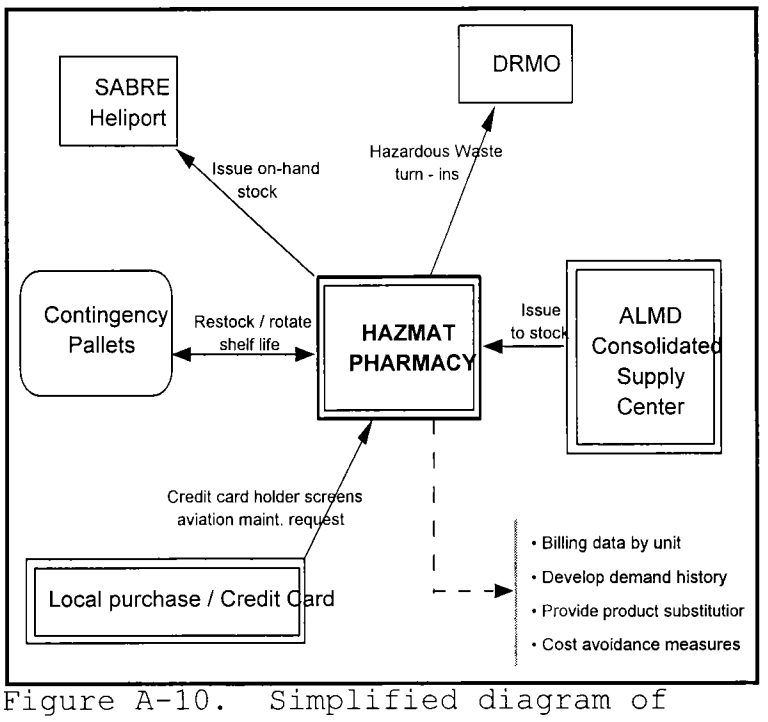

Figure A-10. Simplified diagram of pharmacy operations at Fort Campbell.

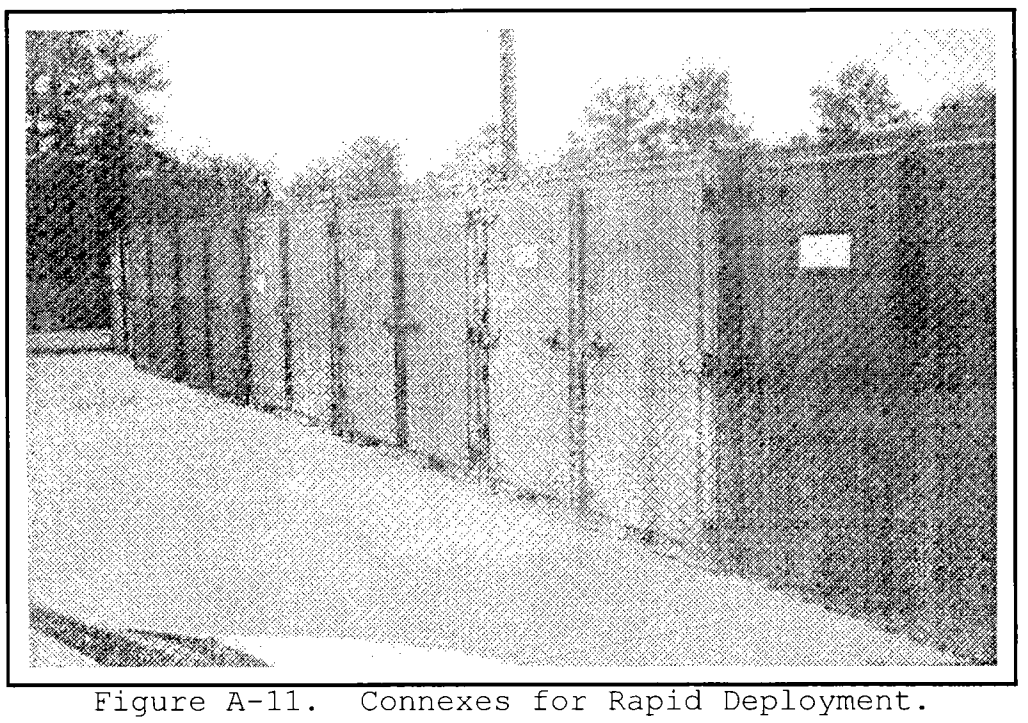

Figure A-11. Connexes for Rapid Deployment.

