

**Armed Forces Pest Management Board  
Technical Guide No. 17**

# **Military Handbook—Design of Pest Management Facilities**



**Published and Distributed by the  
Armed Forces Pest Management Board  
US Army Garrison—Forest Glen  
2460 Linden Lane, Bldg 172  
Silver Spring, MD 20910-1230**

**Office of the Under Secretary of Defense  
(Acquisition and Sustainment)**

**August 2009  
(Minor Revision December 2016)**

## **Acknowledgements**

The following personnel reviewed and worked on the update of this technical guide: Christine Convery, Herbert Bolton, Kevin Delaney, Mary Anderson, Sharon Bartku, Donald Teig, Joseph Tarnopol and Frederick (Jim) Harrison. Final review and editing were provided by Dr. Harold Harlan. The “facility plate” figures included in this document were originally from the United Facilities Criteria, Design of Pest Management Facilities and were developed by Naval Facilities Engineering Command in coordination with the U.S. Army Corps of Engineers and the Air Force Civil Engineering Support Agency.

## Forward

This technical guide provides the criteria and the best available technology for designing a military pest management facility or pest control shop as well as general guidelines for pesticide storage on DoD facilities. Where appropriate, the technical guide provides some operational rationale to justify certain design features. Lastly, the technical guide promotes compliance with measures for safety and environmental protection established by host state or country regulations even if the facility may be exempt from state or local mandates. Pesticide use is closely regulated under the Federal Insecticide Fungicide and Rodenticide Act and several other federal laws. Users, in every case, should consider state or host country requirements in design of pest management facilities.

Recommendations for improvement are encouraged from any party and should be provided to the Armed Forces Pest Management Board Installation Advisory Committee (formally Real Property Protection Committee) Chair.

The design of pesticide storage facilities shall comply with standards described in this document. Existing facilities shall comply with all applicable regulatory standards and shall, where feasible, be modified to meet the minimum standards for new pesticide storage facilities (per DoD 4150.07, May 29, 2008).

## **Background**

This document supersedes MIL-HDBK-1028/A (31 October 1984) and MIL-HDBK-1028/8A, AFPMB Technical Information Memorandum 17 (1 November 1991). The original document was created using the Naval Facilities Engineering Command (NAVFAC) basic criteria to plan and design military installation pest control facilities. This document has been accepted as an AFPMB Technical Guide and responsibility for maintenance of this guidance has been transferred to the AFPMB Installation Advisory (formally Real Property Protection) Committee.

## **Unified Facilities Criteria**

The Department of Defense (DoD) and the military services have initiated a program to unify all technical criteria and standards pertaining to planning, design, construction, and operation and maintenance of real property facilities. The objective of the Unified Facilities Criteria (UFC) program is to streamline the military criteria system by eliminating duplication of information, increasing reliance on private-sector standards, and creating a more efficient criteria development and publishing process. Both technical publications and guide specifications are part of the UFC program.

The Unified Facilities Guide Specification (UFGS) and Unified Facilities Criteria (UFC) Technical Publications can be found at <http://www.wbdg.org/ffc/dod>.

# Table Of Contents

Acknowledgements .....	2
Forward .....	3
Background .....	4
Unified Facilities Criteria .....	5
Table of Contents .....	6
List of Tables and Figures .....	8
Section 1: Introduction .....	9
1.1 Scope .....	9
1.2 Application .....	9
1.3 Operational Notes. ....	9
1.4 Related Criteria. ....	9
1.4.1 Facility Plates .....	9
1.4.2 Unified Facilities Criteria. ....	9
1.4.3 Pesticide Storage Criteria .....	9
1.4.4 Cancellation. ....	10
1.5 Air Force Construction. ....	10
Section 2: Planning .....	11
2.1 Purpose .....	11
2.2 Intended Users .....	11
2.3 Functional Considerations. ....	11
2.3.1 Facility Size .....	11
2.3.2 Multi-Purpose Facilities .....	11
2.3.3 Facility Cost. ....	12
2.3.4 Environmental Concerns .....	12
2.4 Location. ....	13
2.5 Collateral Equipment. ....	13
2.6 Energy Conservation .....	13
2.7 Building Protection. ....	13
2.8 Safety/Security. ....	14
2.9 Contractor Storage. ....	14
Section 3: Design Criteria .....	15
3.1 Architectural .....	15
3.1.1 Style (Character). ....	15
3.1.2 Size .....	15
3.1.3 Functional. ....	15
3.1.4 Pesticide Handling Areas. ....	16
3.1.5 Construction Materials .....	19
3.2. Structural .....	21
3.3. Interior Design. ....	21
3.4. Siting .....	21
3.4.1 General .....	21

3.4.2 Siting.....	21
3.4.3 Accessibility.....	21
3.4.4 Grading.....	22
3.4.5 Parking.....	22
3.4.6 Security Fencing and Gates.....	22
3.4.7 Outdoor Pesticide Mixing Areas.....	22
3.4.8 Hardstand Area.....	22
3.5 Mechanical.....	23
3.5.1 General.....	23
3.5.2 Plumbing.....	23
3.5.3 Heating and Cooling.....	26
3.5.4 Ventilation.....	26
3.6 Electrical.....	27
3.6.1 Explosion Proofing.....	27
3.6.2 Lighting.....	28
3.6.3 Corrosion Resistance.....	28
3.6.4 Appliances.....	28
3.7 Fire Protection.....	28
3.7.1 Fire Extinguisher.....	28
3.8 Signs.....	29
3.9 Architectural.....	29
Section 4: Pre-Fabricated Pesticide Storage Facilities.....	31
4.1 Background.....	31
4.2 Requirements.....	31
4.2.1 Size.....	31
4.2.2 Ventilation.....	31
4.2.3. Plumbing.....	31
4.2.4 Fire Protection.....	31
4.2.5 PPE.....	31
4.2.6 Fertilizers.....	31
4.2.7 Gasoline/Fuel.....	31
4.2.8 Pesticide Mixing.....	31
4.3 Siting.....	31
4.3.1 Location.....	31
4.3.2. Climate Control.....	32
4.4 Security.....	32
4.4.1 Fencing.....	32
4.4.2 Locks.....	32
4.4.3 Signs.....	32
4.5 Spill Prevention.....	32
4.5.1 Spill Kit.....	32
Section 5: Limited Quantity Pesticide Storage.....	33
5.1 Background.....	33
5.2 Requirements.....	33

5.2.1 Hazardous Materials Locker.....	33
5.2.2 PPE.....	33
5.2.3 Fertilizers.....	33
5.2.4 Gasoline/Fuel.....	33
5.2.4 Mixing Pad.....	33
5.3 Siting.....	33
5.3.1 Location.....	33
5.3.2 Climate Control.....	33
5.4 Security.....	34
5.4.1 Locks.....	34
5.4.2 Signs.....	34
5.5 Spill Prevention.....	34
5.5.1 Spill Kit.....	34
Section 6: Facility Plates For Pest Management Facilities.....	35
Section 7: Instructions, Regulations And Laws.....	46
7.1 Federal Laws.....	46
7.2 Code of Federal Regulations.....	46
7.3 Other Government Publications.....	46
7.3.1 Air Force.....	46
7.3.2 Navy.....	47
7.3.3 Army.....	47

## List of Tables and Figures

Table 1: Facility Size.....	12
Figure 1.....	35
Figure 2.....	36
Figure 3.....	37
Figure 4.....	38
Figure 5.....	39
Figure 6.....	40
Figure 7.....	41
Figure 8.....	42
Figure 9.....	43
Figure 10.....	44
Figure 11.....	45



## Section 1: Introduction

### 1.1 Scope.

This technical guide contains basic criteria to design military installation pest management facilities and it includes some operational information to justify certain design features. A facility so designed will support operations and provide for safe storage of pesticides, safeguard the health and safety of employees, prevent environmental contamination, contain spillage and be secure against theft and vandalism. This technical guide also contains information on criteria for pre-fabricated pesticide storage facilities and storage of small quantities of pesticides.

### 1.2 Application.

The requirements in this technical guide are presented as essential (mandated by federal regulation, consensus standard or justified by good practice) and recommend (in the interests of safety and health, cost-effective operations, efficiency or unique operations). In this technical guide, the terms “shall” and “should” equate to essential and recommended requirements, respectively. No deviation from essential criteria are permitted unless approved by the Armed Forces Pest Management Board.

### 1.3 Operational Notes.

Many operational procedures apply to pest management functions that influence the design of pest management facilities. These are identified in applicable sections as Operational Notes. Numerous other operational requirements, determined through best management practices, are identified and all information currently available on pest management facilities is provided or referenced in this publication.

### 1.4 Related Criteria.

#### 1.4.1 Facility Plates.

Facility plates for pest management facilities are contained in this technical guide. These include a functional relationship diagram, facility floor plans, door sill details, exhaust hood detail and utility requirements.

#### 1.4.2 Unified Facilities Criteria.

The Unified Facilities Guide Specification (UFGS) and Unified Facilities Criteria (UFC) Technical Publications can be found at [http://www.wbdg.org/references/pa\\_dod.php](http://www.wbdg.org/references/pa_dod.php).

#### 1.4.3 Pesticide Storage Criteria.

References to Title 40 Code of Federal Regulations (CFR), part 165 (40 CFR 165) are for background information unless otherwise stated. The 40 CFR 165 design-related criteria and procedures are primarily for pesticides and containers whose uncontrolled release into the environment would cause unreasonable adverse effects on the environment, and for those labeled with the signal words DANGER-POISON or WARNING. All CFR criteria and procedures may not apply; states cannot regulate DoD facilities under the Federal Insecticide

Fungicide and Rodenticide Act (FIFRA) requirements due to no waiver of sovereign immunity under FIFRA, but voluntary compliance with substantive state regulations is strongly recommended. Deviations from these criteria shall be approved by a service pest management consultant.

#### 1.4.4 Cancellation.

This Technical Guide #17 cancels and supersedes MIL-HDBK-1028/8 dated 1 November 1991.

#### 1.5 Air Force Construction.

This technical guide is applicable to Air Force Construction except that UFC 3-120-01, Criteria and Standards for Air Force Construction, and the references contained therein, shall be used for technical criteria. Planning and programming criteria are provided in AFI 32-1024, Standard Facility Requirements, under category group 81-89, Base Engineer Pavement and Grounds Facility. Questions and requests for deviations to criteria should be addressed to HQ AFCEC/COSC, 139 Barnes Street – Suite 1, TYNDALL, AFB, FL 32403-6001.

## **Section 2: Planning**

### **2.1 Purpose.**

This technical guide provides the best available technology for basic design guidance of pest management facilities on military installations. It is presented for use by experienced architects and engineers and service consultants concerned with developing new pest management facilities or rehabilitating existing facilities. The contents include design data for storage and handling of pesticides and related pest control equipment. It is not intended for use as an inspection checklist of existing pest management facilities. The design of pesticide storage facilities shall comply with standards described in this document. Existing facilities shall comply with all applicable regulatory standards and shall, where feasible, be modified to meet the minimum standards for new pesticide storage facilities (per DoD 4150.07, May 29, 2008).

### **2.2 Intended Users.**

The primary users of pest management facilities are the installation personnel responsible for pest management operations. Users of this document include design and planning personnel preparing construction guidance for installation pest management shops. Pest Management Consultants use this document to provide installation personnel with guidance on establishing new pesticide storage facilities or improving existing facilities.

### **2.3 Functional Considerations.**

#### **2.3.1 Facility Size.**

Facilities shall provide adequate space for personnel and equipment necessary to address installation pest problems installations' integrated pest management plans. In general, a small facility serves one to three workers or pest controllers, a medium facility serves four to nine workers and a large facility serves 10 or more workers. Table 1 lists the approximate size of facilities up to ten workers. Additional information guidance on the actual size and components of pest management facilities is available from the service pest management consultants and from the scope of operation described in the integrated pest management plan established for each installation.

#### **2.3.2 Multi-Purpose Facilities.**

If two pest control functions (e.g., public works and the golf course) require facilities that can be located at the same location, modify the design to include a common mixing room, separate storage areas, and possibly a shared office, laundry and toilet facilities. For a single-use facility, the size should be a minimum of 1000 square feet (93 square meters) to include pesticide storage and equipment areas, mixing area, and a deluge shower and eyewash as a minimum. Depending on the distance from other facilities, a small office, toilet and laundry area may also be required. Include additional variations in the design to account for staffing and climatic differences and to comply with individual state or host country requirements for pesticide handling.

Table 1: Facility Size

<b>Number of Personnel</b>	<b>Size (X gross 1,000 SF/93 SM)</b>
1-3	1.1 (small facility)
4	1.8 (medium facility)
5	2.1 (medium facility)
6	2.3 (medium facility)
7	2.5 (medium facility)
8	2.6 (medium facility)
9	2.8 (medium facility)
10 or more	3.0 (large facility)

For essential space, the initial criterion is 1,100 gross square feet (93 square meters) for a small facility with an additional 500 gross square feet (46 square meters) for each additional worker over three. The additional increment, however, diminishes as the number of controllers increases. A ten worker facility should require 3,000 gross square feet (279 square meters) or 300 gross square feet (28 square meters) for each worker.

Operational Note. Pest management facilities shall not be used for hazardous waste storage unless specifically designed to accommodate hazardous waste materials because other federal regulations apply to hazardous waste facilities. The facility supervisor must be aware of this distinction and establish the practice of sending all hazardous wastes to an established hazardous waste facility without delay. Normal pest management facilities are not equipped under RCRA to store hazardous wastes.

