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71-119

**SOLID WASTE PRACTICES IN THE  
UNITED STATES AIR FORCE**

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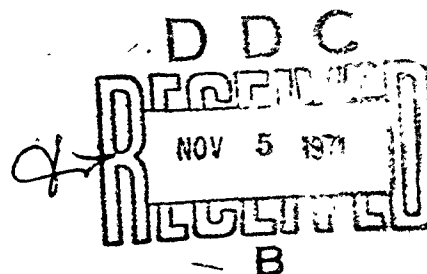
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TECHNICAL REPORT NO. AFWL-TR-71-119

October 1971

**AIR FORCE WEAPONS LABORATORY**

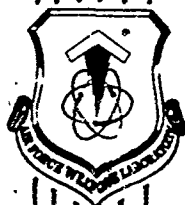
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AFWL-TR-71-119

SOLID WASTE PRACTICES IN THE  
UNITED STATES AIR FORCE

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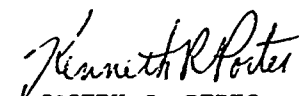
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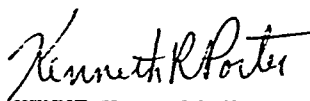
FOREWORD

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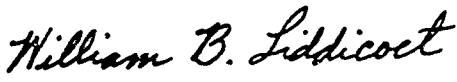
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This technical report has been reviewed and is approved.

  
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ABSTRACT

(Distribution Limitation Statement B)

A questionnaire survey of Air Force solid waste practices was conducted on all active Air Force installations. Information is presented on 98 major installations in the zone of interior (ZI) in the following areas: base and family housing solid wastes; grease disposal; garbage grinders; solid wastes generated in sewage treatment; pathological and classified wastes; liquid industrial wastes; fire fighting training, herbicides and pesticides; on-base landfill operations; and sedimentation from erosion.

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## SECTION I

### INTRODUCTION

#### 1. GENERAL

A questionnaire survey of solid waste practices was conducted by the Air Force Weapons Laboratory (AFWL) of active Air Force installations in the Zone of Interior (ZI), Alaska, Canada, Greenland, Puerto Rico, and Guam. The purpose of the survey, which was conducted from December 1970 to January 1971, was to determine the scope of the solid waste management problem in the Air Force. (A copy of this questionnaire is included as appendix I.)

This report discusses the results of the survey for the 98 major installations in the ZI that are listed in AFM 11-4, Part 4, 1 July 1970. The Air Force Academy, Colorado, and the Aeronautical Chart and Information Center, St Louis, Missouri, are also included. The remaining installations, sites, stations, overseas bases, reserve units, etc. will be covered in a future technical report.

Included in this study are base and family housing wastes, grease disposal, pathological and classified wastes, liquid industrial wastes, fire fighting training, pesticide and herbicide disposal and storage, garbage grinders, solid wastes from sewage treatment, sanitary landfill operations, and sedimentation from erosion. Cost factors were omitted from the questionnaire.

The information is summarized and presented in the text and tables. The data from each base are included as appendixes. Much of the data, especially the base and family housing weight information, is not precise. However, to borrow a phrase from the Interim Report of the 1968 National Survey of Community Solid Waste Practices: "...securing of even rough estimates was considered to be a significant accomplishment ..." (Ref. 1).

This report is intended as an aid in providing information to civil and bioenvironmental engineers in the planning of solid waste management efforts. However, in comparing one base with another, great care must be taken to include intangibles such as mission, geography, climate, location, etc., all of which can greatly influence waste generation, collection, processing, and disposal. Direct comparison of individual factors, i.e., waste generation,

collection frequency, disposal method, etc., without due cognizance of these factors can lead to highly erroneous conclusions. It must be emphasized that even the application of average or median values found in this report as "typical" must be exercised with care because of the intangibles mentioned above.

In the national survey of civilian community solid waste practices, only 6 percent of the land disposal sites could be characterized as sanitary landfills (Ref. 1). It is the authors' opinion, based on experience, that the percentage is considerably higher for Air Force-operated landfills. This appears to be substantiated by the questionnaire data. Almost 100 percent of the questionnaires indicated sanitary landfill and only a few open dumps were reported, mostly in off-base locations. However, since sanitary landfill was not defined in the questionnaire, no attempt is made to distinguish between a true sanitary landfill and open dumping in this report. Both are included under the general heading of land disposal.

This report, in addition to covering the management of base and family housing refuse, briefly discusses grease disposal from dining halls, cafeterias, etc., and solids generated in sewage treatment. Quantitative information on family housing garbage grinders and their relationship to collection frequency is presented.

Pathological, classified, and liquid industrial wastes are covered in some detail. Fire fighting training is briefly discussed as well as pesticide and herbicide storage and disposal. Some comments regarding base solid-waste operations conclude the report.

Information received on sedimentation from erosion is presented in appendix VIII.

## 2. DEFINITIONS

The following definitions were supplied with the questionnaire:

Solid wastes: Garbage, refuse, and other discarded solid materials, including those resulting from commercial, industrial, and agricultural operations and community activities. Examples: household trash, food wastes, discarded furniture and appliances, tree trimmings, grass cuttings, dead animals, abandoned autos, sludges, and precipitations from water and wastewater treatment, construction and demolition wastes, wood crates, cardboard cartons, etc.

Industrial wastes: Those wastes directly attributable to industrial operations, i.e., solvents, oil, chemicals, etc.

Sanitary wastes: The water-borne wastes generated in living activities, i.e., excrement, food wastes (when garbage grinders installed), laundry water, etc.

Pathological wastes: Those wastes generated in the course of medical treatment or other activities, i.e., soiled bandages, bacteriological cultures, amputations, afterbirths, disposable hypodermic needles, etc.

Classified wastes: Paper, photographic film, reproduction masters, typewriter ribbons, etc., which must be destroyed for security reasons. Items that have and items, such as rough drafts, etc., that have not entered the security accountability system are included.

## SECTION II

## UNITED STATES AIR FORCE SOLID WASTE PRACTICES

The 1968 National Survey of Civilian Communities indicates that there is an average of approximately 5.32 pounds of solid waste collected per person per day in the United States (Ref. 1). This breaks down to about 3.0 pounds per person per day of household wastes and 2.32 pounds per person per day of wastes from commercial and industrial activities, constructions and demolitions, street sweepings, and miscellaneous sources. For comparison purposes this can be related to family housing wastes and base wastes, respectively.

## 1. BASE SOLID WASTES

## a. Waste Generation

There are 98 bases included in this study; of these, 90 were able to furnish weight data for their base solid wastes. The total wastes generated by these 90 bases was 64,858.23 tons per month. Using the equivalent base population figure (per AFM 88-11), this yields an average of 5.11 pounds per person per day. The median value (that data point which half the values are greater than and half are less than) is 3.52 pounds per person per day. The range was from 0.14 at Kincheloe AFB, Michigan, to 37.82 pounds per person per day at McCoy AFB, Florida. A frequency distribution graph is shown in figure 1. Unusual values, high and low, as well as most other weight data were confirmed by telephone, some more than once. In many cases, accurate weight information is simply not available as there is no requirement to record it.

The median value of 3.52 pounds per person per day is fairly representative of a typical Air Force base. Such a base might have an equivalent population of perhaps 13,000 people. The per capita figure is expected to be somewhat higher than the 1968 National Survey figure of 2.32 pounds per person per day. The primary reasons are that refuse generation per se is steadily increasing, and a higher proportion of the overall wastes on an Air Force base are collected; whereas a lot of wastes in a civilian community go uncollected. An example of this is the substantial amount of urban wastes that are incinerated in apartment house or home incinerators or burned in backyards of residences and commercial establishments or on demolition sites (Ref. 3).

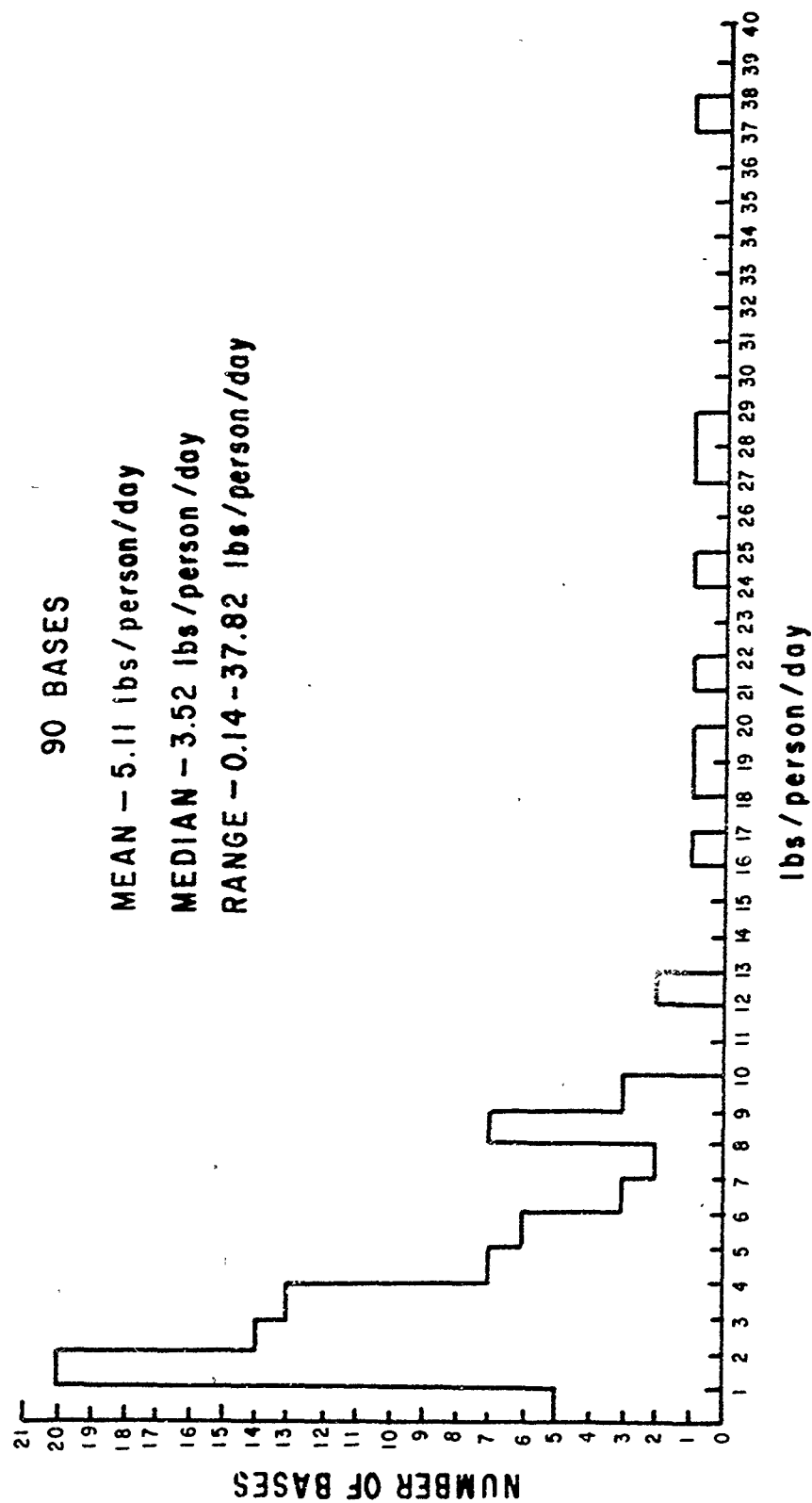


Figure 1. Base Solid Waste Frequency Diagram for Per Capita Production

b. Storage and Collection

Data for storage and collection of base solid wastes is available from all 98 bases. The breakdown of usage of storage containers by type is as follows: 34 bases use dumpsters exclusively; 4 bases use carbage cans exclusively; and 60 bases use some combination of both types of storage containers. When percent usage is considered, 84 bases store 75 percent or more of their solid waste in dumpsters; 6 store 75 percent or more in garbage cans; and the remaining 8 use some combination of containers where neither component is 75 percent or greater.

The collection of base solid wastes is mostly performed by Air Force personnel. On 52 bases Air Force personnel pick up all the base solid wastes; 15 bases use contract collection exclusively; and 31 bases use some combination of Air Force personnel and contractor collection. Air Force personnel pick up 75 percent or more of the base refuse on 71 installations while contractor personnel collect 75 percent or more on 24 bases.