(f) The success of the pharmacy program at Fort Campbell is based on the cooperation of all parties involved, command support, and the avoided hazardous waste disposal costs.

(g) POCs:

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c. Army -- Pine Bluff Arsenal

(1) Pine Bluff Arsenal (PBA) is an active manufacturing facility, with the primary mission of producing smokes and white phosphorous munitions. (Due to the sensitive nature of the mission at Pine Bluff, no photographs were allowed.) The Arsenal's development corresponded with the beginning of WWII. PBA is understandably a limited access installation as they have an active hazardous waste incinerator and hazardous waste landfill, but especially because, until relatively recently (mid 1980s), PBA produced chemical warfare agents, PBA is one of eight sites across the United States safeguarding chemical warfare stockpiles.

(2) The HMCC was established in September 1994 with the following goals:

(a) To centralize hazardous material management under one ``roof.''

(b) To establish and authorize a system to control ``who uses what.''

(c) To formalize ``cradle-to-grave'' tracking.

(d) To issue hazardous materials only as needed or ``just in time.''

(e) To establish a procedure to reissue turned in materials.

(3) Approximately eight persons from other directorates were realigned to staff the HMCC. However, in some cases, they still perform some of their previous duties. One person processes hazardous material requests; another evaluates the request for chemical safety and suggests alternatives if appropriate; another monitors environmental compliance; and another manages the computer tracking system, HSMS. (Each of the staff listed is not 100 percent HMCC.) Current staff members include:

(a) HMCC Chief.

(b) Material Handler Foreman.

(c) Safety & Occupational Health Specialist.

(d) Inventory Management Specialist.

(e) Environmental Protection Assistant.

(f) Recycling Program Manager.

(g) Purchasing Agent.

(h) Supply Technicians (3).

(i) Supply Clerk.

(j) Hazardous Materials Handler Leaders (3).

(k) Hazardous Materials Spill Response Leader.

(l) Hazardous Materials Handlers (10).

(m) Materials Handler (2).

(n) Administrative Assistant.

d. The hazardous material procurement process proceeds thus:

(1) The field activity requests an HM on a special form (reproduced as Appendix E of this document), which includes information on the product, use rate, and how and where it will be used, and where it will be disposed.

(2) The form is evaluated in the HMCC for chemical safety, and to check if the requester is authorized to use the material.

(3) The material is ordered, whenever possible, in small quantities via credit card from local sources for fast turnaround. Large quantities must still be ordered through DOL due to limits on credit cards.

(4) The material arrives in the receiving section and the MSDS sheets are again evaluated to assure that the correct material arrived.

(5) The material is bar-coded and either picked up or delivered to the user. The barcode links the package back to the original material request: user, vendor, material.

(6) Large quantities (pallets, drums) are temporarily stored in one of several old warehouse buildings across the post. The location of the material is tracked by building number and by a floor grid numbering system. Some bulk chemicals are delivered via rail car.

(7) HMCC staff have shown a dedication to the program's success. They have done a great job of convincing their command structure and field activities of the need for a pharmacy. Their customers prefer the pharmacy to the old system, because the always get the right amount of product they need, quickly via credit card ordering. Table A-2 list some measures that help convey the scope and success of the HMCC program at PBA.

(1) POC:

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Table A-2.
Pine Bluff HMCC misc. data for FY96.

Category	Quantity
Stock hazardous material items	800
# HazMat warehouses	40
# Purchases	1397
# Product substitutions	29
# Product request rejections	11
Value of HazMat stock	$11,800,000
Cost savings due to reissue	$11,190
Cost savings through avoided disposal costs	$77,893

e. White Sands Missile Range

(1) White Sands Missile Range (WSMR) covers 2 million acres -- an area about the size of Delaware and Rhode Island combined. The installation tests missiles and weapons systems for various customers, such as the Army, Navy, Air Force, and even other nations.

(2) After much consideration, WSMR identified the best ways to carry out its obligations to protect the environment and comply with Federal, State and local environmental laws. The

control, management and reduction of hazardous materials and waste are an essential part of this effort.