### 2.3.3 Facility Cost.

Pest management facilities are expensive to construct and, unless they are designed economically, funding through the military construction program will be required. This is attributable to the high square footage costs for utility connections, specialized ventilation and safety requirements. Small facilities do not cost proportionately less because the major difference is in the amount of storage space which is a less expensive design consideration. It is essential that installations design and construct minimum sized facilities to meet their mission requirements. Installations should also consider the future use of a pest management facility. Facility planners should consider all options, including pre-fabricated storage facilities in lieu of constructing an entire pest management facility as described in this document. The Pest Management Consultant can provide guidance on whether a pre-fabricated storage facility is appropriate for the installation's pest management operations.

### 2.3.4 Environmental Concerns.

Pesticide use is closely regulated by the U. S. Environmental Protection Agency (EPA) and state regulatory agencies. Pest management facilities are subject to Occupational Safety and Health Administration (OSHA) regulations as well as the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), DoD and military service instructions and criteria. Facility planning shall include safety, public health and environmental protection issues. The storage

and use of pesticides is often regulated by state or local pollution abatement agencies. The use of water to extinguish fires in facilities may generate hazardous liquid wastes that can readily contaminate materials, soil and ground water. Another concern is for the proper disposal of wastes generated with normal operations. Pesticide spills and cleanup procedures are addressed separately in the Armed Forces Pest Management Board (AFPMB) Technical Guide No.15. Excess and waste pesticide concentrates and washing liquids may need special storage while awaiting disposal under Resource Conservation and Recovery Act (RCRA) hazardous waste requirements (40 CFR 260-26-5).

Operational Note: A pesticide spill kit that covers about 9 square feet (0.84 square meters), located in the storage and mixing area, is essential. The kit should be conspicuously identified and made readily available for emergency use. Hazardous materials containers should be labeled with hazardous warning labels and have material safety data sheets for the materials, reference CFR 1910.1200(f)(5).

#### 2.4 Location.

Pest management facilities contain toxic pesticides and related chemicals and may be required in emergencies for interim storage of pesticides classified as hazardous materials. Isolated single-purpose structures are essential if construction of a new facility is planned. Pesticide storage and mixing facilities that are integral parts of multiple-occupied buildings present actual and potential problems. Unless the pest management facility is tightly sealed off, noxious vapors will permeate nearby spaces. Pest control materials are highly pilferable and expensive; thus creating a security problem. When locating a pest management facility in a multiple-use building is the only alternative, the pest management facility shall be located on the end of the structure separated from the other areas by secure vapor impervious partitions. Fire protection criteria also apply. This alternative is recommended only as an interim measure and construction of a separate pest management facility should be the eventual goal.

Operational Note. If functional conversion to contract is anticipated, contractors should be required to store all pesticides off of government property.

#### 2.5 Collateral Equipment.

Several items of collateral equipment are required; these are listed in the appropriate sections of this technical guide. For example, computers with internet access are needed for pesticide use documentation, pesticide inventory and personnel certification management, and other reasons.

#### 2.6 Energy Conservation.

Energy conservation shall be a major consideration in the design of building envelopes, mechanical systems, and electrical systems for pest management facilities. Follow all service specific requirements and recommendations where applicable.

#### 2.7 Building Protection.

The vehicle entrance to the pesticide area shall be protected from damage by vehicles and

moving loads by the installation of concrete filled pipe guards, bumpers, railings, corner guards, or similar protective features.

## 2.8 Safety/Security.

Because of the hazardous nature of various pesticides, (e.g., insecticides, acaricides, herbicides, rodenticides, fungicides, wood preservatives, avicides, nematocides, and molluscicides) stored and mixed in pest management facilities, it is essential that such materials are secured and available only to qualified individuals. Security fencing and security gates and other measures are essential. A climb resistant fence shall enclose the entire facility.

If other security measures are taken such as security devices on the windows, fencing shall enclose the vehicle storage area and outside mixing areas. Design review shall include installation security requirements. See AFPMB Technical Guide #7 for more details about pesticide security and use UFGS 32 31 13.00 40 Chain Link Fences and Gates (07-2007) for guidance on installing fences.

## 2.9 Contractor Storage.

Storage of pesticides on government property is strongly discouraged. Contractors should be required to store all pesticides off of government property. If special conditions exist that require contractors to store on government property the storage facilities must meet the requirements of this document.

## Section 3: Design Criteria

### 3.1 Architectural

#### 3.1.1 Style (Character).

The style of pest management facilities shall be in accordance with each installation's architectural compatibility guidelines.

#### 3.1.2 Size.

Obtain guidance on the actual size and components of pest management facilities from the cognizant service pest management consultant. Facility Plate Sheets 1, 4, and 6 illustrate floor plans for small, medium and large facilities, respectively. Additional plans of Air Force facilities are illustrated on Sheets 3 and 8. Modify these plates for local requirements. Consider also the number of pest control functions required; even small shops may be providing the full range of operations involving three items of trailer mounted equipment, two vehicles, and an inventory of 40 or more pesticides and related chemicals. See Table 1 for additional data on facility size.

#### 3.1.3 Functional.

Arrangement of spaces and corridors shall allow workers to arrive in a clean area, dress for hazardous exposure in the change area, leave through a pesticide area doorway, and retrace that path at the end of the workday. It is essential that the mixing room be located adjacent to the storage area and the equipment storage area (if indoors) and be accessible through the corridor to the shower and locker rooms and the exterior. Functional relationship diagrams are provided as Facility Plate Sheets 2, 5 and 7, respectively. Divide the facility into the three areas - clean, transitional and pesticide, as follows:

3.1.3.1 Clean Areas. Clean areas include an office, vestibule and airlock, and mechanical and electrical spaces.

3.1.3.1.1 Vestibule and Airlock. Provide a vestibule and airlock for the facility, where appropriate due to weather conditions, to conserve energy.

3.1.3.1.2 Office Space. Provide a space to perform office work. A telephone is essential for safety. Heating, ventilation and air conditioning is recommended for effective workplace habitability. It is essential that there be no direct access between office and pesticide storage and mixing areas. Optionally, delete the office space from secondary shops, usually at remote locations, if there is a primary pest management facility under the same command on the installation. However, installations with separate facilities for the golf course pest management operations or other pest management operations should have an office space for administration and record keeping.

Operational Note. Employees shall not eat in areas where pesticides are mixed, stored, or

handled. Use of tobacco products or chewing gum is likewise prohibited for safety reasons. Food storage, area (e.g., in coffee areas or where lunches are stored), shall be physically separated from toxic materials. Waste containers must be provided for the disposal of all waste food. Such containers must be equipped with covers and, in accordance with OSHA standards, must be emptied daily (Ref: 29 CFR 1910.141).

3.1.3.1.3 Equipment Storage/Cabinet/Locker. Provide a separate storage space in the clean area to store clean personal protective gear (new gloves, respirator cartridges, etc.) that is located away from pesticides.

3.1.3.1.4 Mechanical/Electrical Room. Provide a room to contain a water heater and mechanical and electrical equipment.

3.1.3.1.5 General Storage.

Provide a storage closet for uniforms and other items not contaminated with pesticides.

3.1.3.1.6 General Purpose Room. For medium and large facilities in remote sites where meeting space is not available, provide an area for personnel training, conferences and break room.

3.1.4 Pesticide Handling Areas.

The pesticide handling area includes pesticide storage and mixing rooms. This is the area of greatest pesticide exposure and hazard to applicator personnel from toxic materials.

3.1.4.1 Storage

3.1.4.1.1 General. Pesticide storage areas are essential to safely protect and store pesticides and related chemicals in various sizes of glass, metal, plastic and fiber containers. Storage areas shall be secured to prevent unauthorized entry. This is an essential requirement. The minimum storage area requirement is approximately 600 square feet (55 square meters) with an additional 50 square feet (5 square meters) per worker. This requirement diminishes as the number of personnel increases. Storage space may also be combined with, or accommodated in the vehicle and equipment space.

3.1.4.1.2 Indoor Storage. Pesticides shall be stored in an area sealed or separated from clean areas, with direct access to the exterior. All pesticides stored indoors shall be off the floor so that all labels are visible, with 3-foot lanes to provide effective access and inspection, and stored no more than eight feet (2.44 m) high. Pesticides shall be stored in a dry room or building where temperatures are maintained above 50 degrees Fahrenheit (12 degrees Celsius) and below 100 degrees Fahrenheit (38 degrees Celsius). Pesticide storage shall be separated from mixing areas, shower and locker room, offices, or any area where personnel work for prolonged periods (essential). Pesticide concentrates shall not be stored in rooms containing a floor drain of any type; containment by curbing or sloped floors is required in the pesticide



mixing and storage areas. Provide open non-absorptive shelving for pesticides. Metal cabinets separate from the storage area are recommended for non-pesticide contaminated equipment storage, i.e., bait, traps, drills, fumigation equipment and other tools to keep them from becoming contaminated with pesticides or pesticide odors. Mechanisms for off-loading and tipping drums and mounting sprayers on vehicles in the vehicle and equipment or storage area is suggested for medium or large pest management facilities. A workbench made of non-absorptive material for equipment maintenance in the storage area and another workbench in the mixing room is recommended. Provide a remotely located exit from these areas.

Operational Note: In normal practice, insecticides shall be separated from herbicides and fertilizers, due to the potential for contamination of the insecticides with herbicides (not the reverse). Where separate air supplies are not feasible, the pesticides shall be arranged so that clean air flows continuously from the insecticides past the herbicides and out of the facility. This is an essential requirement. Good management practice also dictates that liquid materials be stored below dry materials to prevent contamination if leaks or spills occur; and that rodent bait materials be protected from odors that might destroy the taste. Ammonium nitrate fertilizers IAW NFPA 490, Code for Storage of Ammonium Nitrate, shall not be stored in the same structure as pesticides for fire safety purposes. NFPA 434, Code for Storage of Pesticides, Essential practices for storage areas include:

- A clear, 3-foot (914 mm) aisle or passageway.
- Pesticides shall not be stored within 10 feet (3.048 m) of an opening.
- Flammable or combustible liquids should be ordered in small containers, i.e., one to five gallons and stored in Underwriters Laboratories (UL) approved flammable liquid storage cabinets.
- Dispensing shall be by pump or by UL approved self-closing faucet devices. (Positive displacement pumps inserted in concentrate containers are preferred and closed transfer systems which use returnable containers are most desirable.)
- All storage rooms and cabinets shall be locked when not in use.
- Suitable fire control devices, such as proper types and sizes of portable fire extinguishers, shall be available and adequately maintained.
- Leakage and spillage shall be cleaned up immediately.
- Drip trays containing absorbent materials shall be placed under pesticide containers if spigots are used.
- Adequate precautions shall be taken against igniting flammable vapor through contact with hot surfaces, frictional heat, or mechanical sparks.

Operational Note: Excess pesticides and other chemicals are considered hazardous wastes if they possess certain physical characteristics or are listed under 40 CFR 261, the Resource Conservation and Recovery Act (RCRA). Storage of hazardous wastes brings a facility under additional and stringent requirements and the wastes must be properly contained and immediately shipped out to the appropriate holding or disposal facility.

3.1.4.1.3 Vehicle and Equipment Storage. Provide space for storage of one vehicle and one trailer-mounted equipment item in small facilities. In larger facilities additional space, as required, shall be provided for parking vehicles and storing trailer-mounted application equipment. Motor vehicles and any other gasoline engine (i.e. lawn mower) shall not be stored in the same area as pesticides. Whenever possible, motor vehicles shall be located outside or in a separate building from the pesticide storage or handling area; they shall be separated from the pesticide area by a minimum of two-hour fire rated construction.

3.1.4.1.4 Outdoor Storage. If space is provided for pesticide storage outdoors, the outdoor space shall be secured, under cover, and protected from radiant heating, freezing temperatures and moisture. All liquid fumigants shall be stored outside of occupied buildings in hazardous chemical lockers.

3.1.4.1.2 Pesticide Mixing Room. Provide a room with a work area to mix concentrated pesticides into ready-to-use formulations. Mixing rooms shall have electricity and hot and cold water. Open non-absorptive shelves should be situated near the pesticide storage racks, drum stands, exterior personnel door and in mixing areas. Metal or plastic pallets to hold pesticides off the floor are essential; plastic is preferred. Steel stands to keep drums off the floor are recommended. The work area shall contain a pesticide-resistant sink with a closeable drain, a contiguous self-draining drip-proof counter top at least 5 feet (1524 mm) long, sideboards, a splash panel on back, and an adjacent shelf for holding measuring devices and concentrates. The drain should discharge into a container (not be connected to plumbing) to collect rinsate or any spilled pesticide. An additional unhooded deep sink for washing small equipment, gloves, etc., is recommended for medium and large facilities. Galvanized metal fixtures are acceptable. Additional nonabsorbent shelving, 12 inches (305 mm) deep, is recommended to store mixing equipment items.

Operational Note: Do not use wood pallets as they absorb pesticides and may become an additional source of worker exposure.