The collection frequency varies from once per week to twice per day. The frequency is a function of the types of wastes generated. Those operations discarding highly putrescible materials (i.e., dining halls) or discarding very large volumes (i.e., commissaries) receive the most frequent service.

c. Density

The total volume of base solid wastes is 20,893,463 cubic feet per month from all 98 bases. The volume of wastes from the 90 bases that also reported weight data is 20,342,105 cubic feet per month. A frequency diagram of the densities for the 90 bases in pounds per cubic yard is shown in figure 2. The average density was calculated to be 172.17 pounds per cubic yard, and the median was found to be 194.59 pounds per cubic yard. There is a wide range of densities for refuse reported in the literature. Commonly quoted figures are 200 to 300 pounds per cubic yard for uncompacted refuse and 400 to 500 pounds per cubic yard for refuse in a compactor type collection vehicle. Densities calculated from the data in the questionnaire range from 23.98 pounds per cubic yard at Little Rock AFB, Arkansas, to 1505.54 pounds per cubic yard at McCoy AFB, Florida. The wide range found is probably due to the variations in the waste generation areas where the volume measurement is performed as well as to the uncertainty in much of the weight data. Volume of refuse is presently the only quantitative measurement which is required to be reported (see AFM 300-4, Vol. IV, pages 4 through 37, 1 October 1970, and AF Form 1452, "Daily

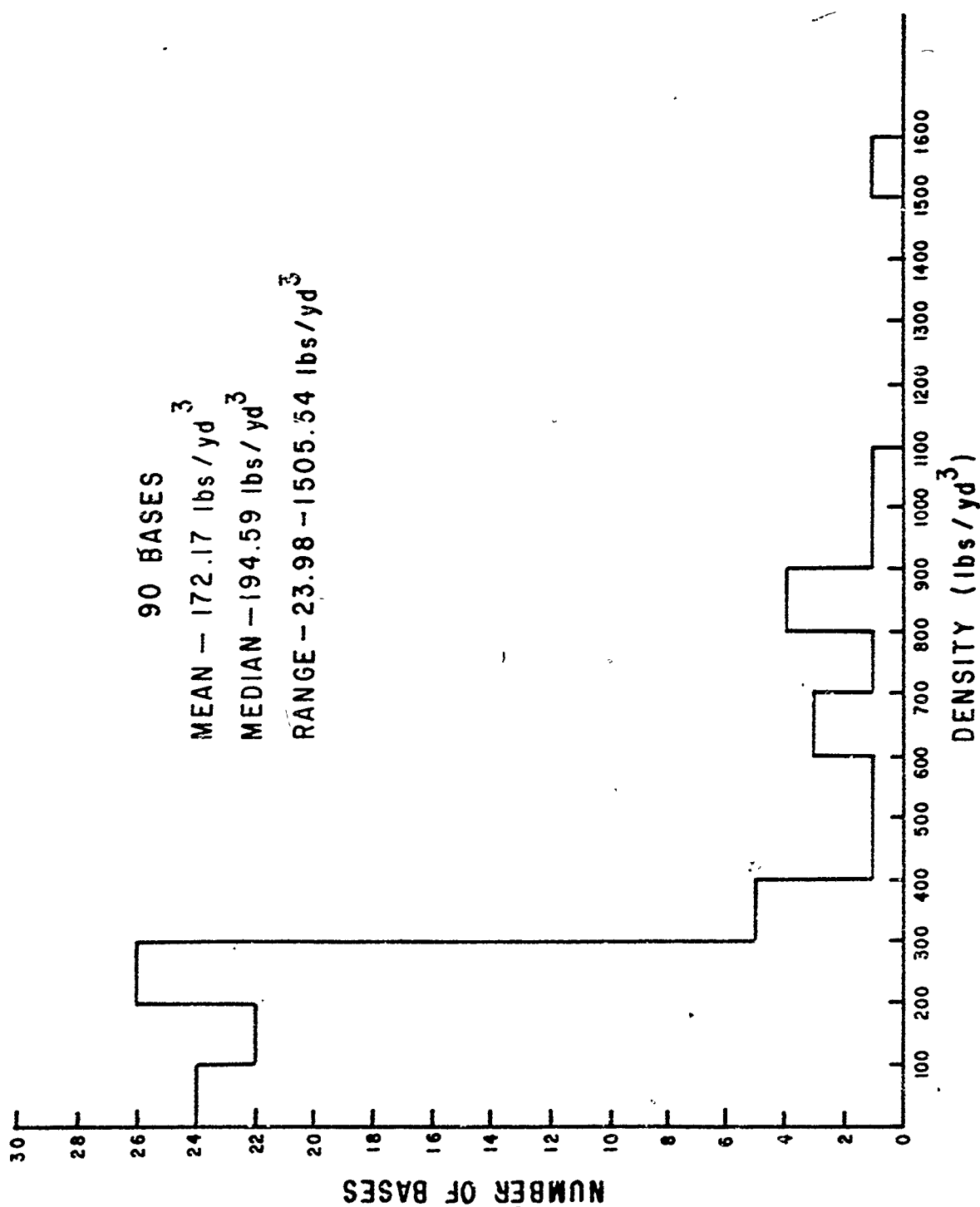


Figure 2. Base Solid Wastes Density Frequency Diagram

Log of Refuse and Salvage Collections"). It is required that the volume be reported as "loose" refuse. Instructions in the above mentioned references require adjustment of compacted volumes by an appropriate factor to be determined for each base and each type of material. This naturally leads to wide variation in calculated densities using the reported weight and volume figures.

d. Disposal

More than 95 percent of the base solid wastes are disposed of on land. Almost 2 percent is incinerated, another 2 percent is recycled, and a small fraction is fed to hogs. In the strict technical sense, incineration is a volume reduction technique, not a disposal method. In this report, however, it will be treated as a means of disposal since it was so reported in the questionnaire.

The quantities and methods for disposal are presented in table I.

Table I  
DISPOSAL OF BASE SOLID WASTES

| <u>Disposal method</u> | <u>Amount</u>                 |                   |
|------------------------|-------------------------------|-------------------|
|                        | <u>Quantity<br/>(tons/mo)</u> | <u>Percentage</u> |
| AF land                | 45,234.52                     | 69.74             |
| Non-AF land            | 16,872.82                     | 26.02             |
| AF incineration        | 821.62                        | 1.27              |
| Non-AF incineration    | 390.50                        | 0.60              |
| Recycle                | 1,345.27                      | 2.07              |
| Hog feed               | 193.50                        | 0.30              |

2. FAMILY HOUSING SOLID WASTES

a. Waste Generation

The total family housing solid wastes for the 90 bases that furnished weight data was 21,853.54 tons per month. This is an average contribution of 3.94 pounds per person per day for each family housing occupant. The median contribution is 3.19 pounds per person per day, which is comparable with the 1968 national average of 3.0 pounds per person per day. In fact, the family housing per capita figure is surprisingly low. It was expected that this

figure would be somewhat larger than it is because of the general increase in the per capita refuse production nationwide and their relatively greater access to packaged foods which produce large amounts of packaging material wastes.

The range was from 0.04 pounds per person per day at Kincheloe AFB, Michigan to 18.26 pounds per person per day at Minot AFB, North Dakota. The values are quite removed from either median or average values, and it is felt that this is because of the lack of requirements in recording the weight of wastes generated on a base. Since there is presently no requirement for keeping a record of the weight of refuse generated, the weights had to be estimated or spot-checked. It is conceivable that such methods could produce what might be called erroneous data even though unusual values were verified by telephone.

A frequency distribution graph of the per capita data is presented in figure 3.

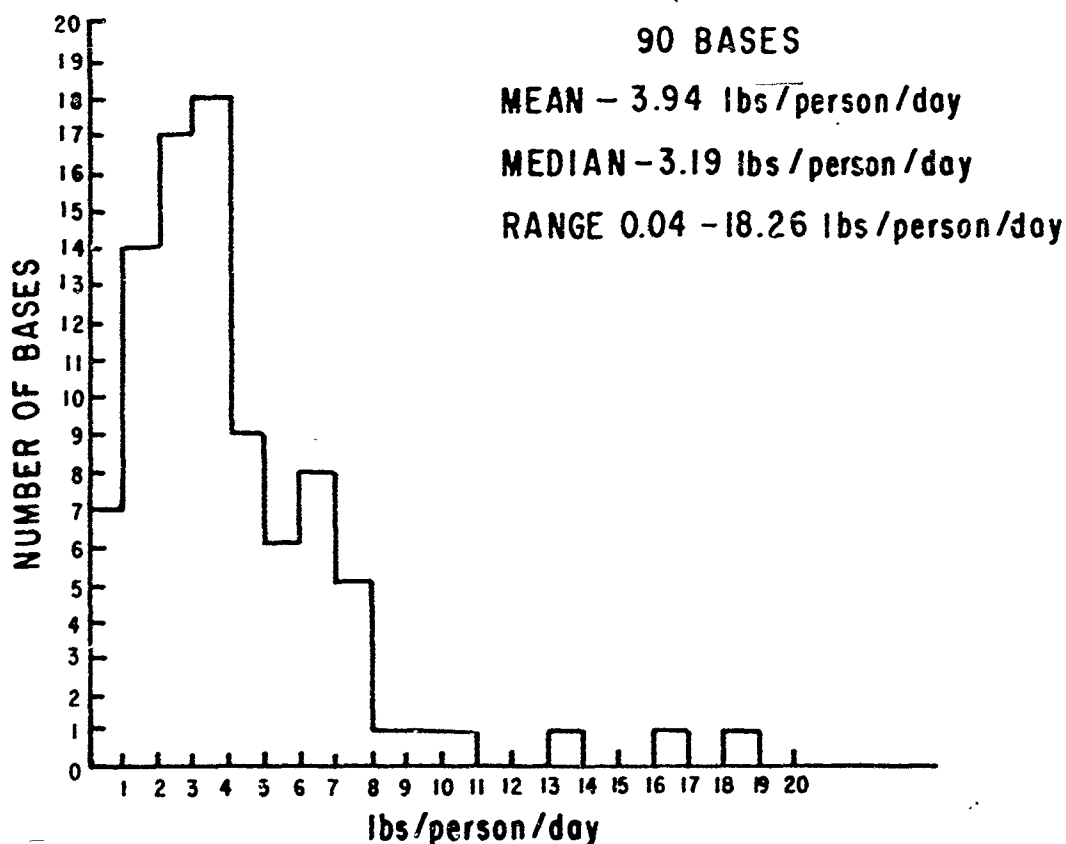


Figure 3. Family Housing Solid Wastes Frequency Diagram for Per Capita Production

## b. Storage and Collection

Storage and collection information was reported by all 98 installations. Two bases report storage of family housing wastes exclusively in dumpsters, while 61 use garbage cans exclusively, and the remaining 35 use some combination of storage containers. Four bases store 75 percent or more of their household wastes in dumpsters and 86 store 75 percent or more in garbage cans. Eight bases use a combination of storage containers where neither is 75 percent or more.

The collection of family housing wastes is primarily a contractor operation. Twelve bases report 100 percent of the family housing wastes picked up by Air Force personnel, while 59 use contractor services exclusively, and 27 bases use Air Force and contractor personnel for collection. Air Force personnel pick up 75 percent or more of the wastes from 15 bases, while contractors collect 75 percent or more from 79 family housing areas. Four bases use Air Force and contractor collection where neither collects 75 percent or more. The figure of 75 percent was arbitrarily chosen to show what means are primarily used for storage and collection.

Collection frequency as related to the presence or absence of garbage grinders is summarized in table II.

Table II

## COLLECTION FREQUENCY RELATED TO GARBAGE GRINDERS IN FAMILY HOUSING UNITS

| Housing units with<br>garbage grinders<br>(percent) | Collection frequency<br>(times/wk) |          |          |                  |                  |                  |                     |
|-----------------------------------------------------|------------------------------------|----------|----------|------------------|------------------|------------------|---------------------|
|                                                     | <u>1</u>                           | <u>2</u> | <u>3</u> | <u>1 &amp; 2</u> | <u>1 &amp; 3</u> | <u>2 &amp; 3</u> | <u>1, 2 &amp; 3</u> |
| 100                                                 | 6                                  | 27       | 4        | 1                | 0                | 0                | 0                   |
| > 50                                                | 4                                  | 15       | 2        | 3                | 0                | 1                | 1                   |
| < 50                                                | 0                                  | 3        | 0        | 0                | 0                | 0                | 0                   |
| 0                                                   | 1                                  | 23       | 2        | 3                | 2                | 0                | 0                   |
| Totals                                              | 11                                 | 68       | 8        | 7                | 2                | 1                | 1                   |

Table II shows that there are 27 bases where all the family housing units have garbage grinders; these provide twice weekly refuse collection. It also shows that there are two bases providing thrice weekly pick-up where the majority of family housing units have garbage grinders.