(a) ``Purple'' Partnership

i. Though WSMR is an Army installation, it has a large Navy presence. In 1994, the Navy opened a Hazardous Material Minimization Center (HMMC) to service Navy activities at WSMR, using business practices from the Navy's Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP). Implementation of CHRIMP significantly reduced the amount of hazardous material procured, stocked, distributed to customers and eventually disposed of as waste.

ii. WSMR Army directorates soon joined and helped fund this successful operation. The commanding general of WSMR visited the center and proposed creating a ``purple'' or Joint Services Hazardous Material Minimization Center (JHMMC), which would provide services to all of WSMR.

(b) Joint Success

i. The JHMMC opened in April 1995 with an Army-Navy staff and two co-managers. WSMR sought to establish uniform policy, guidance and requirements for the life-cycle control and total quality management of its hazardous materials, based on this concept: ``Better managed hazardous material results in less hazardous material used, a reduced risk for state violations, guaranteed issue of Material Safety Data Sheets and reduced waste.''

ii. This success led Army Material Command to select WSMR as one of the first sites to implement the Hazardous Substance Management System (HSMS), the Department of Defense's standardized hazardous substance tracking system.

iii. HSMS was implemented at WSMR in fiscal year 1997. The JHMMC provides service to all of WSMR and has reduced costs of hazardous material procurement and hazardous waste disposal. Superb personnel and command support have made White Sands Missile Range a leader in hazardous material management.

(c) For More information, contact:

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tom_coleman@nawcws2.wsmr.army.mil

f. Detroit Arsenal.

(1) Detroit Arsenal, and Army Materiel Command installation in Warren, MI, is the headquarters of the Army's Tank-Automotive and Armaments Command. The arsenal's primary missions are industrial production, research, development, and engineering.

(2) Detroit Arsenal implemented the Hazardous Substance Management System (HSMS) to control ``life-cycle management'' of all hazardous materials and to facilitate a central material storage and issue point called the Hazardous Materials Control Center (HMCC).

(3) Implementing HSMS helped Detroit Arsenal save more than $215,000. The HMCC dispensed about 33,000 gal of fuel to the various Michigan-based National Guard and Reserve units, along with 8,500 gal of other hazardous materials such as oils, solvents, paints, and adhesives.

(4) Despite some initial reluctance to implement the new materials management system, increasing personnel involvement and education have helped raise confidence in the HSMS program. The main selling point was the user-friendly computer interface with the central material storage and issue point.

(5) Detroit Arsenal personnel realized that the HMCC could reduce the learning curve for material procurement, issue, use, and disposal. Each customer received a biweekly newsletter during the implementation process to inform them of the progress and to facilitate an exchange of ideas between program managers and staff who would be the most affected by the changes.

APPENDIX B

Joint Service Pollution Prevention Opportunity Data Sheet
Centralized Hazardous Material/Hazardous Waste Management

Revision: 4/97

Process Code: Navy and Marine Corps: SR-11-99, ID-25-99; Air Force: MA01, HW01; Army: N/A

Usage List: Navy: High; Marine Corps: High; Army: High; Air Force: High

Substitute For: Traditional Non-Centralized Hazardous Material/Waste Management

Approaches

Applicable EPCRA Targeted Constituents: Numerous

Overview: The Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) or Hazardous Material Pharmacy is a logistical management system responsible for control of hazardous material inventories from requisition to disposal. The Navy initiated the CHRIMP to significantly reduce hazardous waste generation and disposal. The Air Force modified the centralized hazardous materials management system and renamed it a Pharmacy. The CHRIMP or Pharmacy manages authorization, procurement, receipt, storage, issue, use, reuse/recycling and eventual disposal of hazardous materials and their containers. This approach, including a centralized system responsible for procurement, management and tracking of hazardous material inventories, has helped DOD face the challenge of achieving control over the acquisition and management of hazardous materials and disposal of hazardous wastes.

A CHRIMP or Pharmacy is operated by multi-disciplinary teams representing a variety of organizations including supply, contracting, procurement, safety, industrial hygiene, environmental and public affairs. Successful facilities operate on a just-in-time delivery basis, eliminating the tendency to overpurchase and stockpile materials. The use of hazardous materials is restricted, based strictly on need. CHRIMP/Pharmacy staff endeavor to issue materials in the smallest container that

meets mission requirements. Customers return unused materials to the pharmacy for reissue.