3.1.4.3 Transitional Areas. Provide a dressing area for changing clothes, men's shower and lockers, toilet, laundry and cleaning gear room and additional women's shower and lockers, as needed. Operational Note: A work staff of separate sexes may be accommodated at the pesticide facility by scheduling the use of showers and lockers at different times. Doors for toilet facilities should be fitted with a lock to allow use by both males and females. Contaminated clothing shall be stored in the laundry area or the "pesticide" side of the locker facilities.

3.1.4.3.1 Shower and Locker Room. Accommodations may be required for male and female employees if installation requires more than one pest controller. The room serves as a transition area between clean and pesticide handling areas. It contains lockers for street clothing on one side, storage for work clothing (shoes, coveralls, caps, etc.) on the other side,

and a third area for personal protective equipment (respirators, etc.). The room shall be accessible to the showers and lockers, toilet and laundry and cleaning gear areas. Personnel locker space is essential. Provide a hot water shower for personnel to use at the end of the day for personal decontamination. Additional shower stalls may be needed for medium and large shops.

Operational Note: Items of protective clothing and protective equipment shall be stored separately from pesticides. Personnel shall have at least three sets of protective clothing per person, two pairs of gloves, and one respirator with additional respirator cartridges. An extra set of clean clothing in addition to the three sets of protective clothing, should be maintained in the pest management facility for each employee. It is essential that each individual have two lockers: one for street clothing and another for work clothing to preclude contamination of street clothing by work clothing or personal protective gear. The normal work flow is for workers to drop off contaminated or soiled work clothing in the laundry room as they pass from the pesticide area of the shop to the “clean” side of the locker area.

3.1.4.3.2 Alternate Plan for Women’s Shower and Locker Room. Convert the storage room into a women’s shower and locker room if at least one female is employed. See Facility Plate Sheets 1, 3, 4, 6 and 8.

3.1.4.3.3 Toilet. Provide at least one toilet for 1 to 15 employees (male and female). Toilet facilities may be used by male or female and should be locked from the inside. Provide a sign to remind employees to “WASH HANDS BEFORE USING TOILET.” Provide at least one lavatory with hot and cold water, water closet and urinal. These should be located in the transitional area. See also Table 1 and Facility Plate Sheets 1, 3, 4, 6 and 8. These toilet facilities are essential unless suitable toilet facilities are conveniently located, for example, in an adjacent building.

Operational Note: Individual paper towels shall be provided in proper receptacles. Provide a sanitary means maintained for the disposal of used towels. Common-use towels are prohibited. Hot air and hand driers are an option to consider and have the benefit of eliminating waste products.

3.1.4.3.4 Laundry and Clean Gear Room. Provide this room adjacent to or near the shower and locker rooms.

### 3.1.5 Construction Materials

3.1.5.1 Foundations, Floor Slabs, and Floor Finishes. Foundations shall be slab-on-grade with flat (flushed) door sills at interior and exterior doors. Do not install floor drains in the interior pesticide areas. Where pesticides are handled or stored, slope (3/100) floor from sills to the center of interior pesticides areas to collect spilled materials. If a sloped floor is not installed, provide a 4-inch (102-mm) concrete curb to contain spills and facilitate spill management in the pesticide areas only. For exterior slabs, slope to sump with closeable valve (see para.

3.4.8) located not more than 6 feet (1829 mm) from outer margin of washstand as illustrated in Facility Plate Sheets 1, 4, 6, and 11. Slope exterior ramps downward from exterior flat (flushed) door sills as illustrated in Facility Plate Sheet 9. The sloped floor or curb are essential to contain spills and facilitate cleanup operations. The intent of this design is to provide secondary containment for at least 110 percent of the capacity of the largest bulk liquid pesticide container anticipated for the facility.

Operational Note. Liquid pesticide storage quantities range from 25 to 500 gallons (94.63 to 1892.55 L), but the largest individual container is rarely larger than 55 gallons (208 L.) Because the rupture of more than one container is unlikely, allow for containment of 60 gallons (225.1 L) in small shop and 125 gallons (471.12 L) in all others. Most storage and mixing rooms with 4-inch (102-mm) curbs or sloped floors (3/100) will easily contain the required volume.

See Facility Plates Sheets 1 through 8 for suggested design layouts and details. The thickness of the slab shall be designed to accept live loads equal to the weight of a 55 gallon (208 L) drum [500 lb (227 kg)] in the interior storage area. For other areas existing standards suffice. The installation of utility, heating or ventilation ducting is prohibited in or below slabs. Concrete floors shall be finished with a nonabsorbent nonskid finish. The floors in both the storage and mixing areas shall be covered with nonskid epoxy sealant or otherwise made impermeable to absorption. Pesticide concentrates and finished (formulated) materials shall be prevented from entering the sanitary or storm sewer systems. The change room and office floors may be tiled.

3.1.5.2 Exterior Walls. Exterior walls shall be constructed of metal, concrete, or masonry materials. Porous surface finishes shall not be used in pesticide mixing or storage areas. The interior surface of exterior walls and partitions shall be constructed of either metal, or coated concrete or masonry materials.

#### 3.1.5.3 Doors and Windows.

3.1.5.3.1 Doors. Exterior doors shall be self-locking and self-closing with weather stripping. Provide doors with locks to prevent unauthorized entry to the facility. Provide flat (flush) sills on all doors between the mixing and storage areas.

3.1.5.3.2 Overhead Garage Door. Provide a 9 foot (2.74 m) high by 9 foot (2.74 m) wide door with weather stripping. Higher doors may be required to accommodate high mast equipment. Provide a flat (flushed) sill for the garage doorway if the garage is separate from the pesticide mixing and storage areas. If not, provide a ramp to a 4-inch (104-mm) high sill. Provide sufficient slope away from the exterior of the door to prevent rain water from entering facility.

3.1.5.3.3 Windows. Provide non-porous framed windows, double glaze, where appropriate, with a thermal barrier feature. Equip windows with interior security mesh if the facility is not enclosed (surrounded) by a climb-resistance chain link (security) fence and security gates. As an alternative, do not provide windows.

3.1.5.4 Interior Partitions and Ceilings. For clean areas, partitions shall be masonry or gypsum board on metal studs extending to the underside of a gypsum board ceiling and all joints shall

be sealed. Drop ceilings shall not be used in pesticide areas.

3.1.5.5 Roofing. Only include roofing systems as contractor's options that will be compatible with the pesticides that may be discharged from the exhaust hood onto the roof.

### 3.2. Structural.

Construct facilities in accordance service specific requirements and building Unified Facilities Criteria (UFC) 4-218-10N.

### 3.3. Interior Design.

Coat floors, interior partitions and interior surface of exterior walls, and ceilings with nonabsorbent finishes in the pesticide storage areas only. In the clean areas, collateral equipment should include a desk and chair, bookcase, file cabinet, telephone (essential), internet access, a small table with one chair per worker (recommended), and benches (essential). Install metal shelving to store pesticides (essential).

### 3.4. Siting

#### 3.4.1 General.

Isolate pest management facilities away from congested areas for reasons of health and safety, fire protection, environmental protection, and security. This requirement is based on the similarity of requirements for the isolation of storage facilities for pesticides, flammable or explosive materials (hazards), and sewage treatment plants (vapors and odors). Pest management facilities contain toxic pesticides and, in special circumstances such as emergencies, may be used to provide interim storage for pesticides classified as hazardous wastes in accordance with 40 CFR 165.10 and 40 CFR 261. The most compelling reason for isolation of pest management facilities is fire safety. See section 3.7.

#### 3.4.2 Siting.

Site pest management facilities a minimum of 200 feet (61 m) from surface water, existing wells and cisterns, or 100-year flood plain levels. Site pest management facilities downhill from any sensitive areas (e.g., wells, cisterns, etc.), or provide diking (essential) where space is limited. Do not site facility downhill because of flood potential. Consideration must also be given to prevailing wind conditions and the location of populated areas. Facilities shall not be located uphill from potable water sources or continuously occupied structures. Facilities should not be sited over aquifers (subsurface potable water supplies) unless the aquifer is adequately protected through containment measures. Location and design of pest management facilities should be selected to avoid potential adverse impacts to threatened, endangered, and at-risk species. Facilities shall be sited at least 100 feet (30.4 m) from other structures. Siting shall be approved by an industrial hygienist, a sanitary engineer, and by a fire protection engineer. Additionally, the installation environmental manager should approve the siting. Utility connection costs, access, security and subsurface conditions should be considered in siting. Funding limitations will not support excessive utility runs, long access road or extensive site preparation costs. Select a site that, based on previous experience or soil tests, allows slab-on-grade construction. Provide a soil analysis to establish baseline hazardous chemical background levels.

#### 3.4.3 Accessibility.

Provide access to pest management facilities for vehicles carrying supplies or pulling trailer-mounted dispersal equipment. The facility must be accessible to vehicles and pedestrians on at least two sides.

#### 3.4.4 Grading.

Possible runoff from fire-fighting must not reach ponds, lakes, streams or rivers. Diking is recommended for large pest management facilities only.

#### 3.4.5 Parking.

Provide adequate space to park all pesticide dispersal equipment inside the pest management area but out of the building and under cover. That part of the compound to be used for travel and vehicle parking shall be covered with gravel or paved. Employee parking, if provided, shall be outside of the security fence or perimeter.

#### 3.4.6 Security Fencing and Gates.

Security measures described in AFPMB Technical Guide No. 7 shall be followed, including fencing.

#### 3.4.7 Outdoor Pesticide Mixing Areas.

Provide outdoor areas for medium and large pest management facilities consistent with provisions for the safe filling and mixing of pesticide equipment on vehicles and trailer-mounted equipment. See also paragraph 3.4.8.

#### 3.4.8 Hardstand Area.

Provide a covered outdoor hardstand and parking apron for vehicles and equipment consisting of a concrete pad sufficiently large to park a truck and trailer (minimum 15 feet by 25 feet) (4.57 m by 7.62 m). Slope (3/100) hardstand pad to a sump fitted with a removable grate cover suitable for anticipated vehicular traffic load. Size sump for a minimum of 110 percent of the capacity of the largest bulk liquid pesticide container anticipated to be used at the facility. Provide a curb (minimum 4 inches) (102 mm) at the low edge of the pad to direct liquid (spills and rain) into the sump. Provide a 3-inch (75-mm) sump drain to the industrial sewer if available; otherwise, provide a small section of removable grate to accommodate a hose for pumping out (recovering) sump contents. Check with installation Environmental prior to connecting the sump to an industrial sewer. If connection to industrial sewer is approved, provide a normally closed, manually opened, ball valve in the sump drain to control discharge. Locate valve in a pit with grate cover adjacent to the sump (see paragraph 3.5.2.4).

Facility Plate Sheet 11 illustrates a hardstand layout. Provide an elevated hose bib (fill pipe) (1-1/2 to 2 inches (38 to 51 mm) in diameter) if application equipment with 50 gallon (189.8 L) or larger tanks will be used at the facility. Provide an emergency eye wash and deluge shower (30 gallon per minute (2 L/s) shower head) (Federal Specification WW-P-541/7C, Plumbing Fixtures (Shower Bath and Emergency Eye and Face Wash Outfits)) with manually-operated, delayed-closing valves located adjacent to the mixing site unless devices inside the facility are accessible within 10 seconds from the outdoor mixing site. Safety showers should be capable of operating for at least 30 minutes. A canopy roof over the hardstand area may be provided to protect parked vehicles and equipment and to minimize accumulation of water.

Operational Note: Hardstands are recommended for use during cleaning and for filling truck/trailer mounted dispersal equipment. Spills, although uncommon, can be contained and

the material recovered if the apron is curbed or the pavement is sloped (3/100). Hardstand sump shall be fitted with a valve and deadman mechanism so that the valve is closed to flow at all times unless manually opened. Hardstand drains shall only be connected to the industrial waste treatment system if approved by the installation Environmental office. For filling equipment tanks with water, garden hoses are too small. Spigots, hose bibs, fill pipes and other pressurized water sources shall be fitted with backflow prevention devices. Deluge shower and eyewash fountain must be accessible within 10 seconds from the mixing and filling sites.

### 3.5 Mechanical

#### 3.5.1 General.

Provide plumbing, heating, and ventilation systems for the facility for effective workplace habitability. Provide air conditioning (cooling), if required, for the office, and to maintain the temperature of the pesticide storage area below 100 degrees Fahrenheit (47.1 degrees Celsius). A separate HVAC system shall be provided for the clean areas to establish a positive pressure, and prevent odor and chemical infiltration.

#### 3.5.2 Plumbing.

Plumbing shall meet all Uniform Plumbing Code (UPC) requirements and 3-230, 3-240, 3-420 and 3-430 series UFCs.

3.5.2.1 Disposal of Pesticides. No concentrated pesticides shall be discarded to the sanitary sewer or storm drain. The disposal of pesticide wastes shall be regulated by local water quality regulations. Where stringent regulations apply, the term “dilute” pesticide may include wash water generated from (a) the laundry of contaminated work clothing, (b) washing of protective equipment, (c) washing of the exterior of dispersal equipment, (d) emergency deluge showers and (e) eye washes.

Operational Note: AFPMB Technical Guide #21 addresses pesticide disposal. For specific questions, consult with installation Environmental staff and your Command Pest Management Consultant.

3.5.2.2 Spills and Contaminated Water. Design storage and mixing areas only with no drains to contain spills and water. See paragraph 3.1.5.1. Pesticides spills and cleanup procedures are addressed in [AFPMB Technical Guide #15](#).