There are 100,857 family housing units reported by the 98 installations. Of these, 65,197 (64.6 percent) have garbage grinders.

c. Density

All 98 bases submitted information on the volume of solid waste from their family housing units. The total was 6,648,239.5 cubic feet per month. For the 90 bases that submitted weight data, the total volume was 6,292,346.5 cubic feet per month. A frequency diagram for the family housing waste densities is given in figure 4.

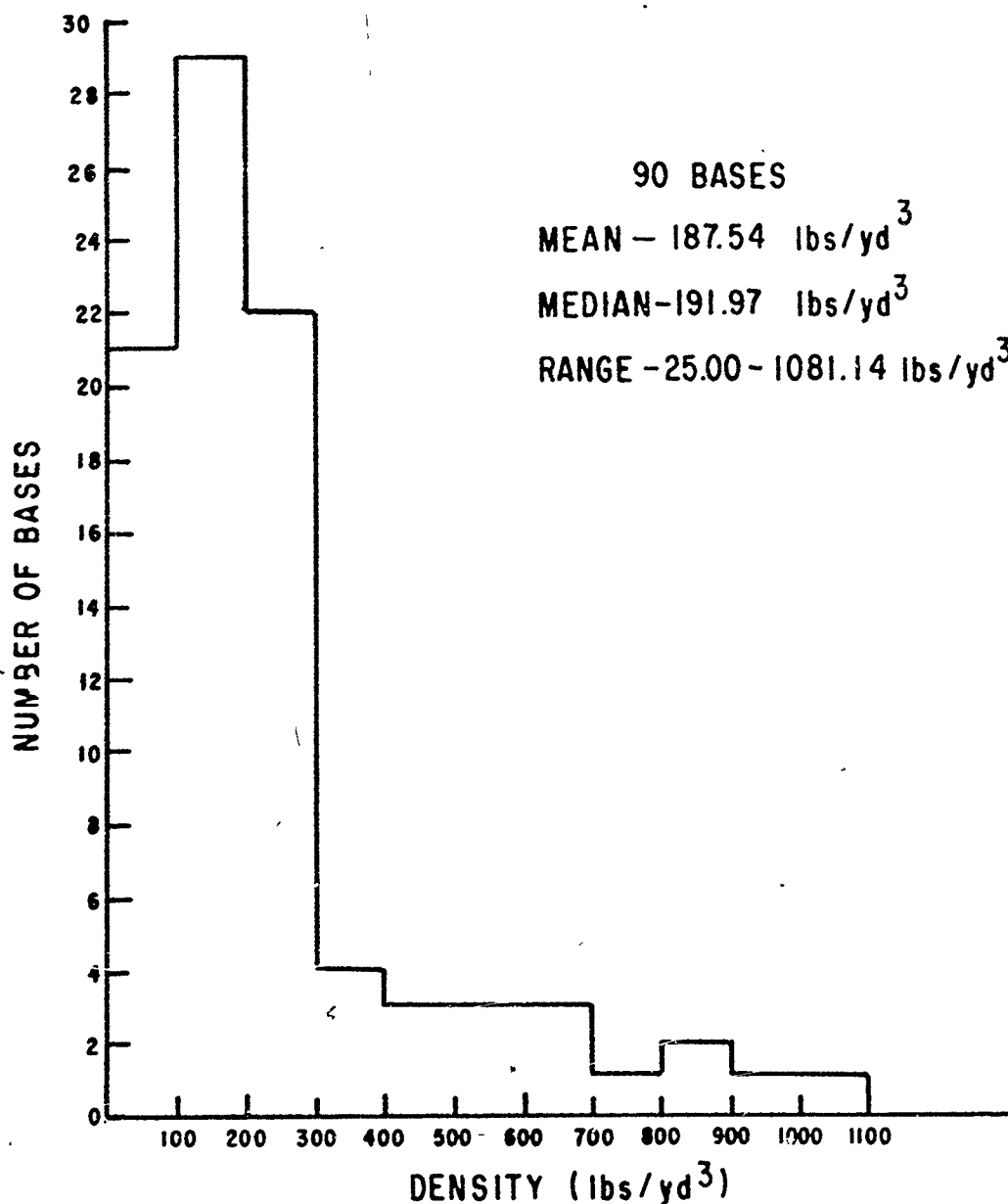


Figure 4. Family Housing Solid Wastes Density Frequency Diagram

The average density was calculated to be 187.54 pounds per cubic yard; the median was found to be 191.97 pounds per cubic yard. The range was from 25.0 pounds per cubic yard at Norton AFB, California, to 1081.14 pounds per cubic yard at Plattsburgh AFB, New York. As explained before, the large range is because of the gross estimates that were necessary at some bases to provide weight data.

#### d. Disposal

More than 97 percent of the 21,853.54 tons per month of family housing wastes are disposed of by landfill. The disposal method and quantities for each are presented in table III.

Table III

#### DISPOSAL OF FAMILY HOUSING SOLID WASTES

| <u>Disposal method</u>   | <u>Amount</u>                 |                   |
|--------------------------|-------------------------------|-------------------|
|                          | <u>Quantity<br/>(tons/mo)</u> | <u>Percentage</u> |
| AF land                  | 11,413.72                     | 52.23             |
| Non-AF land              | 9,796.52                      | 44.83             |
| Civilian<br>incineration | 580.60                        | 2.66              |
| Recycle                  | 62.70                         | 0.28              |

#### 3. GREASE DISPOSAL

Quantitative information from the bases ranges from 1 gallon per month to over 100,000 gallons per month. Many bases reported only so-called "hard" grease, which is material that is separated before its introduction into the sanitary sewer or before its storage. Many reported combined figures for hard grease and pumpings from grease traps which includes large, unknown amounts of water. Fifty-two bases reported that some or all of their grease was collected by a contractor for reclamation. The remaining 46 bases disposed of all their grease in landfills.

## 4. GARBAGE GRINDERS

The information reported by the 98 bases is summarized in table IV.

Table IV

## GARBAGE GRINDERS IN DINING HALLS, CAFETERIAS, AND OPEN MESSES

| <u>Function</u> | <u>With<br/>garbage grinder</u> | <u>Without<br/>garbage grinder</u> | <u>Totals</u> |
|-----------------|---------------------------------|------------------------------------|---------------|
| Dining halls    | 192                             | 89                                 | 281           |
| Cafeterias      | 175                             | 130                                | 305           |
| Open messes     | 162                             | 58                                 | 220           |
| Totals          | 529                             | 277                                | 806           |

## 5. SOLID WASTES GENERATED IN SEWAGE TREATMENT

Sixty-seven out of 98 installations treat their own sewage. Out of these, 35 dispose of their sludge and grit by means of landfill, 12 use the solids as fertilizer, 15 use a combination of landfill and fertilization, 4 use lagoons, and 1 installation employs an oxidation pond for its sewage treatment. The quantities of sludge and grit disposed of range from 400 pounds per month at Laughlin AFB, Texas, to 1,538,700 pounds per month at McClellan AFB, California. However, no generalization can be made about the amounts since it is unknown whether the quantities reported are on a wet or dry basis. Eight bases listed the quantity of sludge and grit disposed of as unknown. A complete breakdown of the quantities disposed of and the disposal method for each installation may be found in appendix V.

## 6. PATHOLOGICAL WASTES

The amount of pathological wastes generated at medical treatment facilities range from 0.0 pounds per week for the Class B Dispensary at Vance AFB, Oklahoma, to 22,700 pounds per week for the 125-bed hospital at Vandenberg AFB, California. Four bases out of 98 reported that the quantity of pathological wastes on their base is unknown. The number of beds at the medical facilities range from 0 at 17 different installations to 1000 at Lackland AFB, Texas. For the 77 bases with an in-patient capability, the per capita production of pathological wastes range from 0.04 pounds per bed per week at Goodfellow AFB, Texas, to 181.60 pounds per bed per week at Vandenberg AFB, California. There are 21 bases with either no beds or an unknown amount of pathological wastes from which

such a figure could be calculated. The average for the 77 installations was calculated to be 5.63 pounds per bed per week and the median was found to be 1.21 pounds per bed per week. A frequency distribution curve of the data obtained can be found in figure 5.

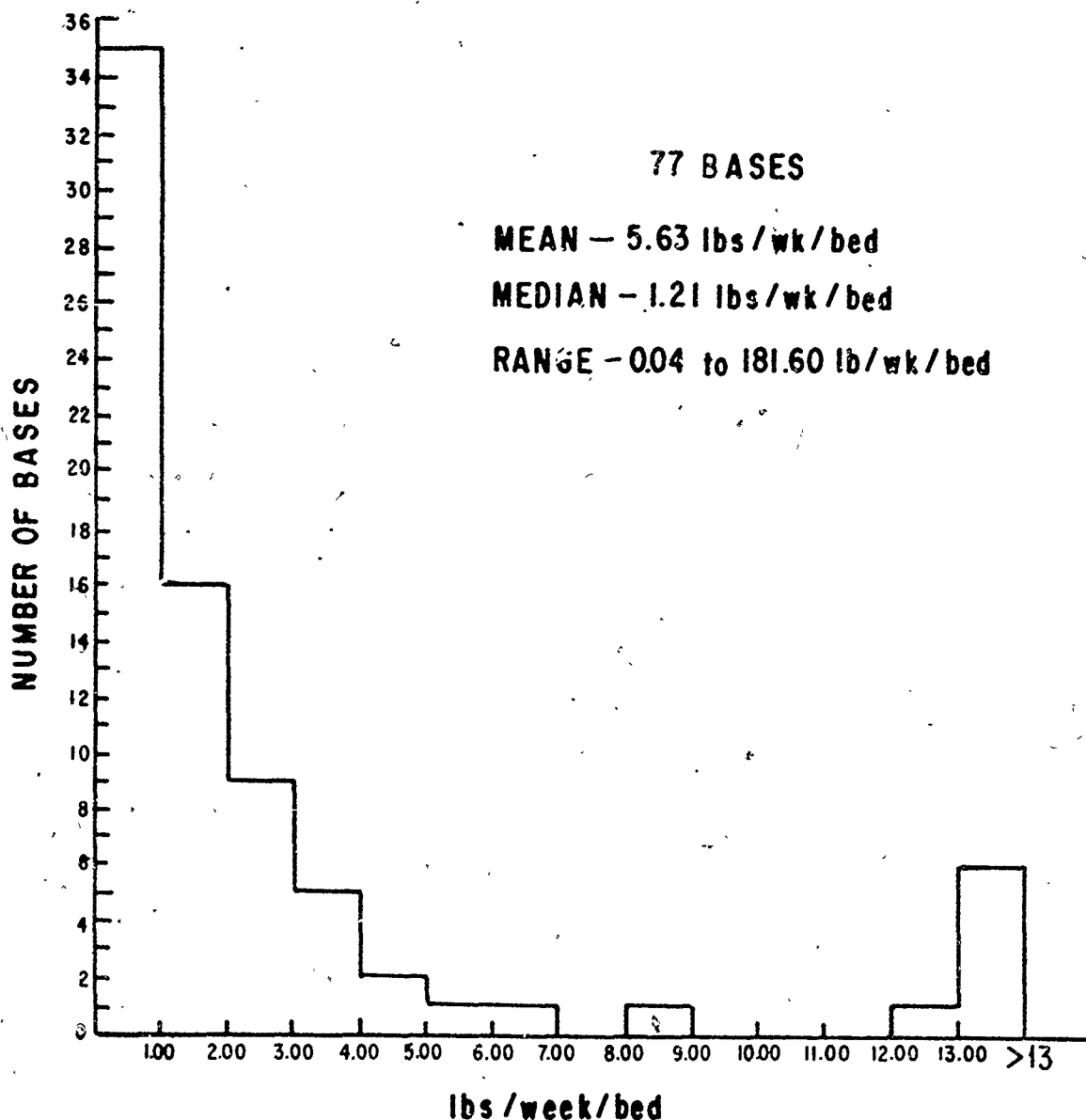


Figure 5. Pathological Wastes Frequency Diagram

To obtain an idea of the composition of the pathological wastes generated at Air Force bases, the questionnaire requested percentages in the following categories: tissue, plastics, bandages, paper, and "other." The percentages obtained in the responses showed no consistency as can be seen from the

tabulations in appendix V. Percent of tissue and percent of plastics each range from 0.0 to 100 percent. Percent of bandages range from 0.0 to 95 percent, percent of paper from 0.0 to 97.62 percent, and percent of other materials from 0.0 to 80 percent. Some of the items listed in the other category include syringes, serum, kitchen wastes, cardboard, drugs, glass, blood, splints, vials, test tubes, petri dishes, cultures, needles, metal, rubber, and cloth.