Establishing a CHRIMP/Pharmacy requires cooperation among all operations. Quantities of materials already on site must be inventoried and each operation's need for hazardous materials evaluated. A facility must be constructed or modified and equipment purchased and installed. CHRIMP/Pharmacy operating procedures must be defined. Staff require training in hazardous material and hazardous waste management and transportation. In addition, the CHRIMP/Pharmacy requires computer equipment and software to establish a tracking system. The tracking function facilitates compliance with reporting requirements. Data from the tracking system can provide accurate accounting for EPCRA reporting as well as an historic record of reductions in the use of specific hazardous materials. The tracking begins when a material is ordered and follows the material and its container through receipt, issue, use, return, reissue, recycling and disposal.

The Naval Air Weapons Station (NAWS) at Point Mugu, CA implemented a Hazardous Material Minimization Center (HAZMINCEN). As an integral part of a base-wide plan for hazardous material management, the Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP). Staff established a system of credits and billings to control inventory and purchase of all hazardous materials and established a delivery system to respond to work order requests and to pick up any unused materials. Efficient inventory management techniques reduced local purchases of hazardous materials. Fort. Mugu uses the Hazardous Inventory Control System (HICS). Using HICS, staff can create a unique bar-code for each container issued, process material requisitions and track receipts and issues. HICS also provides on-line inventory accounting and automatic data collection. In 1994, the Navy issued a CHRIMP manual including HICS software and a User's Guide that outlines the methodology for implementing a HICS-based, centralized hazardous material management program.

A number of Air Force bases have committed to the HAZMAT Pharmacy concept. At Andrews AFB in Maryland, the pharmacy provides a single point of control and accountability for hazardous materials for a joint services team including the Navy, Air National Guard, Army and Marines. The Andrews AFB

pharmacy has virtually eliminated redundancy in procurement of hazardous materials. The pharmacy at Nellis AFB in Nevada uses decentralized ordering and centralized delivery systems. Each request to purchase hazardous material must be approved by Bioenvironmental Engineering to ensure that personnel are trained and equipped to use the material properly. The Air Force Center for Environmental Excellence (AFCEE) developed the Commander's Guide to The Implementation of the Hazardous Material Pharmacy, which provides guidance in planning and implementing a pharmacy. USAF HAZMAT Pharmacies use the Air Force Environmental Management Information System (AF-EMIS), an automated data processing program.

Materials

Compatibility: No materials compatibility issues were identified.

Safety and Health: Reduction in quantity of hazardous material on-site reduces worker exposure and potential for spills and accidents. Materials are managed only by trained staff using proper personal protection equipment.

Benefits:

- Ease of compliance with regulatory reporting requirements.
- Improper management and storage of incompatible materials is eliminated.
- Substantial reductions in the costs associated with acquisition, storage, management and disposal of hazardous materials. For example, at Fort. Mugu, total cost avoidance benefits exceeded $1 million.
- Improved quality and availability of materials for all operations.
- Elimination of excess, expired and unusable materials.
- Improved worker health and safety.

- Increased awareness of and emphasis on pollution prevention and substitution of less or non-hazardous products and processes.

Disadvantages:

- Resistance to change among facility staff.

- Substantial initial investment in site, equipment, staff training and labor to identify, authorize and move hazardous materials to central pharmacy location.

Economic Analysis: The costs and benefits of a properly established pharmacy program to manage hazardous materials and hazardous waste vary depending on the size and mission of each facility and should be evaluated on a facility by facility basis. Over time, with the proper management strategies in place, cost savings may be quite substantial.

Approval Authority: Approval is controlled locally and should be implemented only after engineering approval has been granted. Major claimant approval is not required.

Points of Contact:

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PWTB 200-01-11
31 July 1999

HAZMAT Pharmacy at Nellis AFB

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Sources:

- Conversations with Lt. Jim Morales, Point Mugu Naval Air Weapons Station, 3/97.
- Conversations with Msgt. Edwards HAZMAT Pharmacy at Andrews AFB, 3/97.
- Conversations with Beverly Fussell HAZMAT Pharmacy at Nellis AFB, 3/97.