Operational Note. A spill kit, equal to that described in AFPMB Technical Guide 15, shall be available to use for pesticide spills. Spill kits shall be available in the pest management facility and on each service vehicle(s).

3.5.2.3 Holding Tanks. Do not design drainage to holding tanks. Holding tanks are prohibited in new construction.

Operational Note: Use of a holding tank for storage of any pesticide could bring the installation under additional regulation and could result in considerable unnecessary expense. Procedures are available that preclude the need for holding tanks. These include but are not limited to: (1) the practice of washing outdoor dispersal equipment at the application site and

applying the wash water to the area treated, (2) using water from rinsing concentrate containers to make up finished sprays, (3) saving wash water throughout the work day to be used in the next day's operations, and (4) substituting more hazardous or toxic pesticides with safer, less persistent, biodegradable materials. Prudent use of pesticides can materially reduce disposal requirements. Never pour rinse liquids contaminated with pesticides on the ground or into a sink or drain leading to a storm sewer system. Local water quality regulations must be observed. Consult with installation Environmental staff for local water regulations.

**3.5.2.4 Hardstand Sump Drain.** Hardstand drains shall only be connected to the industrial waste treatment system if approved by installation Environmental. If approved, provide a 3-inch (76-mm) 1/4 turn ball valve fitted with a waterproof spring close/fail close (deadman) mechanism so that the valve is closed to flow unless manually held open allowing drainage to the industrial waste system to remove accumulated water. The valve shall be protected with a steel grating with an opening to accommodate a removable extension handle. The spring close mechanism shall be operated with a handle that extends 30 inches (762 mm) above the grate. Facility Plate Sheet 11 illustrates a hardstand with sump, drain, and valve. A sign shall be provided near the sump drain valve stating "RECOVER PESTICIDE SPILLS. USE VALVE TO DRAIN WASH WATER AND RAIN."

**Operational Note:** Consult with the installation Environmental office to determine how accumulated precipitation can be discharged. Drains are maintained in a closed position and opened only to drain off accumulated precipitation to prevent accidental environmental contamination by spilled pesticides. Conduct maintenance inspection of drain system monthly. Ground water contamination and other adverse environmental effects can be avoided by using wash water as the diluent for soil treatment for subterranean termites (if permitted by the pesticide label) or dispersing the wash water over the same outdoor area where the initial pesticide was applied according to the label. Wash water containing herbicide residues should be used only on the site listed on the pesticide label.

**3.5.2.5 Wash Water.** Provide spill containment for indoor pesticide mixing and storage facility only. Provide liquid spill collection system for outdoor mixing facility (hardstand) connected to the industrial waste system only. Do not connect drains from pesticide mixing areas, indoor or outdoor, to septic systems, sanitary sewer, or storm water system.

**3.5.2.6 Sanitary Sewer System and Drains.** Consult local water quality control regulations before connecting toilet, showers, and laundry plumbing fixtures to a sanitary sewer system. Ensure that only rain or snow-melt water from the roof is routed to storm drains. Pesticide wastes are generated routinely from equipment washdown, laundry of work clothing, and personal showering. Disposal of these wastes through the industrial waste system may be required as determined by the installation. Other wastes may occur from actual pesticide spills. Pesticide spills are addressed in paragraph 3.5.2.2, Spills and Contaminated Water.

**Operational Note:** Water resulting from washing and the exterior of dispersal equipment and vehicles may not be drained into the sanitary sewer. Consult with installation Environmental staff to determine local water quality control regulations.

**3.5.2.7 Sink.** Provide a deep sink to fill and wash small equipment items 24 inches (61 cm) high and standard 5 gallon (19 L) cans. Install the hot and cold water faucets so that an air gap



of at least two diameters (minimum of 2-inch (51 mm)) of discharge opening exists between the outlet of the faucets and the top rim of the sink. The drain should discharge into a container (not connected to plumbing) to collect rinsate or any spilled pesticide. Swing-type spigots are recommended. Provide a slotted hood or ventilator to each sink in the mixing area designed to enclose the mixing operation as much as possible and to exhaust the vapors and dusts away from personnel as illustrated in Facility Plate Sheet 10. Provide at least 2 linear feet (610 mm) of counter top next to the sink [2 linear feet (610 mm) of counter top on each side for double compartment sinks].

Operational Note: Where water quality regulations are especially stringent and discharge to the sanitary or industrial waste system is not an option, the sink should be drained to five gallon (19 L) containers resting in a pit in the floor. In such a case, drainage from the sink is severely limited and appropriate disposal procedures for the container contents is required.

3.5.2.8 Water Heater. Provide a water heater if a source of hot water is not available.

3.5.2.9 Washer and Dryer. Provide all plumbing connections and floor drain for washer and vent for a dryer.

Operational Note: It is essential that work clothing be laundered separately from uncontaminated clothing. Work clothing should not be laundered at home. If the installation laundry facility is used, work clothing slightly contaminated with pesticides can be bagged, tagged as pesticide clothing and washed at the installation laundry separately from other items. Oily flight line garments and soiled hospital clothing are similarly laundered. The results are clean, pressed, professional looking uniforms and coveralls.

3.5.2.10 Back-Flow Prevention. Install reduced pressure backflow prevention device in accordance with American Water Works Association (AWWA) Standard C506-78, Backflow Prevention Devices. Plumbing which provides a source of water for filling pesticide dispersal equipment tanks, both inside and outside, must be provided with a back-flow prevention device so that a water hose attached to a faucet can be used to fill the spray tank. For installations that purchase water from municipal sources, install the device in conformance with local codes. Some communities may prohibit such devices.

3.5.2.11 Hose Bib. Provide permanent hose bib (overhead filling pipe) (frost-free) fitted with a 1-1/2 to 2 inch (3.8 to 5.1 cm) discharge hose and an approved backflow preventer for the outdoor washdown area for medium and large facilities. Discharge hose should come to within 4 feet (1232 mm) of the ground.

3.5.2.12 Emergency Eye Wash, Deluge Shower and Drain. Provide an emergency eye wash and deluge shower (30 gallon per minute (2 L/s) shower head) (Federal Specification WW-P-541/7C, Plumbing Fixtures (Shower Bath and Emergency Eye and Face Wash Outfits) with manually-operated, delayed-closing valves located adjacent to the mixing counter. Site eye and deluge shower(s) to be accessible within 10 seconds from indoor and outdoor mixing areas. An eye wash and deluge shower is essential for emergency washing of individuals accidentally contaminated with pesticides, IAW 29 CFR 1910.151. If the eye wash and deluge shower are located in the outdoor mixing area, they must be protected from freezing.

3.5.2.13 Rough-In Plumbing. Provide rough-in plumbing (shower drain, shower fixtures for hot and cold water) for the small storage area. Also, provide rough-in plumbing (shower drain, shower fixtures for hot and cold water) for showers and lockers. If a washer and dryer are not included as a bid item, seal off all stubbed-in plumbing.

3.5.2.14 Floor Drains. Do not provide floor drains in interior pesticide areas to preclude the potential for environmental contamination from accidentally spilled concentrated or diluted pesticides. Provide floor drains in shower rooms.

### 3.5.3 Heating and Cooling.

All current federal requirements (3-410 UFC series) for HVAC should be met. A separate HVAC system shall be provided for the clean areas to establish a positive pressure and prevent odor and chemical infiltration.

3.5.3.1 Clean Areas. Indoor winter and summer design temperatures shall be 68 degrees and 78 degrees Fahrenheit (20 degrees and 26 degrees Celsius), respectively. Recirculation of air is not permitted if a central air system is provided.

3.5.3.2 Pesticide Mixing and Storage Areas. Winter design temperature for the mixing area shall be 55 degrees Fahrenheit (13 degrees Celsius); for the storage area, 50 degrees Fahrenheit (10 degrees Celsius). Maximum temperature for the storage area is 100 degrees Fahrenheit (38 degrees Celsius).

### 3.5.4 Ventilation.

Refer to UFC 3-410-04N, Industrial Ventilation.

3.5.4.1 Clean Areas. Outdoor air provided for ventilation shall be exhausted through the toilets and pesticide mixing and storage areas to control migration of odor, dust, and vapor. Vent the clothes dryer to the outdoors.

3.5.4.2 Mixing and Storage Areas. Provide a separate ventilation system for the mixing and storage areas. System shall be provided with roof mounted centrifugal fan selected for six air changes per hour (minimum). Fans shall discharge vertically. Replacement air shall be heated to 55 degrees Fahrenheit (13 degrees Celsius). Design the system to maintain a negative pressure in the mixing and storage areas relative to the clean areas by supplying approximately 95 percent of the air exhausted, with the remainder being from infiltration of ventilation air supplied to the clean areas. Locate the exhaust stack and supply air intakes far enough apart to prevent recirculation of contaminated air; do not rely on prevailing winds to prevent recirculation. Position supply and exhaust register to provide good mixing to ensure proper dilution [refer to Industrial Ventilation, a Manual of Recommended Practice by the American Conference of Governmental Industrial Hygienists (ACGIH), Chapter 2, for general principles of dilution ventilation]. Provide a motorized damper at the air intake louver and at the exhaust fan discharge. Damper shall close when the ventilation system is turned off. Provide a ventilation system control switch with light to indicate "ON" at the entrance to the pesticide handling areas, and a sign at the switch which reads, "VENTILATION SYSTEM SHOULD OPERATE CONTINUOUSLY. DO NOT ENTER UNLESS VENTILATION SYSTEM HAS OPERATED FOR AT LEAST TEN MINUTES."

Operational note: The ventilation system should operate continuously to minimize exposure to air borne pesticide dust and vapors and to avoid inadvertent contamination of the clean areas. If the ventilation system is shut down for an extended period, i.e., over a weekend or from an outage, it should be turned on at least 10 minutes for one air change prior to entry into the mixing and storage areas. Extended shut down of the system is not recommended except for maintenance and repair. Entry into a pesticide storage area after extended shut down of the ventilation system would result in exposure to maximum vapor concentration.

**3.5.4.3 Mixing Sink Exhaust System.** Provide a slotted hood, local exhaust system for the mixing sink as shown on Facility Plate 10. The exhaust hood shall provide an air velocity of 150 linear feet per minute (fpm) (0.76 m/s) at face of the hood (29 CFR 1910. 106). Baffles or plenums should be used to maintain a uniform face velocity. If multiple stacked slots are used, the upper slots will have a higher air volume (cfm) unless provisions are made to ensure that the lower slots provide 150 fpm (0.76 m/s) capture velocity at the outer edge of the counter or sink top. Sink and exhaust hood shall be stainless steel. Specify either stainless steel or fiberglass reinforced plastic (FRP) ductwork and a centrifugal FRP exhaust fan with backward inclined blades. The fan shall be roof mounted and have a vertical “no loss” discharge stack (see ACGIH Industrial Ventilation Manual). Top of stack shall be 30 percent higher than the roof elevation. The replacement air system shall provide approximately 95 percent of the air exhausted through the hood to maintain a negative pressure in the mixing room relative the clean areas. Replacement air shall be heated to 55 degrees Fahrenheit (13 degrees Celsius). Exhaust fan and replacement air fan shall be activated by the same switch. It is critical that replacement air is introduced into the room at low velocity to minimize turbulence around the exhaust hood (refer to UFC 3-410-04N, Industrial Ventilation, for design of the replacement air system). Provide a motorized damper at the air intake louver and at the exhaust fan discharge. Damper shall close when the ventilation system is turned off.

Operational Note: For upgrading existing facilities, exposure hazards from toxic vapors shall be engineered out with the installation of an exhaust fan or duct directly opposite the mixing surface from the worker. Stainless steel hoods are recommended because they last longer in a corrosive environment. Personal protective equipment (respirator, face mask or shield, gloves, apron and work clothing) may be used to provide interim protection during mixing operations, but proper engineering controls to correct such deficiencies in plumbing or ventilation systems described above should be addressed immediately or placed on an abatement program for correction.

### **3.6 Electrical.**

Electrical systems will be designed in accordance with the National Electrical Code (NEC) and the UFC 3-500 series.

#### **3.6.1 Explosion Proofing.**

Pesticide concentrates ordinarily used in structural pest control work have flash points above 140 degrees Fahrenheit (60 degrees Celsius), Reference 40 CFR 1900.106. They may be combustible (flash point above 100 degrees Fahrenheit or 38 degrees Celsius), but are not flammable (flash point below 100 degrees Fahrenheit or 38 degrees Celsius). A hazardous area classification is not applicable if flammable pesticides (flash point below 100 degrees Fahrenheit or 38 degrees Celsius) are not stored or used.

Operational Note: Service pest management consultants should recommend pesticides with flash points above 140 degree Fahrenheit (60 degrees Celsius) to avoid the need for explosion proof features. The excessive cost of explosion proof motors and switches can be avoided by storing or using pesticides with flash points greater than 100 degrees Fahrenheit (38 degrees Celsius). If flammable pesticides are required for use in the installation pest management program, as determined by the service pest management consultant, the pesticides must be stored in a separate flammable liquid storage cabinet outside the facility. Additional details on these lockers is give in paragraph 3.7.1.

### 3.6.2 Lighting.

3.6.2.1 Indoor. Switching for the exhaust hood shall be located adjacent to the counter. Lighting shall be 50 foot-candles (538 lux) in the office and mixing rooms and pesticide storage areas, and 20 foot-candles (215 lux) in the washroom.