It should be noted that it is quite difficult to report "typical" data values in this category, since such values are entirely dependent on the type of facility and the types of products it uses. For instance, a Class B Dispensary cannot be expected to have the same types and amounts of wastes as a large hospital. Similarly, a hospital that has a large laboratory facility would have wastes of a different composition than a hospital with a small laboratory. Another point for consideration is that one medical facility may use a large amount of disposable items, whereas another may not. Furthermore, in regard to pounds per bed per week numbers, it should be noted that pathological waste quantities are truly a function of in-patient load and not hospital capacity. Careful interpretation is necessary to prevent the formation of erroneous conclusions.

The majority of the bases dispose of their pathological wastes by incineration and landfill. Out of 97 bases reporting wastes in this category, 66 use incineration only, 13 use landfill only, 16 use a combination of incineration and landfill, and 2 use a combination of incineration, landfill, and sewage disposal. Out of the 31 installations that reported use of landfill alone or in combination with another method, 12 autoclave the wastes going to the landfill, and 14 bases did not indicate autoclaving before landfill disposal. The two bases that employ sewage as a partial disposal means employ garbage grinders to dispose of their placentas.

Out of 77 bases that reported the use of their own incinerators for burning pathological wastes (Brooks AFB, Texas, reported four incinerators), temperature data was supplied for only 32 incinerators. The data were for either primary or secondary chambers or both. In some cases the temperatures were not actual temperatures, but rather information taken from manufacturers' literature.

Approximately 50 percent of the incinerators reported in use are 9 years old or older; three of these are 20 years old and one is 40 years old. Because of their age, many of these incinerators, and possibly some of the more recent

ones, most likely do not meet air pollution control standards. In such cases, it may be necessary to install air pollution control devices to bring down emissions to acceptable levels.

## 7. CLASSIFIED WASTES

Ninety-five out of 98 bases reported figures for classified wastes totaling 1,638,939.5 pounds per month, with Kelly AFB, Texas, accounting for almost 50 percent of this total (716,000 pounds per month). The lowest reported value came from Moody AFB, Georgia, which reported only 0.5 pounds per month of classified wastes. A complete rundown on the bases and the amount of classified wastes reported by them may be found in appendix VI.

Disposal of classified wastes was broken down into four categories: incineration, grinding, pulping, and "other." Fifty-eight bases use incineration only as a disposal technique. Eight use grinding only, 7 use pulping only, and 25 use a combination of two or more of the three methods. Kelly AFB, Texas, was the only base reporting disposal in the other category. This was burial of 35,800 pounds per month of classified metal wastes. The breakdown on the figure for the way each base disposes of classified wastes may be found in appendix VI.

Incineration is used at 70 bases, either alone or along with another method of disposal. A total of 82 incinerators were tabulated, four bases having more than one incinerator. Of the 82 incinerators, about half were reported as being 9 years old or older; five of these were reported as being 20 years or older. As noted for the incinerators used in burning pathological wastes, there is an indication here that many incinerators used for burning classified materials do not meet the standards for air pollution control. It was found that only 14 bases employ some sort of air pollution device for their classified waste incinerators.

Six Air Force bases (Griffiss AFB, New York; Kincheloe AFB, Michigan; Moody AFB, Georgia; Mountain Home AFB, Idaho; Otis AFB, Massachusetts; and Seymour-Johnson AFB, North Carolina) (60 percent) incinerate their classified waste in boilers. In small quantities, such a practice does not appear to be harmful and seems to be one means of capturing the heat value of the waste.

## 8. LIQUID INDUSTRIAL WASTES AND FIRE FIGHTING TRAINING

The information on liquid industrial waste disposal and fire fighting training was included in the questionnaire at the request of the Air Force

Surgeon General's Office. The data submitted are tabulated in appendix VII. Engine oil was reported as a separate item by 86 bases with a monthly quantity of 115,301 gallons. Eighty-two bases dispose of 12,209 gallons per month of hydraulic fluid. Disposal of industrial fluids such as cutting oils, cleaners, strippers, and other petrochemical wastes not elsewhere reported amount to 148,736 gallons per month from 87 bases. There are 241,859 gallons per month of contaminated fuel disposed of by 91 bases. Of the 97 bases who reported emergency destruction of fuel as a separate item, 12 disposed of 108,480 gallons during FY 1970; the rest reported no emergency destruction of fuel during that period.

A total of 11 bases included one or more of the other categories of liquid industrial wastes in the engine oil category. These figures are not included in the above totals and are considered as a separate item. The quantity of such combined liquid industrial waste is 93,889 gallons per month.

All 98 bases provided information on fire fighting training, which is included in appendix VII. Only two bases, the Aeronautical Chart and Information Center, St Louis, Missouri, and Gunter AFB, Alabama, do not conduct regular training sessions involving real fires. The 96 bases that do have such drills conduct 1,149.5 fires per quarter, using a total of 594,685 gallons of fuel. JP-4 and other aircraft propellants are the fuels of choice for nearly all the bases.

The number of fires per base ranges from 2 per year at Brooks AFB, Texas, to 200 at Cannon AFB, New Mexico, and the fuel per drill ranges from 5 to 3000 gallons.

All 96 bases indicate that they make an effort to perform the training under favorable meteorological conditions, i.e., maximum dispersion, winds in the direction of unoccupied areas, etc.

#### 9. PESTICIDES AND HERBICIDES

A list of the pesticides and herbicides now in storage awaiting disposal instruction is in appendix VIII. These wastes are in the solid, liquid, and gaseous forms, and they present an immediate problem since there are no firm methods accepted at the present time for their storage and disposal. It is difficult to analyze the data in this category since the wastes reported are in various physical states and forms and are given in different unit amounts.

#### 10. ON-BASE LANDFILL OPERATIONS

Eighty-one of the 98 bases operate a land disposal facility on the base. The trench type of landfill is being used by 67 bases with the other 14 using the area method.

The estimated life of these landfills ranges from 1/6 of a year at McChord AFB, Washington, to an unlimited life at Edwards AFB, California. Of the 81 bases with landfills, 40 have fills with a life of less than 10 years while 41 have a life of 10 or more years. The life of the landfills was calculated on the basis of 15 acre feet per 10,000 people per year.

In regard to operation of the fill, the number of operators used per fill operation ranges from 0.2 to 11.0 per 8-hour day. The fractional number indicates a person that is on duty for only part of the working day. The average of 1.5, however, gives a better indication of the number of operators used at each base. There are 75 bases with two or less operators per 8-hour day, and of these 75 there are 54 bases with less than two operators per working day.

The most frequently used piece of equipment in the landfill operations is the D-6 bulldozer tractor. The number of vehicles available at a particular base ranges from one to four. Thirty-seven bases have one piece of equipment of any type, 29 have two pieces, 12 have three pieces, and 3 have four pieces of equipment. It should be noted that in many cases certain equipment is available at the landfill for only part of the full day's operation.

#### 11. SEDIMENTATION FROM EROSION

Eighty-eight bases indicated slight land erodability, eight indicated moderate, and two indicated severe. This data for individual installations along with erosion control practices and land area currently denuded may be found in appendix IX.

### SECTION III

#### DISCUSSION OF RESEARCH NEEDS

##### 1. STORAGE AND COLLECTION OF BASE AND FAMILY HOUSING WASTES

At the present time, family housing wastes are stored mostly in garbage cans and are collected by contract personnel. Base wastes, on the other hand, are mostly stored in dumpsters and collected by Air Force personnel. It appears from the data presented that a minimum of planning has been done in both areas. Considering the fact that approximately 80 percent of the expenditures for solid waste management is for collection and transportation (Ref. 1), it appears that some research and cost analysis should be done on this particular aspect of solid waste management in order to optimize the collection systems and minimize costs.

Several studies in civilian communities have shown considerable savings in collection costs resulting from switching from backyard pick-up of garbage cans to curbside pick-up in either plastic or paper sacks. With the use of the sacks, collection frequency can normally be reduced to once per week without sacrifice of sanitation or esthetics and without fly-breeding problems. Sacks can be tightly closed and do not require cleaning as do cans to remove spilled garbage and other fly attractants.

Collection efficiency in terms of manhours expended per ton of refuse collected have increased as much as 20 percent by the change in collection system proposed above.

Home-type compactor units are now available which allow a reduction of household refuse to approximately one-fourth of its original volume or, to put it another way, one large paper sack may be filled to an equivalent of what is contained in about two 30-gallon refuse cans.

The Solid Wastes Management Office is sponsoring several demonstration programs which are beginning to show promise in this area. For instance, in Scottsdale, Arizona, it has been shown that refuse from a residential area can be collected mechanically, i.e., without a man touching the containers or leaving the cab of the collection vehicle. Special containers of 80-gallon capacity are provided to each family. On alley routes a 300-gallon container

can serve four families. A unique loading device permits the truck operator to pick up the special containers, empty them into a large packer body, and return the container without leaving the cab (Ref. 4). Considerable savings in cost have been observed.

In Chilton County, Alabama, rural residents are placing their refuse in 4-cubic-yard containers located along collection routes. This eliminates collection from individual households in the rural districts.

The Air Force should conduct a systems analysis to determine the optimum scheme or schemes that should be incorporated into its waste storage and collection systems. Questions that should be answered include: Should paper or plastic sacks be provided? Should household compactors be used? Should residents carry their refuse to a centrally located container to be shared by a number of households? Should base and family housing waste be considered separately or as one in solid waste planning?

Serious consideration should be given to integrating collection and storage systems for family housing and base wastes. Presently, there appears to be a haphazard connection, if any. If at all feasible, refuse collection, processing, and disposal should be performed by contractor personnel. In this case, a certain amount of expertise should be developed and maintained within the Air Force establishment to enable monitoring of the contractor operation.

With the emphasis being placed on solving solid waste problems, it is no longer adequate to report refuse quantities by volume. Weight measurements are now the basis of determining the extent of the solid waste problem in civilian communities, and the Air Force should follow suit. Such measurements need not be accomplished for every load of refuse, but once a baseline has been established, periodic spot-checks, possibly monthly, should suffice. Small, transportable scales are available for weighing of trucks through measurements taken at each wheel. Thus, large, permanent, and expensive whole truck platform weighing stations need not be constructed.

## 2. DISPOSAL OF BASE AND FAMILY HOUSING SOLID WASTES

As the amount of solid wastes continues to grow, it becomes more and more important to consider in what way the Air Force will dispose of its wastes. Table I of this report shows that 69.74 percent of base solid wastes are presently disposed of on Air Force land and 26.02 percent are disposed of on non-Air Force land. Similarly, as shown in table III, 52.23 percent of family

housing solid wastes are disposed of on Air Force land and 44.83 percent are disposed of on non-Air Force land. This shows that up until now, landfill has been chosen above other means as the prime disposal method for Air Force solid wastes. How much longer will the Air Force be able to employ landfill? According to the results of the questionnaire, of the 81 Air Force installations that have landfills of their own, approximately 50 percent had fills with a life of less than 10 years. This means that within 10 years or sooner, these installations will have to look elsewhere to dispose of their solid wastes. The immediate answer would appear to be the use of civilian landfill areas. However, it must be emphasized that the civilian population is growing and associated with this is the even more rapid increase in per capita production of refuse.

The first step, of course, is to maximize the use of present landfills. Open dumping and burning must be prohibited. All land disposal sites should be converted to sanitary landfills. This means that the refuse is compacted daily and overlaid with 6 inches of cover material. The final cover should be a minimum of 2 feet of clean dirt.

However, proper operation of a landfill will not prolong the life of the fill indefinitely. The Air Force should investigate volume reduction methods such as incineration, pyrolysis, and recycle to further extend the life of landfill areas as a disposal means.