APPENDIX C
Equipment

1. Pharmacy systems require several types of specialized equipment. These include

   a. Storage Buildings / Cabinets

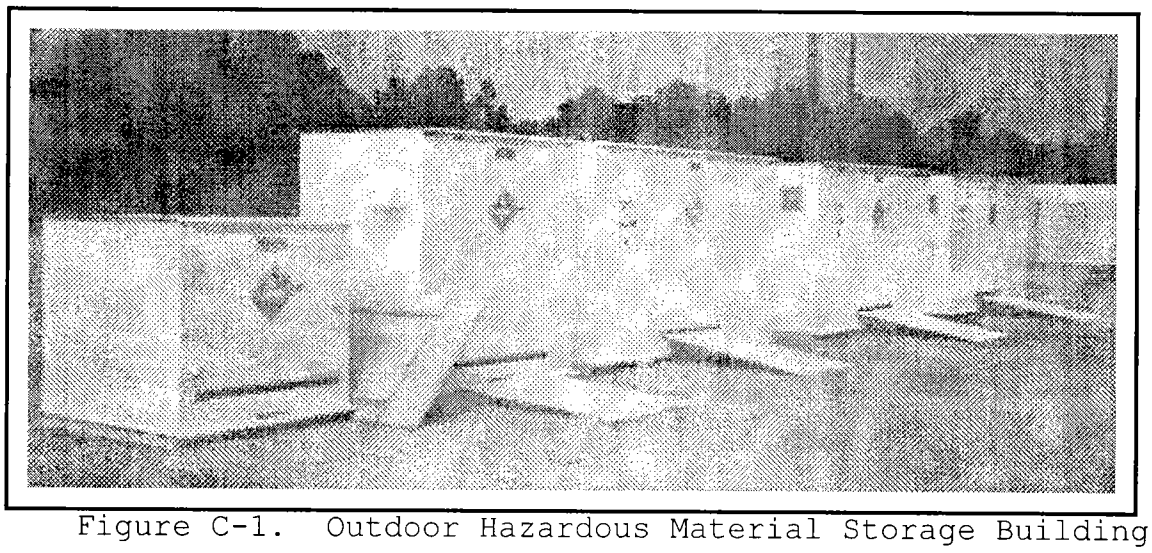

Figure C-1. Outdoor Hazardous Material Storage Buildings.

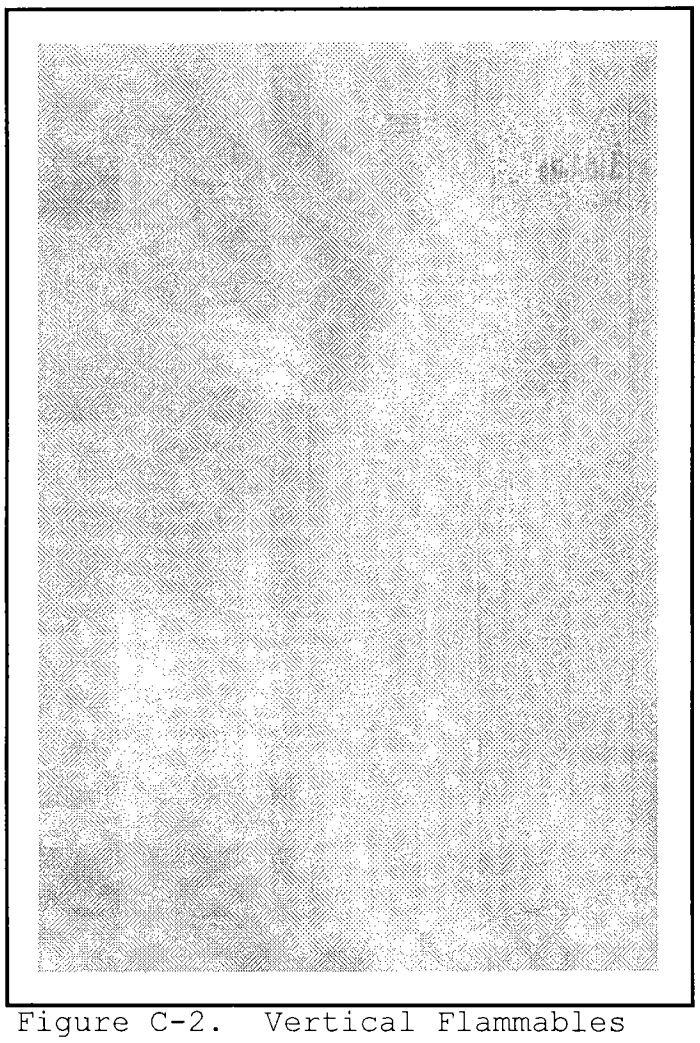

Figure C-2. Vertical Flammables Storage Cabinet.