3.6.2.2 Outdoor. Provide outdoor lighting when dawn or dusk operations such as mosquito adulticiding (usually via ULV) are performed.

3.6.2.3 Security. Outside security lighting should be considered. This may be a bid item.

### 3.6.3 Corrosion Resistance.

Use of corrosion resistant fixtures (raceways, receptacles, sinks, drain boards, vapor collection hood, etc.) is recommended to prevent the corrosive effects of pesticide formulations.

Operational Note: Dibrom (Naled) is extremely corrosive to metal surfaces.

### 3.6.4 Appliances.

Provide a clothes washer and dryer. This may be a bid item.

Operational Note: Other appliances commonly found in offices such as electric heaters, microwave ovens, and coffee makers, are the responsibility of the Government, regardless of ownership, and shall comply with OSHA standards.

## 3.7 Fire Protection.

Provide fire protection in accordance with UFC 3-600-01, Fire Protection Engineering, for Facilities Chapter 6, Special Occupancies and Hazards. [AFPMB Technical Guide #16](#) provides more details on this topic.

Operational Note: Accepted practice is to develop a pre-fire plan for fire department operations. Accordingly, an inventory of the contents of the facility shall be provided at least annually to the fire department serving the installations.

### 3.7.1 Fire Extinguisher.

Provide a fire extinguisher by the door between the storage and mixing areas in accordance with 29 CFR 1910.106 and NFPA 10.

Operational Note: It is more practical and economical to eliminate the few flammable

pesticides in use (substitutes are available) than to provide expensive fixed fire-fighting systems and explosion-proof equipment and fixtures. This can be accomplished through the pest management plan review process that is monitored by a service pest management consultant in accordance with the appropriate service directive; OPNAVINST 6250.4 (series) (Navy) AF 32-1053 (Air Force), AR 420-76 (Army). After construction of a pest management facility, subsequent operating procedures, detailed in the installation pest management plan, must identify pesticides suitable for the level of fire protection provided in the facility. Storage of combustible and flammable liquids (of which many may be pesticides) is regulated by NFPA 30. Depending on the amount of liquids stored and their flash points, special handling and storage may be necessary. Not more than 120 gallons (554 L) of Class I, Class II and Class IIIA liquids may be stored in a flammable liquid storage cabinet. Of this total, not more than 60 gallons (277 L) may be of Class I and Class II liquids and not more than 3 such cabinets may be located in a single fire area. Only UL approved metal cabinets may be used. If no more than 60 gallons (277 L) of flammable or 120 gallons (554 L) of combustible liquids are stored, a storage cabinet of metal, as described in the regulation, will be adequate. If larger quantities are to be stored, a separate room, outside metal shed, or warehouse meeting the required fire resistant rating of the material shall be provided. In these situations, it would be advisable to seek additional guidance on fire protection (reference 29 CFR 1910.106). The storage cabinets may be bid items.

### 3.8 Signs.

Provide identification signs such as “DANGER,” “POISON,” and “PESTICIDE STORAGE AREA” outside appropriate rooms and on buildings and fences to advise personnel of the contents and warn of their hazardous nature. Install a sign to read “NO SMOKING” in the pesticide areas. Install a sign over the sink that reads “DO NOT DISCHARGE PESTICIDES INTO THE SINK.” Provide a sign at the entrance(s) to the toilet to read “WASH HANDS BEFORE USING TOILET.” Provide warning signs on the exterior of the building at each entrance except the utility room. Provide a sign to read “CLOSE DRAIN WHILE HANDLING PESTICIDES ON HARDSTAND.” Provide a sign to read “FLAMMABLE PESTICIDES” if flammable liquid storage cabinet is included in design. A sign shall be provided near the pit valve stating “RECOVER PESTICIDE SPILLS. USE VALVE TO DRAIN WASH WATER AND RAIN.”(NOTE: Consult with the Environmental office before draining wash water.) Signs should be posted in the both English and any predominant local language(s) where appropriate. Provide building identification information on the outside of the structure visible from 100 feet (30.48 m). Provide a 3 foot (914 mm) by 4 foot (1219 mm) notice board in the office or hallway near the office for emergency instructions and notices.

Operational Note. A list of the types of materials stored shall be posted on the outside of the storage area and a copy should be give to the installation on-scene hazardous waste coordinator and the fire department serving the installation. The list shall include “chemical names and formulations” rather than generic “brand” names. Moveable equipment used for handling pesticides should be dedicated to the pest management facility and not used elsewhere or for other purpose, forklifts excluded. A sign shall be posted at the actual mixing area requiring the use of protective gloves, aprons and boots, protective eye wear or face shields, coveralls, and an approved pesticide respirator. Increased ventilation only reduces the need for a respirator. All pesticide containers shall be labeled.

### 3.9 Architectural.

For guidance in the selection of small, medium or large facility sizes see paragraph 2.3.1. Provide exterior design that is compatible with other existing structures and siting to suit project requirements and architectural guidelines for each installation.

## **Section 4: Pre-Fabricated Pesticide Storage Facilities**

### **4.1 Background.**

As an alternative to constructing a pest management facility, a pre-fabricated hazardous material storage building may be considered for purchase. These buildings are available in many sizes with options for air conditioning, specialized shelving, mixing facilities, etc. These buildings do not have office facilities, restrooms or showers, so if those items are required, they should be provided in a separate facility.

### **4.2 Requirements.**

#### **4.2.1 Size.**

The storage building should be large enough to store what is reasonably expected during normal operations.

#### **4.2.2 Ventilation.**

All pre-fabricated storage buildings shall be equipped with adequate ventilation. The ventilation system shall be capable of providing at least 6 air changes per hour with an exhaust discharged vertically or in a location to prevent recirculation of the exhaust. The on/off switch for the ventilation system should be located outside the storage area (on the exterior of the building). A sign by the switch should read, "DO NOT ENTER UNLESS VENTILATION SYSTEM HAS OPERATED FOR AT LEAST TEN MINUTES".

#### **4.2.3. Plumbing.**

All faucets used to fill pesticide equipment or mix pesticides shall be equipped with backflow prevention. To determine where wastewater should discharge, consult with the installation Environmental office.

#### **4.2.4 Fire Protection.**

Fire protection guidelines in sections 3.7 of this document should be followed.

#### **4.2.5 PPE.**

A separate locker shall be provided for storing PPE.

#### **4.2.6 Fertilizers.**

Fertilizers shall be stored separately from pesticides.

#### **4.2.7 Gasoline/Fuel.**

Gasoline and other fuels shall be stored separately from pesticides.

#### **4.2.8 Pesticide Mixing.**

Facilities for mixing pesticides and loading equipment shall be provided. Follow guidelines in sections 3.1.4.1.2 and 3.4.8 of this document.

### **4.3 Siting.**

#### **4.3.1 Location.**

Pre-fabricated storage buildings should be sited in accordance with the guidelines provided in

section 3.4 of this document. The building shall be placed on a stable and level concrete slab with access to utilities (electricity and water).

#### 4.3.2. Climate Control.

All pre-fabricated pesticide storage buildings shall be equipped with climate control to maintain an inside temperature between 50F and 100F, or as specified by the individual pesticide labels).

#### 4.4 Security.

##### 4.4.1 Fencing.

Provide fencing in accordance with the guidelines provided in section 3.4.6 of this document.

##### 4.4.2 Locks.

The storage building shall be capable of being locked to ensure no unauthorized access.

##### 4.4.3 Signs.

Post signs in accordance with section 3.8 of this document.

#### 4.5 Spill Prevention.

##### 4.5.1 Spill Kit.

Provide a spill kit in accordance with the guidelines outlined in AFPMB Technical Guide 15.



## **Section 5: Limited Quantity Pesticide Storage**

### **5.1 Background.**

On some small installations (e.g., National Guard sites, reserve centers, GOCOs, etc.) contracted services are unavailable or prohibitively expensive for minor pest management problems. In these instances, small storage facilities for pesticides, such as a hazardous materials storage locker, may be necessary. Generally, these storage facilities are not “Pest Management Facilities” as described in sections 1-4 of this document. These storage facilities are small, generally holding less than 15 gallons of ready-to-use pesticide pesticides. This type of storage facility must be approved by the Pest Management Consultant on a case by case basis.

### **5.2 Requirements**

#### **5.2.1 Hazardous Materials Locker.**

A locker shall be provided to store the maximum quantity of pesticide required to accomplish operations in a 3-6 month time period. The locker shall have built-in spill containment and be made of a non-absorbent material.

#### **5.2.2 PPE.**

A separate locker shall be provided for storing PPE.

#### **5.2.3 Fertilizers.**

Fertilizers shall be stored separately from pesticides.

#### **5.2.4 Gasoline/Fuel.**

Gasoline and other fuels shall be stored separately from pesticides.

#### **5.2.4 Mixing Pad.**

A mixing and loading pad is NOT required and is not necessary because all pesticides stored in this type of simplified storage locker shall be ready-to-use (no mixing/filling required). If there is a need to store pesticides which require mixing, the requirements outlined in sections 1-4 of this document apply.

### **5.3 Siting.**

#### **5.3.1 Location.**

Place the locker in a secure place that will not be flooded and in an area where a spill maybe will not leak into wells, drains, ground water or surface water. The locker should be on secure ground, preferably concrete. Ideally the locker shall be placed in a well-ventilated, detached building, such as a utility area. The locker shall not be placed inside of an office space.

#### **5.3.2 Climate Control.**

Select a storage site where the locker will not be exposed to weather. Moisture can cause rusty pesticide containers, disintegration of paper or cardboard packaging, and disintegration of critical pesticide labels. Additionally, strong storms could cause the locker to fall over and, possibly result in a pesticide spill. The locker should be placed in a temperature controlled area (between 50F and 100F – or in temperature ranges as specified by the individual pesticide

labels). At a minimum, the locker shall not be exposed to extreme cold or hot temperature and direct sun.

#### 5.4 Security.

##### 5.4.1 Locks.

The locker shall be capable of being locked to ensure no unauthorized access.

##### 5.4.2 Signs.

Post a sign on the locker that reads “DANGER PESTICIDES – UNAUTHORIZED PERSONNEL KEEP OUT”.

#### 5.5 Spill Prevention

##### 5.5.1 Spill Kit.

A spill kit, as described in AFPMB Technical Guide 15, shall be kept directly next to the storage locker.