The latest incineration technology has brought new designs and concepts such as high-temperature, starved-air, and fluidized-bed incineration (Ref. 5). Concepts such as the incineration of refuse and sewage sludge together, the heat of the burning refuse being sufficient to also incinerate the sludge, are coming into view. Incineration may also be a means to convert the energy contained in refuse to electricity.

In pyrolysis, refuse is heated to high temperatures in the absence of oxygen. Valuable gaseous, liquid, and solid products may be recovered from this process. The Air Force should investigate applications to determine if any of these methods are feasible for its use.

Another consideration in the area of disposal is not to dispose of the refuse at all. Although total recycling is something in the future, efforts must be started now to achieve success. This is especially true in the base solid waste area. For instance, the commissary and base exchange facilities are likely places to begin paper and cardboard recycling efforts since there

are large quantities of such wastes generated at these facilities, and they are relatively easily segregated from other wastes. Recycling efforts such as this, along with other disposal means should be included in an optimization study of the type mentioned under the discussion dealing with storage and collection. Recycling efforts may prove to be minimal at the present time, but they will not be so in the future. Emphasis on recycling was put in the Resources Recovery Act of 1970 (Ref. 2). Furthermore, it is of utmost importance that present considerations in the areas of collection, processing, and disposal in general be geared to future improvements. With technology rapidly introducing new techniques, it is no longer economically safe to design a system that will be satisfactory in the present but obsolete in the future. Careful research must be accomplished so that systems employed by the Air Force are designed in such a way that they may be expanded and improved as new and better technology is developed.

The inclusion of Air Force installations into regional planning efforts for solid waste management along with civilian communities should be researched. Establishing processing and disposal sites to handle the solid wastes from a region rather than individual communities has many advantages. With the availability of landfill rapidly decreasing, the cost of disposal will rapidly go up. This will be because of the increase in the cost of available land. Another reason for increased disposal costs is the higher costs of advanced technology for solid waste disposal. The larger volumes of wastes handled regionally usually reduce unit costs for both processing and disposal. It also allows expenditure of sufficient money to provide adequate environmental protective systems and devices. In accordance with PL 91-512 (Ref. 2), regional planning is the preferred approach to future solid waste management efforts.

Along these same lines, it should be determined how small Air Force installations near a large Air Force base should be included in this total picture. Large installations may have to act as a central processing site optimizing management of wastes generated by small installations.

### 3. PATHOLOGICAL WASTES

The questionnaire showed that approximately 50 percent of the incinerators used to burn pathological wastes were 9 years old or older. The oldest is 40 years old. It is doubtful if all or even most of these incinerators can handle present-day wastes. To alleviate some of the problems, more care should be taken in segregating actual pathological wastes from non-pathological wastes

before disposal. This will reduce the number and volume of wastes that must be fed into the pathological incinerator.

Modification or replacement of some pathological incinerators, especially the older ones, may be necessary because they were designed to incinerate wastes of lower heat content than is usually present in today's hospital wastes. The increase is because of the greater use of disposable plastic and paper items. This results in much higher temperatures and may easily damage incinerators designed to burn wastes of lower heat content. To determine which incinerators do not meet air pollution standards, the Environmental Health Laboratories should survey all pathological incinerators for compliance with air pollution legislation. A program for updating and standardizing a family of pathological waste destructor units should be developed for Air Force use.

It is possible that the present concept of entirely segregating pathological wastes from other refuse may prove to be obsolete in the future. This is especially true if incineration and pyrolysis are considered as the future means of disposing of Air Force solid wastes. It will be necessary in such a case to consider integrating the disposal of pathological wastes with other refuse.

#### 4. HERBICIDES, PESTICIDES, AND PETROCHEMICAL WASTES

At the present time there is much controversy concerning the storage and disposal of herbicides, pesticides, and petrochemical wastes. It appears that these wastes have much potential for recycle in the form of material or heat recovery. Material recovery may especially be pertinent to petrochemical wastes which might be refined again to usable substances.

Research should be accomplished on the disposal of these wastes by means of the latest incineration techniques or by pyrolysis with possible recovery of valuable substances and energy. The possibility of regional disposal should be included in the economic analysis of such a study.

During FY 1972 the Environmental Protection Agency (EPA) will conduct a survey of hazardous solid wastes found on federal facilities. The objective of the survey is to determine types, amounts, and locations of these hazardous wastes for the purpose of establishing central disposal sites. It is recommended that the pesticides and herbicides now in storage remain at their present locations unless they present uncontrollable leakage, decomposition to more dangerous products, etc. As an interim measure such wastes should be carefully

repacked into containers that would eliminate any danger to people and property. When hazardous waste disposal sites are established, all these wastes can then be shipped there for processing and final disposal.

## 5. CLASSIFIED WASTES

Classified materials consist of paper, photographic film, or metal. Of the three mentioned here, photographic film has the greatest potential for recycling because of its silver content.

Presently, the Navy is responsible for silver recovery programs throughout DOD. Active research is being conducted in developing chemical means for removing the silver from film, leaving the film base polymer for possible recycle. The Navy is also conducting an optimization study for the most economic placement of film-destruction/silver-recovery units, in particular, film destruction incinerators. The Air Force should closely monitor developments in these studies. Since most of the Navy's efforts are being conducted on a large scale basis, it would be profitable for the Air Force to investigate small-scale film-destruction/silver-recovery units that might be used on installations disposing of small amounts of film. Such systems may easily be integrated and prove to be profitable in an optimization scheme.

## 6. GENERALIZED STUDY

An in-depth study of the solid waste management at several bases should be performed. The bases should be selected to provide the maximum variation in terms of mission, geography, climate, etc., so that the results of the study will have the widest potential applicability to other bases. The study should be aimed at achieving an overall mass balance of solid entering and leaving the base. The objective of the effort should be to determine qualitatively and quantitatively all the sources of solid wastes on these bases, characterize these wastes in terms of quantity and composition, determine areas where the potential exists for economical resource recovery from discarded materials, identify changes in processing and disposal techniques to reduce expenditures in those areas, identify changes in processing and disposal techniques to eliminate or at least keep to an absolute minimum any environmentally detrimental effects, and recommend methods for reducing the quantities of wastes generated at the various sources.

#### SECTION IV RECOMMENDATIONS

The following recommendations are submitted:

1. A study should be done to optimize storage and collection systems with respect to costs. The study should include use of paper or plastic sacks, home-type compactors, centralized refuse containers, the latest collection techniques, etc.

2. Refuse quantities should be reported by weight to give a more accurate accounting of the actual amount of refuse produced.

3. All landfill areas on Air Force installations should be converted to sanitary landfills. This means that the refuse is compacted daily and overlaid with 6 inches of cover material, the final cover being a minimum of 2 feet of clean dirt.

4. The Air Force should investigate volume reduction methods such as incineration, pyrolysis, and recycle to extend the life of landfill areas as disposal means. All the latest technological developments and concepts must be considered.

5. The inclusion of Air Force installations into regional planning efforts should be researched. This is to include how small installations are to fit in the total solid waste management effort.

6. To alleviate some of the problems of incinerating pathological wastes, more care should be taken in segregating actual pathological wastes from non-pathological wastes before incineration. The Environmental Health Laboratories should survey all pathological incinerators for compliance with air pollution legislation so that proper action may be taken where needed.

7. If incineration and pyrolysis are considered as future means of disposing of Air Force wastes, the integration of pathological wastes with other refuse should be studied.

8. Incineration and pyrolysis techniques should be investigated for the disposal of herbicides, pesticides, and petrochemicals with consideration given to material and energy recovery and regionalized disposal.

9. Herbicides and pesticides now in storage that present an immediate danger should be carefully repacked into suitable containers to safeguard people and property from hazards. Various methods should be researched to determine the best handling and disposal means including those mentioned above.

10. The Air Force should closely monitor the Navy's efforts in film destruction and silver recovery. It would be profitable for the Air Force to investigate small-scale units to be used on installations disposing of small amounts of film.

11. An in-depth study of the solid waste management at several bases should be performed. The study should be aimed at achieving a mass balance of solids entering and leaving a base with the ultimate purpose of developing emission factors and determining the most economic solid waste processing and disposal techniques.

## APPENDIX I

## AIR FORCE WASTE PRACTICES QUESTIONNAIRE

## A. Installations Information

1. Name of Installation \_\_\_\_\_
  - a. Major Host Command \_\_\_\_\_
  - b. Station Location Code \_\_\_\_\_
  - c. General Services Administration (GSA) Number \_\_\_\_\_
2. County \_\_\_\_\_
3. State \_\_\_\_\_
4. Nearest City \_\_\_\_\_
5. Name, Grade, and Job Title of Individual Completing Questionnaire \_\_\_\_\_
  - a. Complete duty phone number \_\_\_\_\_
  - b. Complete duty mailing address \_\_\_\_\_
6. Installation Population
  - a. Equivalent population \_\_\_\_\_ (per AFM 88-11)
  - b. Number of people residing in family housing \_\_\_\_\_

## B. Solid Waste Handling -- Divided Into Two Groups:

Group A                      Base  
Group B                      Family Housing

- |                                            |                  |         |
|--------------------------------------------|------------------|---------|
| 1. Where is waste stored prior to pick-up? | Group A          | Group B |
| a. Dumpster                                | _____ %          | _____ % |
| b. Garbage cans                            | _____ %          | _____ % |
| c. Other (specify)                         | _____ %          | _____ % |
|                                            | _____            | _____   |
| 2. Waste collected by                      | Group A          | Group B |
| a. AF Personnel                            | _____ %          | _____ % |
| b. Contract Personnel                      | _____ %          | _____ % |
| c. Other (specify)                         | _____ %          | _____ % |
|                                            | _____            | _____   |
| 3. Frequency of pick-up                    | _____ times/week |         |
| 4. Waste disposed by                       | Group A          | Group B |
| a. Incineration                            | _____ %          | _____ % |
| b. Sanitary land fill                      | _____ %          | _____ % |

- |                    |         |         |
|--------------------|---------|---------|
| c. Open dump       | _____ % | _____ % |
| d. Open burning    | _____ % | _____ % |
| e. Other (specify) | _____ % | _____ % |

- |                                    |                |                |
|------------------------------------|----------------|----------------|
| 5. Where is the disposal facility: | <u>Group A</u> | <u>Group B</u> |
| a. On AF property                  | _____ %        | _____ %        |
| b. On civilian property            | _____ %        | _____ %        |
| c. On other Government property    | _____ %        | _____ %        |

- |                            |                |                |
|----------------------------|----------------|----------------|
| 6. Total quantity disposed | <u>Group A</u> | <u>Group B</u> |
| tons per month             | _____          | _____          |
| cu ft per month            | _____          | _____          |

7. Indicate how the figures for total quantity disposed were arrived at:

\_\_\_\_\_ actual weighing; \_\_\_\_\_ periodic survey;  
 \_\_\_\_\_ estimate; \_\_\_\_\_ other (specify) \_\_\_\_\_

C. Grease Disposal From Dining Halls, Cafeterias, and Open Messes.

1. Grease storage prior to pick-up

- |                    |         |       |
|--------------------|---------|-------|
| a. Garbage cans    | _____ % |       |
| b. Other (specify) | _____ % | _____ |

2. Are cans stored in refrigerator location? Yes \_\_\_\_\_ No \_\_\_\_\_

3. Grease collected by

- |                       |         |       |
|-----------------------|---------|-------|
| a. AF Personnel       | _____ % |       |
| b. Contract Personnel | _____ % |       |
| c. Other (specify)    | _____ % | _____ |

4. Frequency and amount of grease pick-up \_\_\_\_\_ per week.

5. Ultimate disposition of grease \_\_\_\_\_

D. Garbage Grinders

1. Number

- |                                                   |
|---------------------------------------------------|
| a. Dining halls with _____, without _____         |
| b. Cafeterias with _____, without _____           |
| c. Open messes with _____, without _____          |
| d. Family housing units with _____, without _____ |

## E. Solid Wastes Generated in Sewage Treatment

1. How are sludge, grit, etc., ultimately disposed? \_\_\_\_\_
2. If disposed by contract, what is the ultimate disposition? \_\_\_\_\_
3. How much is disposed? \_\_\_\_\_ lbs per month