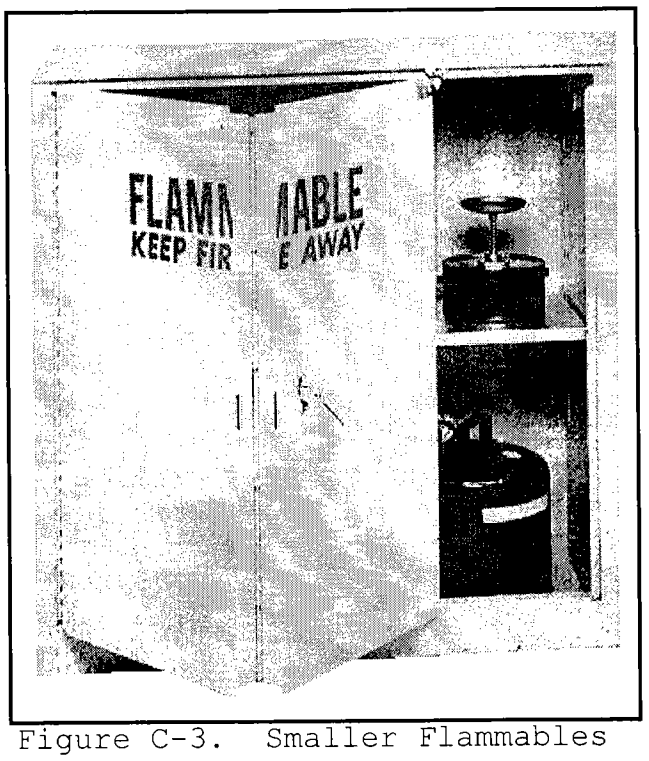

Figure C-3. Smaller Flammables Storage Cabinet.

b. Spill Kits

Figure C-4. Large Wheeled Spill Kit.

Figure C-5. Compact Spill Kit with Absorbent Socks.

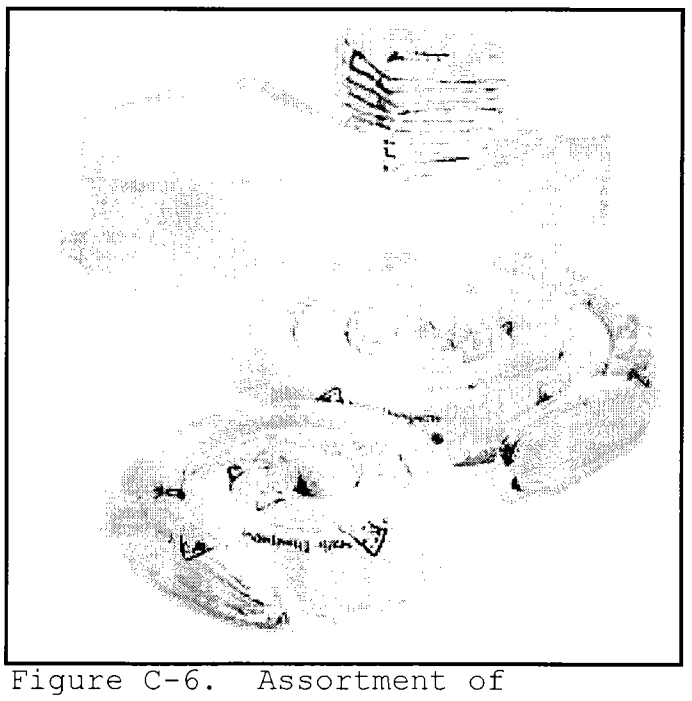

Figure C-6. Assortment of Absorbent Products for Use in Spill Kit.

Figure C-7. Application of Absorbent Pads and Socks.

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