## Section 6: Facility Plates for Pest Management Facilities

Figure 1

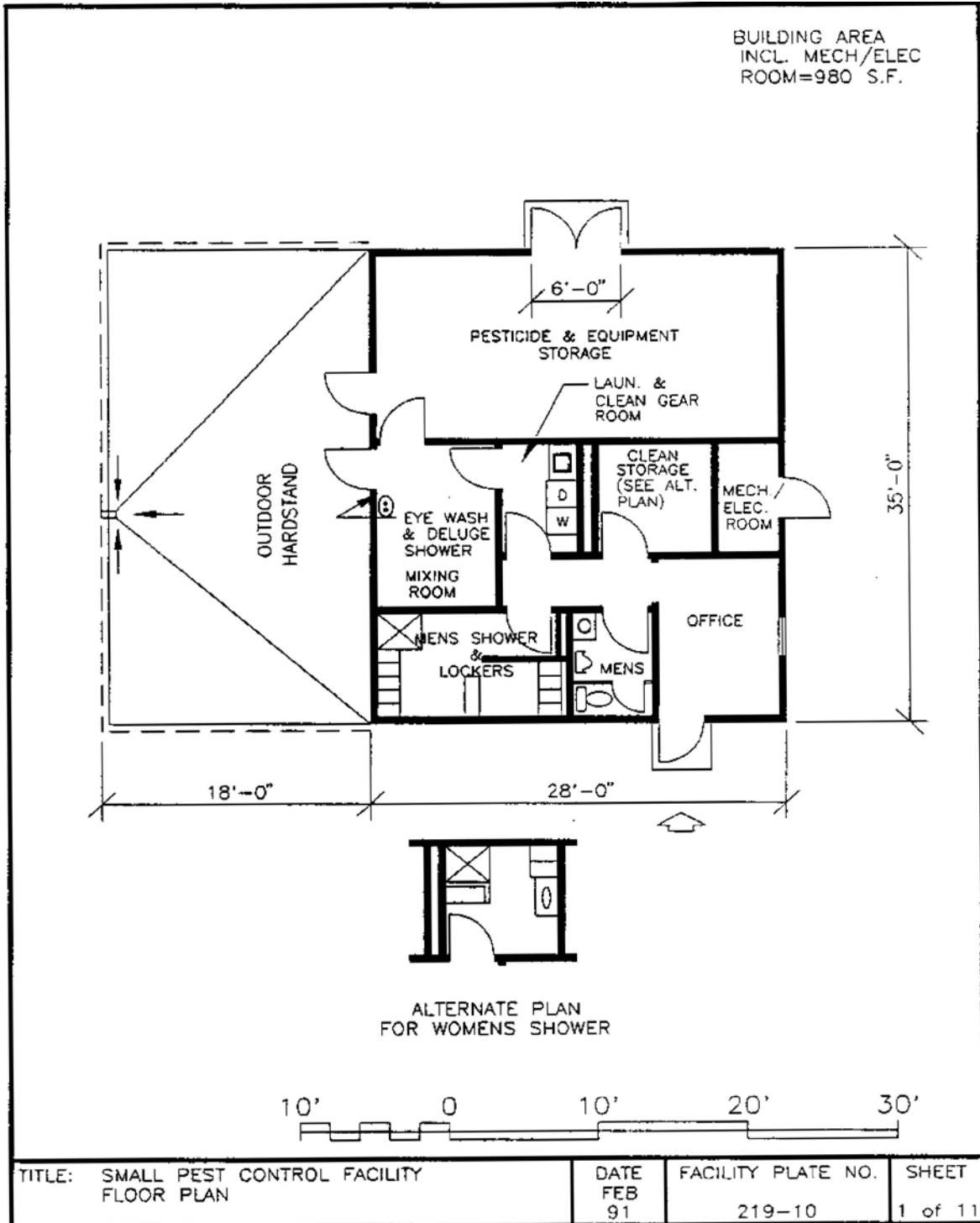


Figure 2

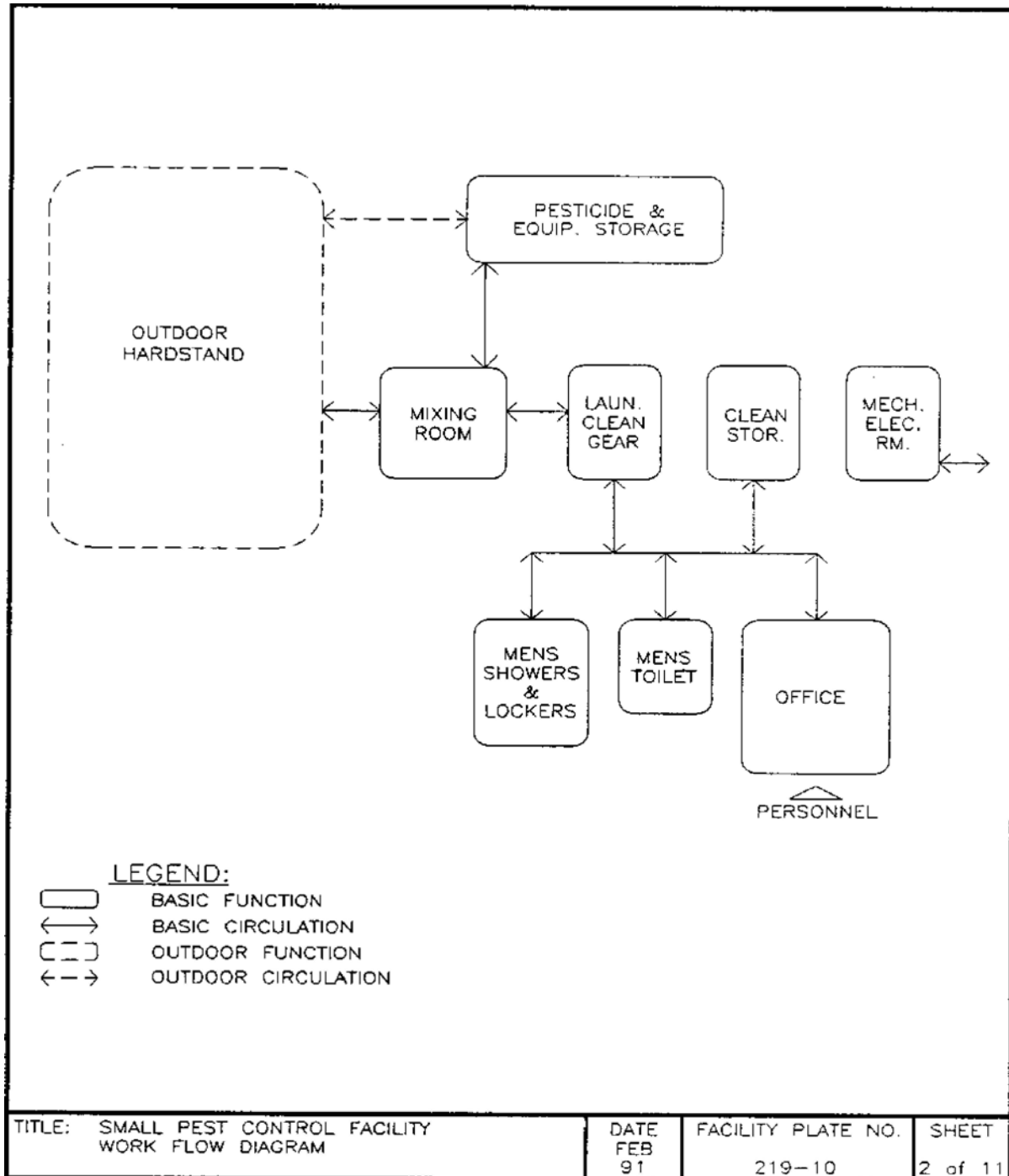


Figure 3

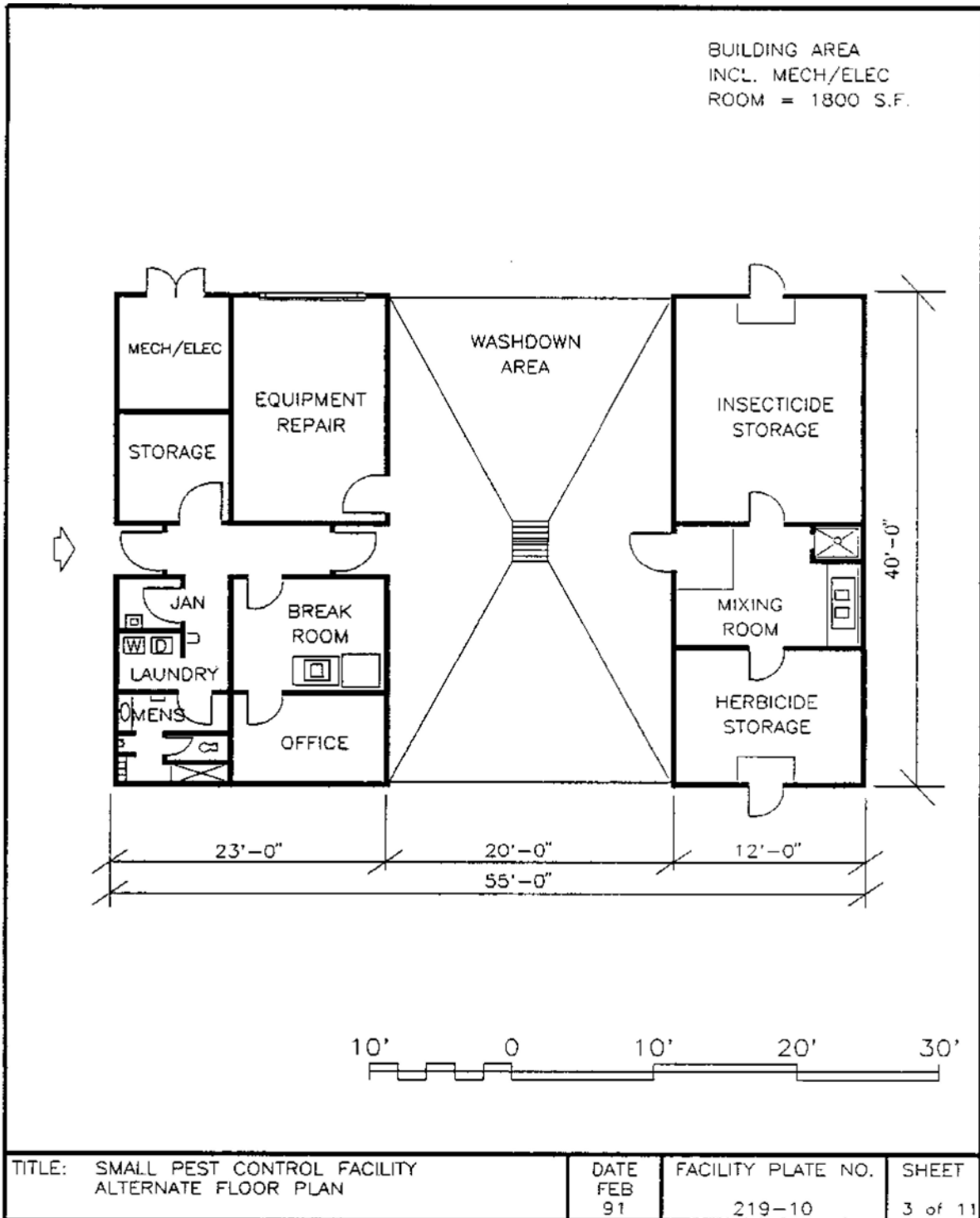


Figure 4

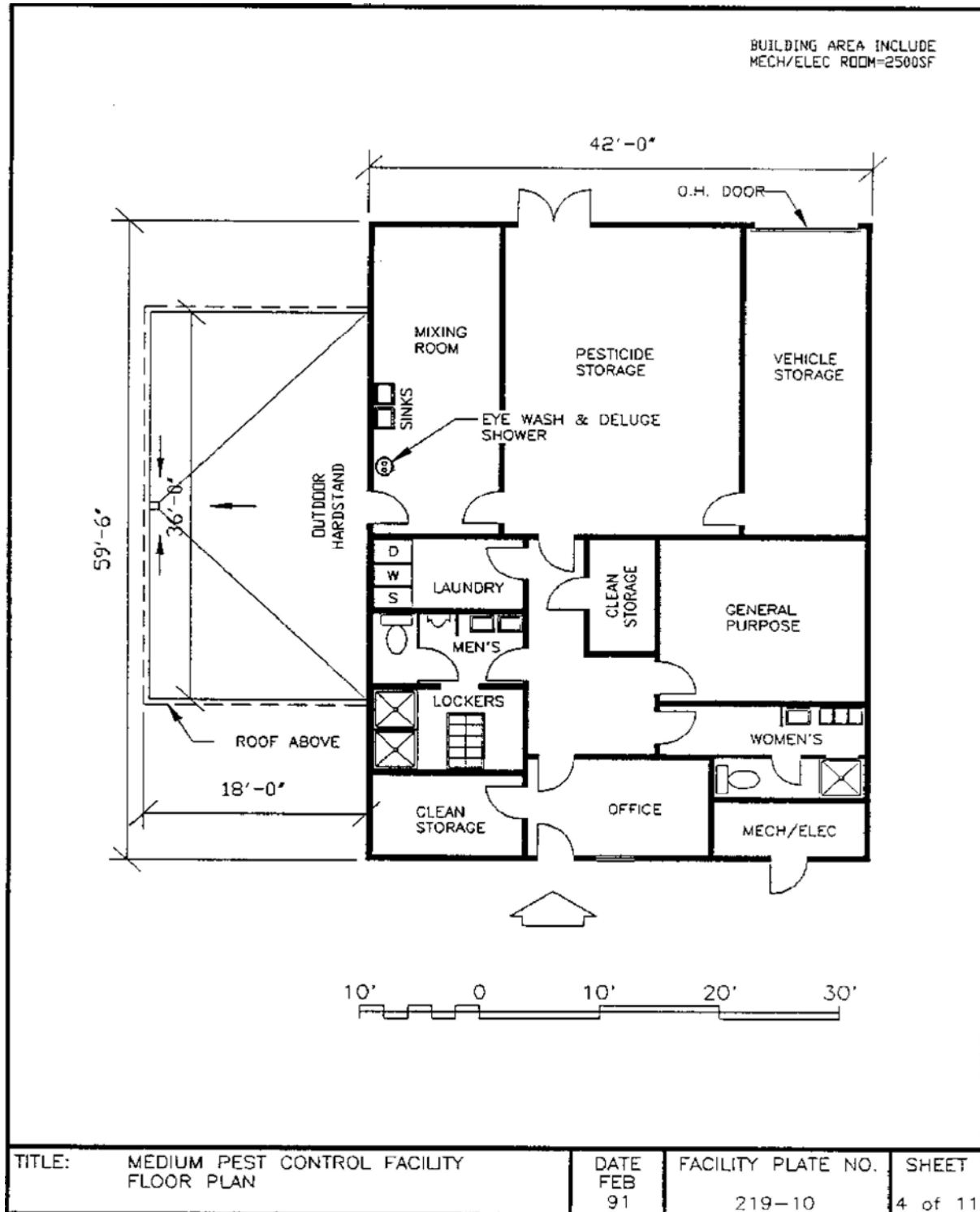


Figure 5

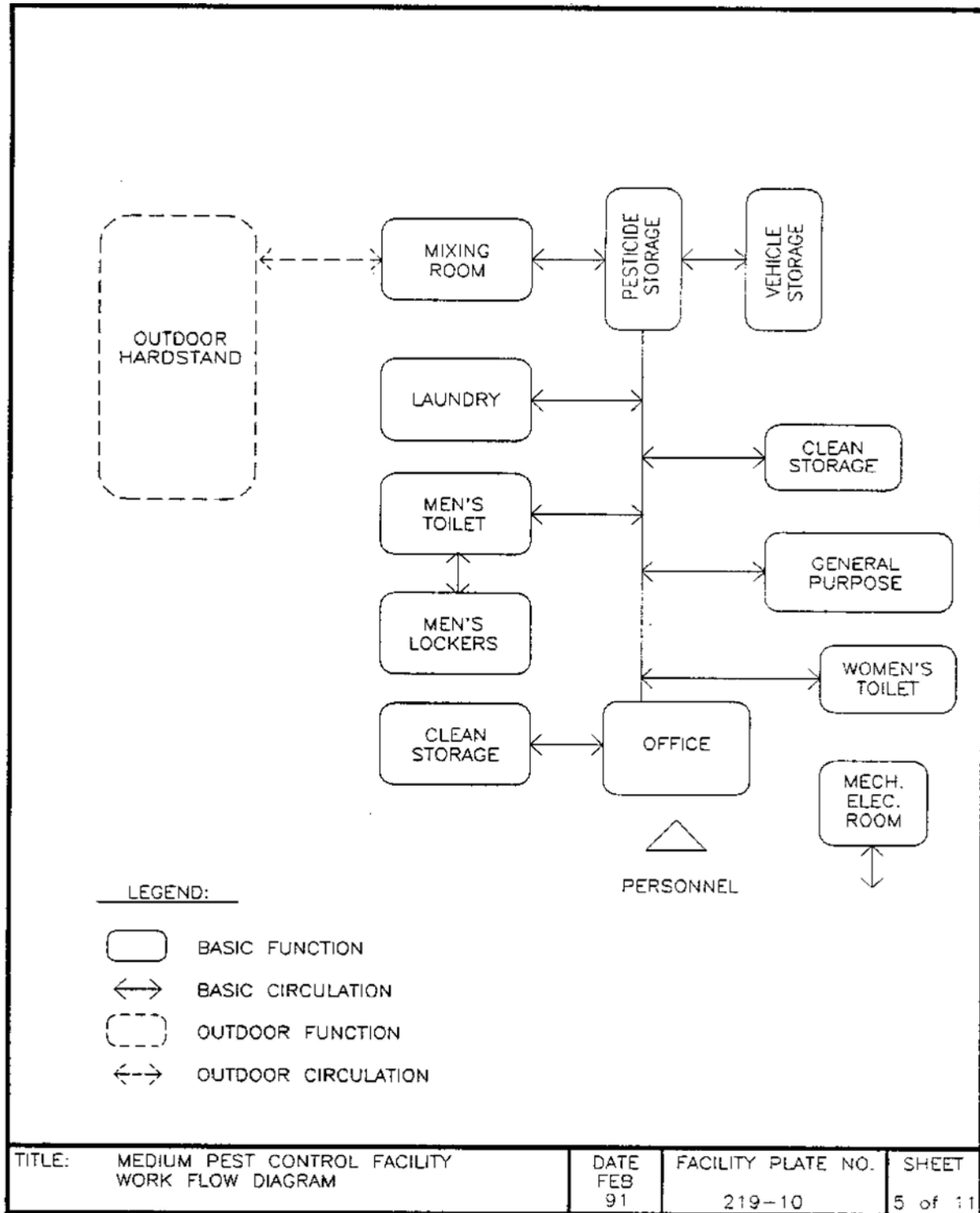


Figure 6

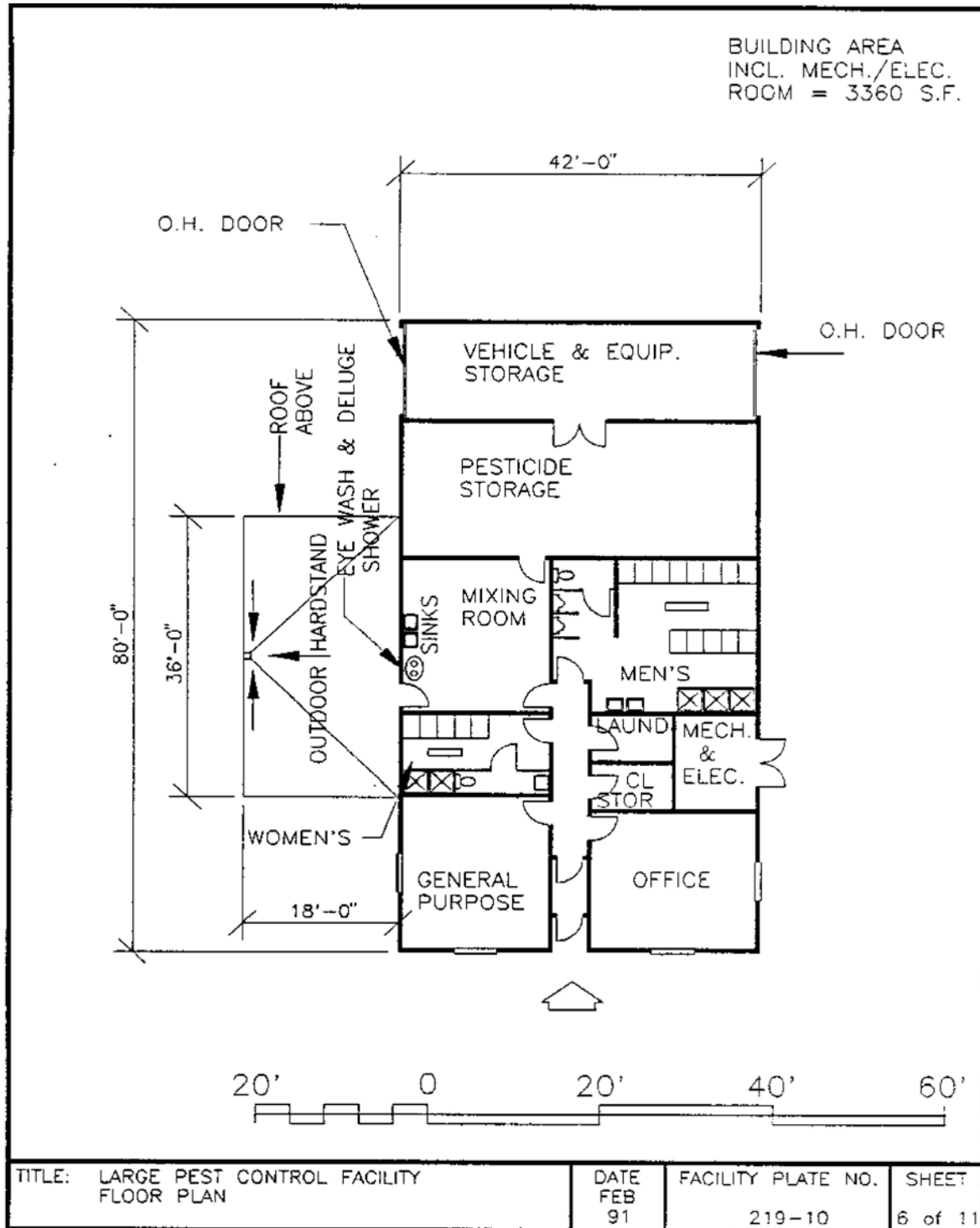




Figure 7

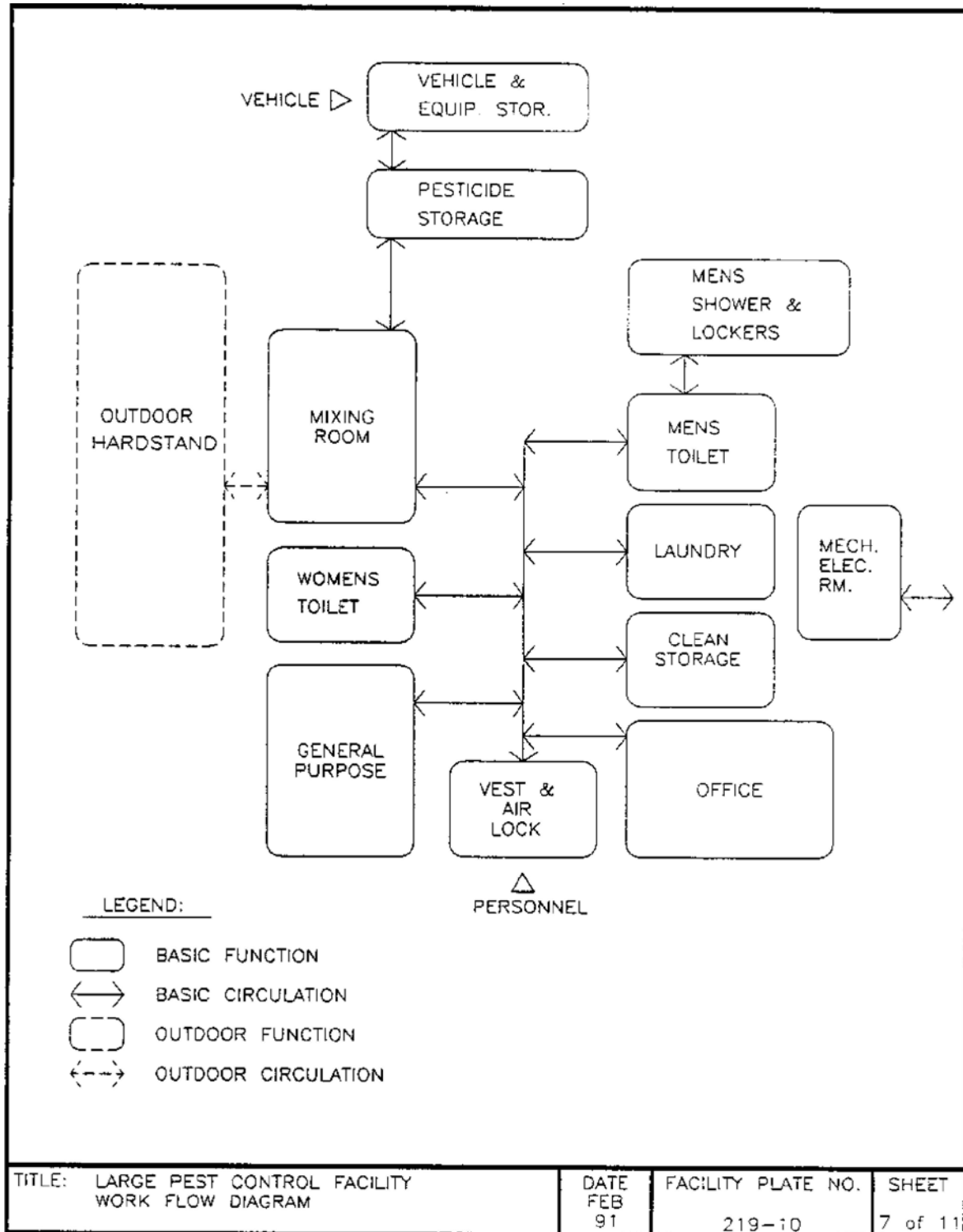


Figure 8

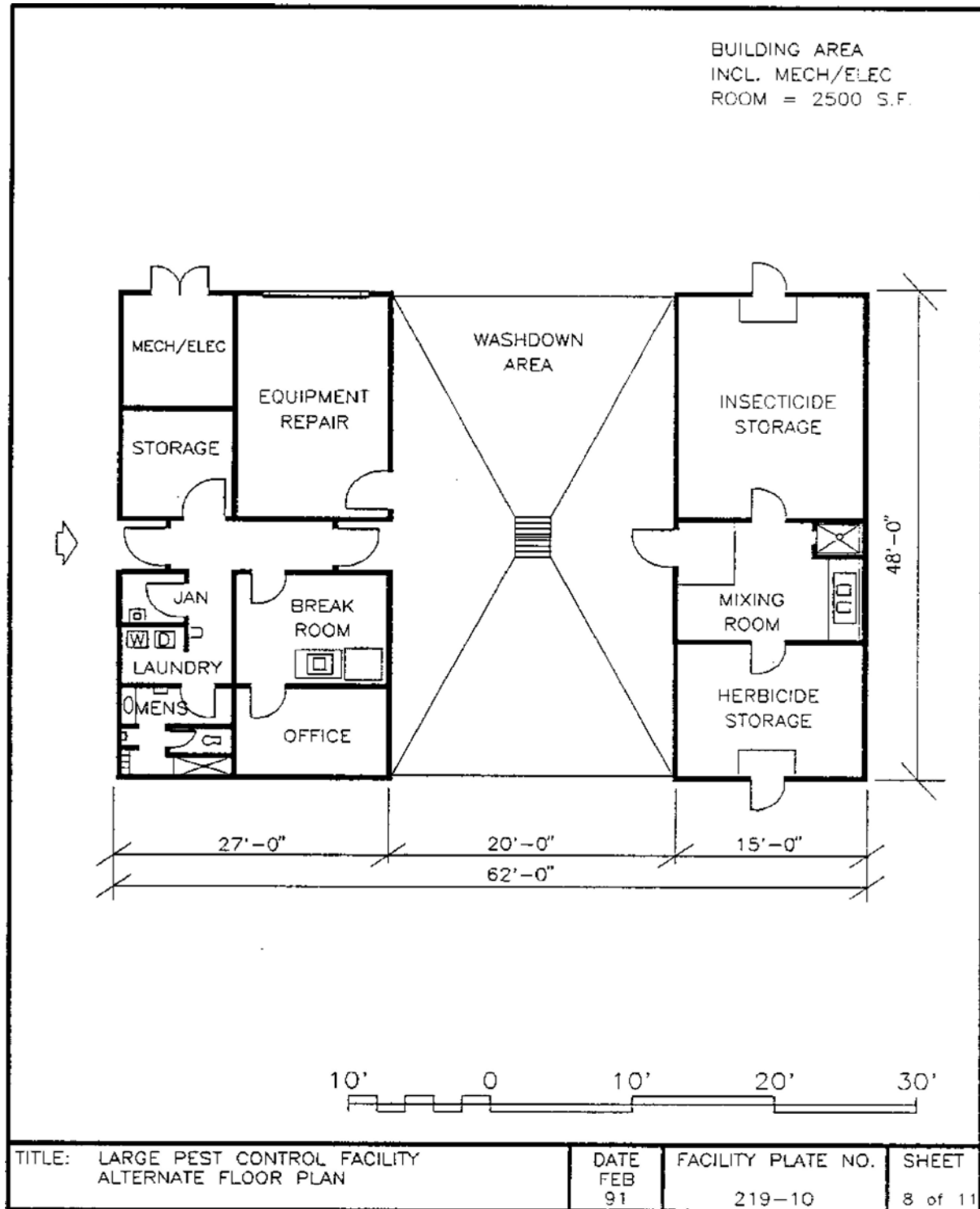


Figure 9

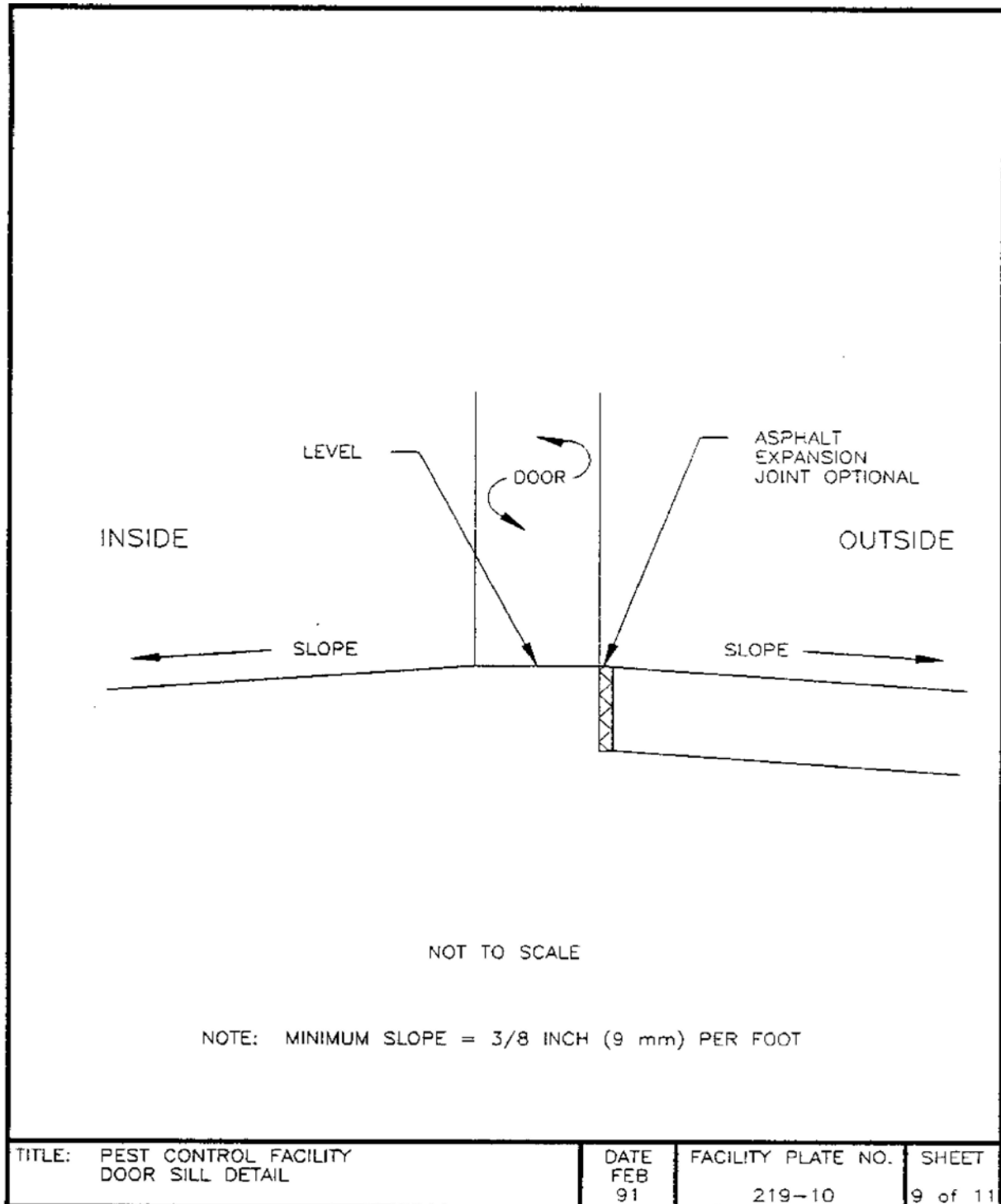


Figure 10

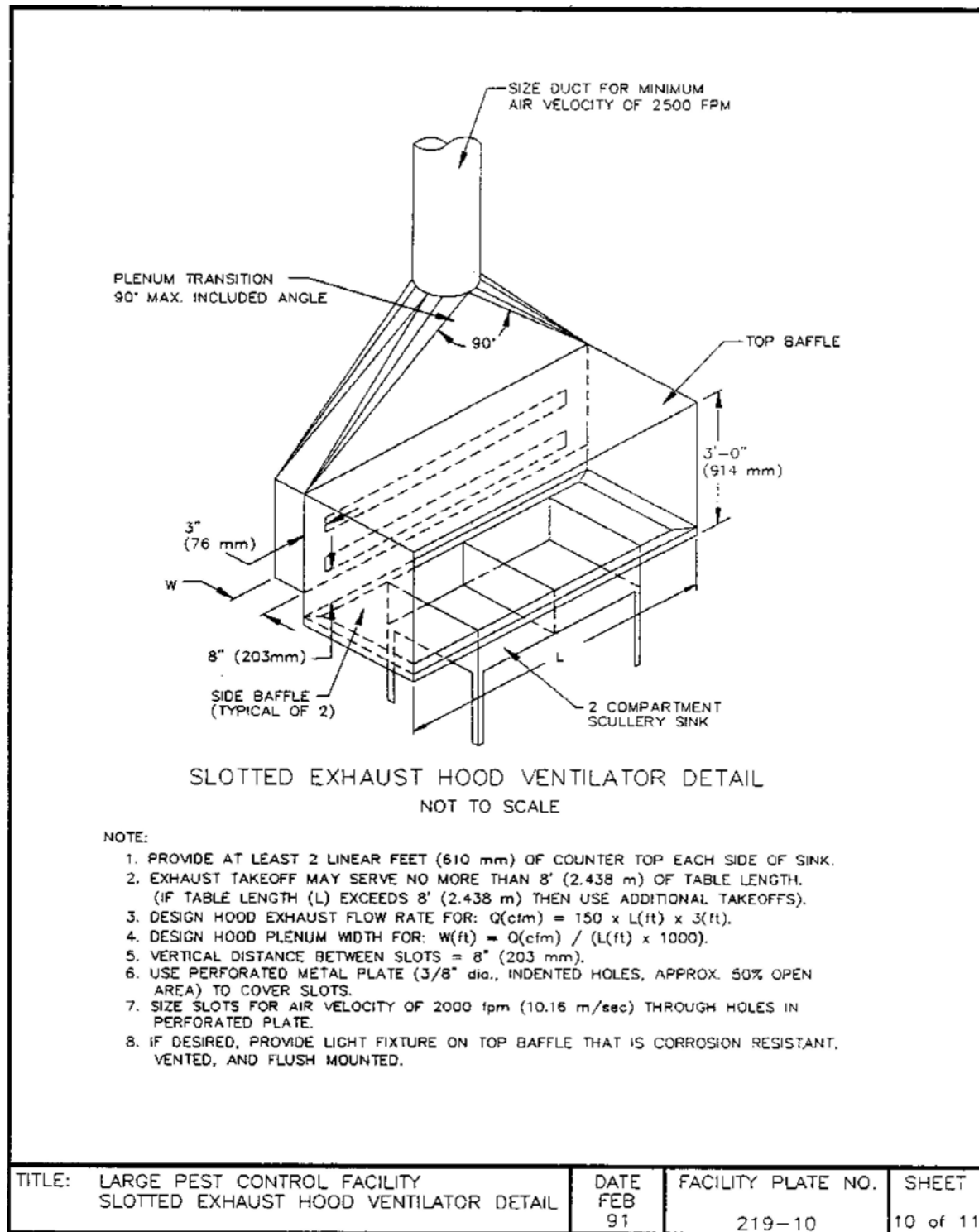
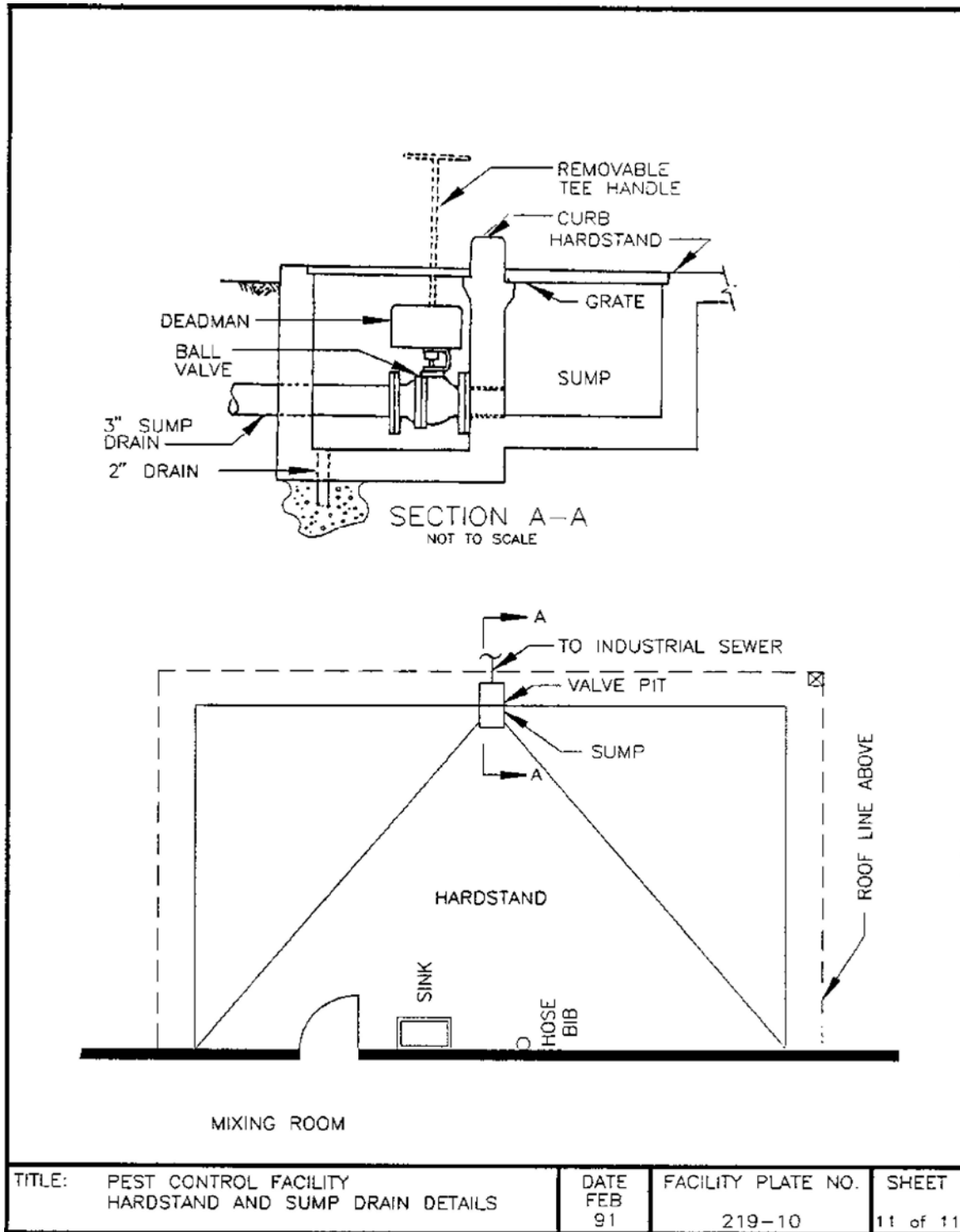


Figure 11



## **Section 7: Instructions, Regulations and Laws**

### **7.1 Federal Laws.**

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

Resource Conservation and Recovery Act (RCRA)

### **7.2 Code of Federal Regulations.**

29 CFR 1910 Subpart L	Fire Protection
29 CFR 1910.106	Flammable and Combustible Liquids
29 CFR 1910.141	Sanitation
40 CFR 165	Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers
40 CFR 165.8	Disposal of Pesticides Wastes
40 CFR 165.10	Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers
40 CFR 260	Hazardous Waste Management System
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 262	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

### **7.3 Other Government Publications.**

[DoD 4150.07, DoD Pest Management Program](#)

#### **7.3.1 Air Force.**

Air Force Instruction AFI 32-1024, Standard Facility Requirements

AFPMB TG-17

UFC 3-120-01, Criteria and Standards for Air Force Construction

Air Force Instruction AFI 32-1053, Pest Management Program.

Available from the Publications Distribution Office (PDO) on each Air Force Base

7.3.2 Navy.

OPNAV 6250.4B, Pest Management Programs

OPNAV 5090.1C, Chapter 17: Environmental Readiness Manual, Pesticide Compliance  
Ashore

7.3.3 Army.

AR 200-1, Environmental Protection and Enhancement