## F. Pathological Wastes

1. Size of your medical facility \_\_\_\_\_ (number of beds)
2. If pathological wastes are disposed of by incineration:
  - a. Is incinerator designed specifically for pathological wastes? (Type 4, 80-85% moisture) \_\_\_\_\_
  - b. Rated size of incinerator \_\_\_\_\_ lbs/hr of Type 4 wastes
  - c. Average amount burned \_\_\_\_\_ lbs/wk, \_\_\_\_\_ cu ft/wk. (please give both figures.)
  - d. Is incinerator preheated prior to charging? Yes \_\_\_\_\_ No \_\_\_\_\_
  - e. How is residue, ash, etc., disposed of? \_\_\_\_\_
  - f. Has any stack sampling been performed? Yes \_\_\_\_\_ No \_\_\_\_\_
  - g. If so, when, by whom, what analyses (particulate, gaseous, microbiological) were run, and what were the results? \_\_\_\_\_
  - h. Age of incinerator \_\_\_\_\_ (years)
  - i. Type of air pollution control equipment \_\_\_\_\_
  - j. Is there a secondary combustion chamber? \_\_\_\_\_
  - k. Is this incinerator used for other types of wastes? Yes \_\_\_\_\_ No \_\_\_\_\_
  - l. If so, what type and how much? \_\_\_\_\_
  - m. Are there any temperature measurement devices in either or both chambers? \_\_\_\_\_
  - n. What temperatures are maintained? \_\_\_\_\_ °F, primary chamber, \_\_\_\_\_ °F, secondary chamber
3. If pathological wastes are disposed of by means other than incineration, please elaborate \_\_\_\_\_

4. If pathological wastes are sorted prior to disposal, i.e., plastics to land fill, tissue to incinerator, etc., please elaborate \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

5. What is composition of your pathological wastes?  
 \_\_\_\_\_ % tissue, \_\_\_\_\_ % plastics, \_\_\_\_\_ % bandages,  
 \_\_\_\_\_ % paper, \_\_\_\_\_ % other (specify) \_\_\_\_\_  
 \_\_\_\_\_

6. How did you arrive at composition figures? \_\_\_\_\_  
 \_\_\_\_\_

#### G. Classified Wastes

1. How are classified wastes disposed of? (If more than one is applicable, indicate percent for each.)

- a. Incineration \_\_\_\_\_ %  
 b. Grinding \_\_\_\_\_ %  
 c. Pulping \_\_\_\_\_ %  
 d. Other (specify) \_\_\_\_\_  
 \_\_\_\_\_

2. If incinerated:

- a. Is it a multiple- or single-chamber incinerator? \_\_\_\_\_  
 b. Rated capacity of incinerator (lbs/24 hrs) \_\_\_\_\_  
 c. Average amount burned (lbs/24 hrs) \_\_\_\_\_  
 d. Average operating time (hrs/day and days/week) \_\_\_\_\_  
 e. Number of operating personnel per shift \_\_\_\_\_  
 f. Age of incinerator (yrs) \_\_\_\_\_  
 g. Has any stack sampling been performed? Yes \_\_\_\_\_ No \_\_\_\_\_  
 h. When? \_\_\_\_\_  
 i. Who performed it (Organization) \_\_\_\_\_  
 j. What were the results, and does the incinerator meet Federal/State criteria? \_\_\_\_\_  
 \_\_\_\_\_  
 k. How are ashes disposed of? \_\_\_\_\_  
 l. Type of air pollution control equipment installed (if any) \_\_\_\_\_  
 \_\_\_\_\_

3. If grinding or pulping, what is ultimate disposal? \_\_\_\_\_  
 \_\_\_\_\_

4. Monthly quantity disposed of (lbs) \_\_\_\_\_

H. Liquid Industrial Wastes:

1. Volume of waste engine oil generated per month \_\_\_\_\_ gallons.
  - a. How is it disposed of? \_\_\_\_\_
  - b. If by contract, how often and the cost? \_\_\_\_\_
  - c. If by fire department, how often do they burn? \_\_\_\_\_
  
2. Volume of waste hydraulic fluid generated per month \_\_\_\_\_ gallons:
  - a. How is it disposed of? \_\_\_\_\_
  - b. If by contract, how often and the cost? \_\_\_\_\_
  - c. If by fire department, how often do they burn? \_\_\_\_\_
  
3. Volume of industrial wastes (cutting oils, cleaners, strippers, and other petrochemical wastes not included in other answers) generated per month \_\_\_\_\_ gallons.
  - a. How is it disposed of? \_\_\_\_\_
  - b. If by contract, how often and the cost? \_\_\_\_\_
  - c. If by fire department, how often do they burn? \_\_\_\_\_
  
4. Volume of contaminated or out of spec fuel generated per month \_\_\_\_\_ gallons.
  - a. How is it disposed of? \_\_\_\_\_
  - b. If by contract, how often and cost? \_\_\_\_\_
  - c. If by fire department, how often do they burn? \_\_\_\_\_
  
5. Emergency destruction of fuel
  - a. How often during FY 1970? \_\_\_\_\_
  - b. Method(s) of disposal \_\_\_\_\_
  - c. Total volume \_\_\_\_\_ gallons
  - d. Material and contaminant involved \_\_\_\_\_

6. Fire fighting training of open fires

- a. Frequency for maintaining proficiency \_\_\_\_\_
- b. Frequency for training recruits \_\_\_\_\_
- c. Source and volume of combustibles \_\_\_\_\_
- d. Are efforts made to perform training under favorable meteorological conditions; i.e., maximum dispersion, winds in direction of unoccupied areas, etc.? Yes \_\_\_\_\_ No \_\_\_\_\_

I. Pesticide and Herbicide Disposal

1. How are waste pesticides/herbicides disposed of? \_\_\_\_\_
2. What types, quantities, and by what method did you dispose of any pesticides/herbicides during FY 1970? \_\_\_\_\_
3. What types and quantities of herbicides/pesticides are stored pending disposal instructions? \_\_\_\_\_

J. Other

1. What effect does disposal have on the environment; i.e., smoke, odors, etc., from incineration or open burning; vector breeding, bird attraction, blowing paper, etc., from land fill; water pollution, i.e., by improper disposal of residue quench water from an incinerator or leaching from a land fill? \_\_\_\_\_

2. Sanitary Land Fill

- a. Is base solid waste disposed of in sanitary land fill? Yes \_\_\_\_\_  
No \_\_\_\_\_

If yes, answer b through g.

b. Operations for fill \_\_\_\_\_ number of people  
 \_\_\_\_\_ hours per day

c. Type of equipment available and amount of time available at site.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

d. Is refuse covered daily (6 inches of cover)? Yes \_\_\_\_\_  
 No \_\_\_\_\_

If not, how often is it covered? \_\_\_\_\_

e. Type of land fill: \_\_\_\_\_ trench  
 \_\_\_\_\_ area

f. Estimated life of present fill area \_\_\_\_\_ years (based on 15-acre  
 feet/10,000 people/yr.

g. Is completed fill covered with minimum of 2 feet of compacted earth?

Yes \_\_\_\_\_  
 No \_\_\_\_\_

### 3. Sedimentation From Erosion

a. Rate erodibility of base land subject to current and/or future  
 construction

\_\_\_\_\_ Severe, \_\_\_\_\_ Moderate, \_\_\_\_\_ Slight

b. What erosion control practices are used on sites during construc-  
 tion?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

c. Estimate area currently denuded by grading without temporary cover  
 du to contruction activities.

\_\_\_\_\_ acres

K. Additional Comments (attach additional sheets as required).

## APPENDIX II

## BASE SOLID WASTES

| <u>Air Force base</u>                                   | <u>Quantity<br/>(ton/mo)</u> | <u>rounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |               |              |
|---------------------------------------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|---------------|--------------|
|                                                         |                              |                                          |                                        | <u>Land</u>                  |               | <u>Other</u> |
|                                                         |                              |                                          |                                        | <u>AF</u>                    | <u>Non-AF</u> |              |
| Air Force Academy, CO                                   | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |               |              |
| Aeronautical Chart and Information Center, St Louis, MO | 70.8                         | 1.29                                     | 74.98                                  |                              | 70.8          |              |
| Altus AFB, OK                                           | 207.0                        | 1.03                                     | 120.59                                 |                              | 207.0         |              |
| Andrews AFB, Wash, DC                                   | 914.0                        | 7.17                                     | 238.43                                 |                              | 914.0         |              |
| Barksdale AFB, LA                                       | 451.0                        | 3.28                                     | 135.03                                 | 451.0                        |               |              |
| Beale AFB, CA                                           | 1396.0                       | 8.00                                     | 263.32                                 | 1396.0                       |               |              |
| Bergstrom AFB, TX                                       | 190.0                        | 1.77                                     | 42.22                                  | 190.0                        |               |              |
| Blytheville AFB, AR                                     | 750.0                        | 9.41                                     | 246.71                                 | 600.0                        | 150.0         |              |
| Bolling AFB, Wash, DC                                   | 758.0                        | 8.43                                     | 201.94                                 |                              | 379.0         | 379 I-C      |
| Brooks AFB, TX                                          | 224.5                        | 4.29                                     | 200.00                                 | 168.0                        | 56.5          |              |
| Cannon AFB, NM                                          | 160                          | 1.26                                     | 157.09                                 | 160.0                        |               |              |
| Carswell AFB, TX                                        | 890.0                        | 12.11                                    | 356.00                                 | 890.0                        |               |              |
| Castle AFB, CA                                          | 80.5                         | 0.82                                     | 26.83                                  | 80.5                         |               |              |
| Chanute AFB, IL                                         | 480.0                        | 2.77                                     | 82.57                                  | 480.0                        |               |              |
| Charleston AFB, SC                                      | 1000.0                       | 6.16                                     | 125.00                                 | 1000.0                       |               |              |
| Columbus AFB, MS                                        | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |               |              |
| Craig AFB, AL                                           | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |               |              |
| Davis-Monthan AFB, AZ                                   | 1216.0                       | 2.91                                     | 269.95                                 | 1216.0                       |               |              |

| <u>Air Force base</u>      | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |               |                     |
|----------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|---------------|---------------------|
|                            |                              |                                          |                                        | <u>Land</u>                  |               | <u>Other</u>        |
|                            |                              |                                          |                                        | <u>AF</u>                    | <u>Non-AF</u> |                     |
| Dover AFB, DE              | 4050.0                       | 27.01                                    | 810.0                                  |                              | 4050.0        |                     |
| Dyess AFB, TX              | 90.0                         | 1.12                                     | 35.29                                  | 76.5                         |               | 13.5 R              |
| Edwards AFB, CA            | 125.5                        | 0.75                                     | 748.59                                 | 125.5                        |               |                     |
| Eglin Aux Fld<br>No. 9, FL | 945.0                        | 16.08                                    | 270.00                                 | 945.0                        |               |                     |
| Eglin AFB, FL              | 800.0                        | 4.14                                     | 132.92                                 | 800.0                        |               |                     |
| Ellsworth AFB, SD          | 648.0                        | 4.22                                     | 324.00                                 | 648.0                        |               |                     |
| England AFB, LA            | 1050.0                       | 12.21                                    | 240.25                                 |                              | 1050.0        |                     |
| Ent AFB, CO                | 1473.0                       | 19.04                                    | 208.44                                 | 1450.0                       | 23.0          |                     |
| Fairchild AFB, WA          | 1736.1                       | 21.57                                    | 148.14                                 | 1728.1                       |               | 8 I-AF              |
| Forbes, KS                 | 875.0                        | 8.91                                     | 810.19                                 | 875.0                        |               |                     |
| F. E. Warren AFB,<br>WY    | 325.0                        | 3.22                                     | 121.95                                 | 325.0                        |               |                     |
| George AFB, CA             | 230.0                        | 2.01                                     | 76.67                                  | 230.0                        |               |                     |
| Goodfellow AFB,<br>TX      | 194.0                        | 3.41                                     | 272.10                                 | 192.06                       |               | 1.94 S              |
| Grand Forks AFB,<br>ND     | 660.0                        | 3.81                                     | 538.78                                 | 660.0                        |               |                     |
| Griffiss AFB, NY           | 989.4                        | 8.91                                     | 270.00                                 | 989.4                        |               |                     |
| Grissom AFB, IN            | 714.42                       | 8.12                                     | 202.50                                 |                              | 714.42        |                     |
| Gunter AFB, AL             | 205.0                        | 9.62                                     | 170.83                                 |                              | 205.0         |                     |
| Hamilton AFB, CA           | 300.0                        | 2.57                                     | 163.93                                 |                              | 300.0         |                     |
| Hill AFB, UT               | 568.0                        | 3.51                                     | 64.78                                  | 378.0                        | 99.0          | 91 R                |
| Holloman AFB, NM           | 232.0                        | 1.35                                     | 201.09                                 | 229.68                       |               | 2.32 I-AF           |
| Homestead AFB, FL          | 535.0                        | 2.55                                     | 299.10                                 |                              | 535.0         |                     |
| Keesler AFB, MS            | 2847.0                       | 8.68                                     | 230.00                                 | 34.2                         | 2812.8        |                     |
| Kelly AFB, TX              | 940.0                        | 1.89                                     | 34.03                                  | 42.3                         | 676.0         | { 4.7 I-AF<br>217 R |

| <u>Air Force base</u>    | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |                   |
|--------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|-------------------|
|                          |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u>      |
| Kincheloe AFB, MI        | 15.0                         | 0.14                                     | 202.50                                 | 15.0                         |                        |                   |
| Kingsley AFB, OR         | 170.0                        | 5.51                                     | 222.17                                 |                              | 161.5                  | 8.5 I-C           |
| Kirtland AFB, NM         | 375.0                        | 5.27                                     | 100.00                                 |                              | 375.0                  |                   |
| K. I. Sawyer AFB,<br>MI  | 700.0                        | 5.45                                     | 248.41                                 | 700.0                        |                        |                   |
| Lackland AFB, TX         | Unknown                      | Unknown                                  | Unknown                                | (90%)                        | (10%)                  |                   |
| Langley AFB, VA          | 350.0                        | 2.45                                     | 270.00                                 | 343.0                        |                        | 7 I-AF            |
| Laredo AFB, TX           | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |                        |                   |
| Laughlin AFB, TX         | 270.0                        | 4.32                                     | 675.00                                 |                              | 243.0                  | 27 H              |
| L. G. Hanscom Fld,<br>MA | 570.0                        | 6.11                                     | 270.00                                 | 550.0                        |                        | 20 I-AF           |
| Little Rock AFB,<br>AR   | 80.0                         | 0.59                                     | 23.98                                  | 4.0                          | 76.0                   |                   |
| Lockbourne AFB,<br>OH    | 365.0                        | 3.53                                     | 48.67                                  | 365.0                        |                        |                   |
| Loring AFB, ME           | 888.0                        | 5.15                                     | 204.92                                 | 888.0                        |                        |                   |
| Lowry AFB, CO            | 332.0                        | 1.93                                     | 619.92                                 |                              | 328.7                  | 3.3 R             |
| Luke AFB, AZ             | 244.0                        | 2.14                                     | 70.01                                  |                              | 244.0                  |                   |
| MacDill AFB, FL          | 420.0                        | 2.61                                     | 83.92                                  | 420.0                        |                        |                   |
| Malmstrom AFB, MT        | 200.0                        | 1.31                                     | 275.09                                 | 198.0                        |                        | 2 H               |
| March AFB, CA            | 90.0                         | 0.80                                     | 39.51                                  | 87.0                         |                        | 3 I-C             |
| Mather AFB, CA           | 945.0                        | 8.08                                     | 189.00                                 | 945.0                        |                        |                   |
| Maxwell AFB, AL          | 516.6                        | 3.84                                     | 165.45                                 |                              | 516.16                 |                   |
| McChord AFB, WA          | 1397.0                       | 6.83                                     | 179.19                                 | 1397.0                       |                        |                   |
| McClellan AFB, CA        | 1939.0                       | 5.62                                     | 54.54                                  | 194.0                        |                        | 775 I-AF<br>970 R |
| McConnell AFB, KS        | 231.0                        | 3.80                                     | 250.00                                 |                              | 213.0                  |                   |
| McCoy AFB, FL            | 3470.2                       | 37.82                                    | 1505.54                                | 3470.2                       |                        |                   |

| <u>Air Force base</u>      | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |                       |
|----------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|-----------------------|
|                            |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u>          |
| McGuire AFB, NJ            | 972.0                        | 3.53                                     | 324.00                                 | 972.0                        |                        |                       |
| Minot AFB, ND              | 660.0                        | 2.92                                     | 377.14                                 | 594.0                        | 64.5                   | 1.5 H                 |
| Moody AFB, GA              | 68.0                         | 1.44                                     | 188.31                                 | 67.0                         |                        | 1.0 H                 |
| Mountain Home<br>AFB, ID   | 160.0                        | 1.24                                     | 144.00                                 | 160                          |                        |                       |
| Myrtle Beach<br>AFB, SC    | 520.2                        | 5.23                                     | 159.99                                 | 520.0                        |                        | 0.2 I-AF              |
| Nellis AFB, NV             | 613.5                        | 4.20                                     | 126.76                                 | 613.5                        |                        |                       |
| Norton AFB, CA             | 204.46                       | 1.18                                     | 25.56                                  | 199.58                       |                        | { 0.40 I-AF<br>4.48 R |
| Offutt AFB, NE             | 500.0                        | 2.71                                     | 101.24                                 | 500.0                        |                        |                       |
| Otis AFB, MA               | 220.0                        | 4.94                                     | 209.52                                 | 220.0                        |                        |                       |
| Patrick AFB, FL            | 1255.0                       | 9.43                                     | 216.52                                 | 1255.0                       |                        |                       |
| Pease AFB, NH              | 335.0                        | 3.87                                     | 606.88                                 | 335                          |                        |                       |
| Perrin AFB, TX             | Unknown                      | Unknown                                  | Unknown                                |                              | (100%)                 |                       |
| Plattsburgh AFB,<br>NY     | 159.0                        | 1.16                                     | 1039.19                                | 159.0                        |                        |                       |
| Pope AFB, NC               | 249.0                        | 3.84                                     | 99.72                                  |                              | 249.0                  |                       |
| Randolph AFB, TX           | 301.05                       | 2.68                                     | 270.85                                 |                              | 286.00                 | 15.05 R               |
| Reese AFB, TX              | 1296.0                       | 24.01                                    | 869.51                                 | 1296.0                       |                        |                       |
| Richards-Gebaur<br>AFB, MO | 213.0                        | 1.53                                     | 88.34                                  |                              | 213.0                  |                       |
| Robins AFB, GA             | 437.0                        | 1.07                                     | 133.27                                 | 437.0                        |                        |                       |
| Scott AFB, IL              | 252.0                        | 1.49                                     | 250.00                                 | 252.0                        |                        |                       |
| Selfridge AFB,<br>MI       | 228.0                        | 2.42                                     | 120.71                                 | 228.0                        |                        |                       |
| Seymour-Johnson<br>AFB, NC | 241.0                        | 1.89                                     | 180.75                                 | 241.0                        |                        |                       |
| Shaw AFB, SC               | 370.0                        | 1.37                                     | 83.25                                  | 333.0                        |                        | 37 H                  |

| Air Force base              | Quantity<br>(ton/mo) | Pounds per<br>person<br>per day | Density<br>(lb/yd <sup>3</sup> ) | AF     | Disposal<br>(ton/mo) |                |
|-----------------------------|----------------------|---------------------------------|----------------------------------|--------|----------------------|----------------|
|                             |                      |                                 |                                  |        | Land                 | Other          |
|                             |                      |                                 |                                  |        | Non-AF               |                |
| Sheppard AFB, TX            | 740.0                | 3.32                            | 328.89                           | 586.0  |                      | { 29 R<br>25 H |
| Tinker AFB, OK              | 1206.0               | 8.35                            | 60.00                            |        | 1206.0               |                |
| Travis AFB, CA              | Unknown              | Unknown                         | Unknown                          | (100%) |                      |                |
| Tyndall AFB, FL             | 3613.0               | 28.73                           | 807.37                           | 3613.0 |                      |                |
| Vance AFB, OK               | 70.0                 | 2.09                            | 189.19                           |        | 70.0                 |                |
| Vandenberg AFB,<br>CA       | 4840.0               | 18.61                           | 450.23                           | 4840.0 |                      |                |
| Webb AFB, TX                | 70.0                 | 1.56                            | 54.00                            | 66.0   |                      | 4 I-AF         |
| Westover AFB, MA            | 634.0                | 4.41                            | 80.98                            | 634.0  |                      |                |
| Whiteman AFB, MO            | 300.0                | 2.98                            | 212.01                           |        | 300.0                |                |
| Williams AFB, AZ            | 90.0                 | 1.46                            | 36.00                            | 90.0   |                      |                |
| Wright-Patterson<br>AFB, OH | 1153.0               | 3.19                            | 89.50                            | 1153.0 |                      |                |
| Wurtsmith AFB,<br>MI        | Unknown              | Unknown                         | Unknown                          | (100%) |                      |                |

## Abbreviations used for disposal:

C-Non-Air Force  
 AF-Air Force  
 I-Incineration  
 R-Recycle  
 H-Hog feed

## APPENDIX III

## FAMILY HOUSING SOLID WASTES

| <u>Air Force base</u>                                   | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |              |
|---------------------------------------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|--------------|
|                                                         |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u> |
| Air Force Academy, CO                                   | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |                        |              |
| Aeronautical Chart and Information Center, St Louis, MO | 1.98                         | 6.60                                     | 203.08                                 |                              | 1.98                   |              |
| Altus AFB, OK                                           | 72.00                        | 2.31                                     | 104.73                                 |                              | 72.00                  |              |
| Andrews AFB, Wash, DC                                   | 588.00                       | 9.07                                     | 560.00                                 |                              | 588.00                 |              |
| Barksdale AFB, LA                                       | 292.00                       | 6.08                                     | 269.57                                 | 292.00                       |                        |              |
| Beale AFB, CA                                           | 590.00                       | 4.65                                     | 269.77                                 | 590.00                       |                        |              |
| Bergstrom AFB, TX                                       | 110.00                       | 3.49                                     | 42.02                                  | 110.00                       |                        |              |
| Blytheville AFB, AR                                     | 190.00                       | 3.12                                     | 250.06                                 | 190.00                       |                        |              |
| Bolling AFB, Wash, DC                                   | 82.00                        | 3.15                                     | 62.72                                  |                              | 41.00                  | 41 I-C       |
| Brooks AFB, TX                                          | 94.50                        | 5.31                                     | 200.00                                 | 59.50                        | 35.00                  |              |
| Cannon AFB, NM                                          | 48.00                        | 0.85                                     | 162.00                                 |                              | 48.00                  |              |
| Carswell AFB, TX                                        | 730.00                       | 13.91                                    | 358.36                                 |                              | 730.00                 |              |
| Castle AFB, CA                                          | 44.50                        | 1.26                                     | 161.82                                 |                              | 44.50                  |              |
| Chanute AFB, IL                                         | 34.32                        | 0.35                                     | 81.11                                  | 34.32                        |                        |              |
| Charleston AFB, SC                                      | 190.00                       | 3.18                                     | 124.84                                 |                              | 190.00                 |              |
| Columbus AFB, MS                                        | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |                        |              |
| Craig AFB, AL                                           | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |                        |              |
| Davis-Monthan AFB, AZ                                   | 290.00                       | 8.57                                     | 271.42                                 |                              | 290.00                 |              |

| <u>Air Force Base</u>      | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |              |
|----------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|--------------|
|                            |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u> |
| Dover AFB, DE              | 526.00                       | 5.95                                     | 809.23                                 |                              | 526.00                 |              |
| Dyess AFB, TX              | 40.00                        | 0.76                                     | 25.81                                  | 40.00                        |                        |              |
| Edwards AFB, CA            | 283.00                       | 1.89                                     | 749.12                                 | 283.00                       |                        |              |
| Eglin Aux Fld<br>No. 9, FL | 95.90                        | 6.53                                     | 262.21                                 | 95.90                        |                        |              |
| Eglin AFB, FL              | 150.00                       | 1.25                                     | 124.62                                 | 150.00                       |                        |              |
| Ellsworth AFB, SD          | 199.00                       | 1.74                                     | 404.88                                 |                              | 199.00                 |              |
| England AFB, LA            | 146.00                       | 3.18                                     | 240.37                                 |                              | 146.00                 |              |
| Ent AFB, CO                | 112.00                       | 6.05                                     | 207.84                                 | 14.00                        | 98.00                  |              |
| Fairchild AFB, WA          | 824.10                       | 7.14                                     | 148.14                                 | 64.10                        | 760.00                 |              |
| Forbes AFB, KS             | 170.00                       | 2.37                                     | 809.52                                 |                              | 170.00                 |              |
| F. E. Warren AFB,<br>WY    | 53.00                        | 1.09                                     | 133.96                                 | 53.00                        |                        |              |
| Georgé AFB, CA             | 192.00                       | 2.76                                     | 76.80                                  | 192.00                       |                        |              |
| Goodfellow AFB,<br>TX      | 8.00                         | 1.49                                     | 78.66                                  | 8.00                         |                        |              |
| Grand Forks AFB,<br>ND     | 310.00                       | 2.37                                     | 539.13                                 |                              | 310.00                 |              |
| Griffiss AFB, NY           | 245.70                       | 4.59                                     | 275.76                                 | 245.70                       |                        |              |
| Grissom AFB, IN            | 236.52                       | 3.64                                     | 270.00                                 |                              | 236.52                 |              |
| Gunter AFB, AL             | 49.30                        | 5.34                                     | 176.07                                 |                              | 49.3                   |              |
| Hamilton AFB, CA           | 200.00                       | 2.96                                     | 119.05                                 |                              | 200.00                 |              |
| Hill AFB, UT               | 179.00                       | 2.51                                     | 78.25                                  | 179.00                       |                        |              |
| Holloman AFB, NM           | 278.00                       | 3.22                                     | 269.08                                 | 278.00                       |                        |              |
| Homestead AFB, FL          | 347.00                       | 4.63                                     | 299.81                                 |                              | 347.00                 |              |
| Keesler AFB, MS            | 728.00                       | 7.05                                     | 229.94                                 | 76.50                        | 651.50                 |              |
| Kelly AFB, TX              | 270.00                       | 7.05                                     | 55.38                                  |                              | 208.00                 | 62 R         |

| <u>Air Force base</u>    | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |              |
|--------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|--------------|
|                          |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u> |
| Kincheloe AFB, MI        | 2.80                         | 0.04                                     | 196.36                                 |                              | 2.80                   |              |
| Kingsley AFB, OR         | 92.00                        | 6.05                                     | 194.43                                 |                              | 87.40                  | 4.6 I-C      |
| Kirtland AFB, NM         | 125.00                       | 4.17                                     | 197.95                                 |                              | 125.00                 |              |
| K. I. Sawyer AFB,<br>MI  | 338.00                       | 3.25                                     | 358.88                                 | 338.00                       |                        |              |
| Lackland AFB, TX         | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |                        |              |
| Langley AFB, VA          | 350.00                       | 5.08                                     | 270.00                                 | 350.00                       |                        |              |
| Laredo AFB, TX           | Unknown                      | Unknown                                  | Unknown                                |                              | (100%)                 |              |
| Laughlin AFB, TX         | 219.00                       | 5.58                                     | 675.77                                 |                              | 219.00                 |              |
| L. G. Hanscom Fld,<br>MA | 300.00                       | 6.22                                     | 270.00                                 |                              |                        | 300 I-C      |
| Little Rock AFB,<br>AR   | 17.00                        | 0.19                                     | 32.45                                  | 0.50                         | 16.50                  |              |
| Lockbourne AFB,<br>OH    | 130.00                       | 3.09                                     | 433.33                                 |                              | 130.00                 |              |
| Loring AFB, ME           | 656.00                       | 4.62                                     | 192.86                                 | 656.00                       |                        |              |
| Lowry AFB, CO            | 68.00                        | 2.17                                     | 615.08                                 | 67.3                         |                        | 0.7          |
| Luke AFB, AZ             | 93.00                        | 2.01                                     | 76.54                                  |                              | 93.00                  |              |
| MacDill AFB, FL          | 61.00                        | 1.46                                     | 84.37                                  | 61.00                        |                        |              |
| Malstrom AFB, MT         | 456.00                       | 4.02                                     | 215.86                                 | 456.00                       |                        |              |
| March AFB, CA            | 40.00                        | 1.30                                     | 37.89                                  | 2.00                         | 38.00                  |              |
| Mather AFB, CA           | 1215.00                      | 16.33                                    | 270.00                                 | 1215.00                      |                        |              |
| Maxwell AFB, AL          | 344.40                       | 7.73                                     | 165.45                                 |                              | 344.40                 |              |
| McChord AFB, WA          | 115.00                       | 1.85                                     | 115.00                                 | 115.00                       |                        |              |
| McClellan AFB, CA        | 213.00                       | 4.35                                     | 74.07                                  |                              | 213.00                 |              |
| McConnell AFB, KS        | 81.00                        | 3.00                                     | 123.63                                 |                              | 81.00                  |              |
| McCoy AFB, FL            | 109.20                       | 2.07                                     | 123.46                                 |                              | 109.20                 |              |

| <u>Air Force base</u>      | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |              |
|----------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|--------------|
|                            |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u> |
| McGuire AFB, NJ            | 324.00                       | 3.52                                     | 324.00                                 | 324.00                       |                        |              |
| Minot AFB, ND              | 1824.00                      | 18.26                                    | 375.22                                 | 1824.00                      |                        |              |
| Moody AFB, GA              | 23.00                        | 3.36                                     | 191.08                                 | 23.00                        |                        |              |
| Mountain Home<br>AFB, ID   | 162.00                       | 1.61                                     | 140.64                                 | 162.00                       |                        |              |
| Myrtle Beach<br>AFB, SC    | 95.80                        | 2.32                                     | 160.07                                 | 76.60                        | 19.20                  |              |
| Nellis AFB, NV             | 229.50                       | 3.43                                     | 126.87                                 | 229.50                       |                        |              |
| Norton AFB, CA             | 3.00                         | 2.57                                     | 25.00                                  | 3.00                         |                        |              |
| Offutt AFB, NE             | 400.00                       | 3.20                                     | 114.29                                 |                              | 400.00                 |              |
| Otis AFB, MA               | 81.00                        | 1.25                                     | 270.00                                 | 81.00                        |                        |              |
| Patrick AFB, FL            | 635.00                       | 6.60                                     | 270.00                                 | 635.00                       |                        |              |
| Pease AFB, NH              | 235.00                       | 5.70                                     | 606.97                                 |                              |                        | 235 I-C      |
| Perrin AFB, TX             | Unknown                      | Unknown                                  | Unknown                                |                              | (100%)                 |              |
| Plattsburgh AFB,<br>NY     | 171.00                       | 2.02                                     | 1081.14                                | 171.00                       |                        |              |
| Pope AFB, NC               | 37.00                        | 2.05                                     | 99.96                                  |                              | 37.00                  |              |
| Randolph AFB, TX           | 136.00                       | 2.34                                     | 270.00                                 |                              | 136.00                 |              |
| Reese AFB, TX              | 158.00                       | 6.56                                     | 268.71                                 | 158.00                       |                        |              |
| Richards-Gebaur<br>AFB, MO | 41.90                        | 1.75                                     | 49.97                                  |                              | 41.90                  |              |
| Robins AFB, GA             | 57.00                        | 0.69                                     | 133.75                                 | 57.00                        |                        |              |
| Scott AFB, IL              | 70.00                        | 0.73                                     | 437.50                                 |                              | 70.00                  |              |
| Selfridge AFB,<br>MI       | 121.00                       | 1.78                                     | 78.72                                  | 121.00                       |                        |              |
| Seymour-Johnson<br>AFB, NC | 92.00                        | 1.14                                     | 184.00                                 |                              | 92.00                  |              |
| Shaw AFB, SC               | 107.00                       | 2.12                                     | 81.73                                  |                              | 107.00                 |              |

| <u>Air Force base</u>       | <u>Quantity<br/>(ton/mo)</u> | <u>Pounds per<br/>person<br/>per day</u> | <u>Density<br/>(lb/yd<sup>3</sup>)</u> | <u>Disposal<br/>(ton/mo)</u> |                        |              |
|-----------------------------|------------------------------|------------------------------------------|----------------------------------------|------------------------------|------------------------|--------------|
|                             |                              |                                          |                                        | <u>AF</u>                    | <u>Land<br/>Non-AF</u> | <u>Other</u> |
| Sheppard AFB, TX            | 270.00                       | 4.05                                     | 269.87                                 |                              | 270.00                 |              |
| Tinker AFB, OK              | 142.50                       | 4.80                                     | 75.00                                  |                              | 142.50                 |              |
| Travis AFB, CA              | Unknown                      | Unknown                                  | Unknown                                | (100%)                       |                        |              |
| Tyndall AFB, FL             | 321.00                       | 7.28                                     | 55.26                                  | 256.80                       | 64.20                  |              |
| Vance AFB, OK               | 36.00                        | 2.64                                     | 103.45                                 |                              | 36.00                  |              |
| Vandenberg AFB,<br>CA       | 439.00                       | 3.04                                     | 149.85                                 | 439.00                       |                        |              |
| Webb AFB, TX                | 105.00                       | 3.50                                     | 54.00                                  |                              | 105.00                 |              |
| Westover AFB, MA            | 274.00                       | 3.05                                     | 114.17                                 |                              | 274.00                 |              |
| Whiteman AFB, MO            | 600.00                       | 10.37                                    | 179.08                                 |                              | 600.00                 |              |
| Williams AFB, AZ            | 125.00                       | 3.95                                     | 250.00                                 | 125.00                       |                        |              |
| Wright-Patterson<br>AFB, OH | 512.00                       | 3.51                                     | 89.10                                  | 512.00                       |                        |              |
| Wurtsmith AFB,<br>MI        | Unknown                      | Unknown                                  | Unknown                                | (10%)                        | (90%)                  |              |

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Abbreviations used for disposal:

C-Non-Air Force  
 AF-Air Force  
 I-Incineration  
 R-Recycle  
 H-Hog feed

## APPENDIX IV

## SEWAGE TREATMENT

| <u>Air Force base</u>                                            | <u>Quantity of<br/>sludge and grit<br/>(lb/mo)</u> | <u>Landfill</u> | <u>Disposal method</u> |              |
|------------------------------------------------------------------|----------------------------------------------------|-----------------|------------------------|--------------|
|                                                                  |                                                    |                 | <u>Fertilizer</u>      | <u>Other</u> |
| Air Force Academy,<br>CO                                         | Unknown                                            | X               | X                      |              |
| Aeronautical Chart<br>and Information<br>Center, St Louis,<br>MO | NT                                                 |                 |                        |              |
| Altus AFB, OK                                                    | 500                                                | X               |                        |              |
| Andrews AFB, Wash,<br>DC                                         | 31,000                                             | X               | X                      |              |
| Barksdale AFB, LA                                                | NT                                                 |                 |                        |              |
| Beale AFB, CA                                                    | Unknown                                            | X               | X                      |              |
| Bergstrom AFB, TX                                                | NT                                                 |                 |                        |              |
| Blytheville AFB, AR                                              | 10,200                                             | X               |                        |              |
| Bolling AFB, Wash,<br>DC                                         | NT                                                 |                 |                        |              |
| Brooks AFB, TX                                                   | NT                                                 |                 |                        |              |
| Cannon AFB, NM                                                   | (Lagoons)                                          |                 |                        | Lagoons      |
| Carswell AFB, TX                                                 | NT                                                 |                 |                        |              |
| Castle AFB, CA                                                   | 1,000                                              | X               | X                      |              |
| Chanute AFB, IL                                                  | 350,000                                            | X               |                        |              |
| Charleston AFB, SC                                               | 2,000                                              | X               |                        |              |
| Columbus AFB, MS                                                 | 10,000                                             | X               |                        |              |
| Craig AFB, AL                                                    | 5,000                                              | X               |                        |              |
| Davis-Monthan AFB,<br>AZ                                         | NT                                                 |                 |                        |              |
| Dover AFB, DE                                                    | 700                                                | X               |                        |              |
| Dyess AFB, TX                                                    | NT                                                 |                 |                        |              |

| <u>Air Force base</u>      | Quantity of<br>sludge and grit<br>(lb/mo) | <u>Landfill</u> | <u>Disposal method</u> |                   |
|----------------------------|-------------------------------------------|-----------------|------------------------|-------------------|
|                            |                                           |                 | <u>Fertilizer</u>      | <u>Other</u>      |
| Edwards AFB, CA            | 9,570                                     | X               |                        |                   |
| Eglin Aux Fld No. 9,<br>FL | 4,000                                     | X               |                        |                   |
| Eglin AFB, FL              | 564,000                                   | X               |                        |                   |
| Ellsworth AFB, SD          | 24,700                                    | X               |                        |                   |
| England AFB, LA            | (Oxidation pond)                          |                 |                        | Oxidation<br>pond |
| Ent AFB, CO                | NT                                        |                 |                        |                   |
| Fairchild AFB, WA          | 15,188                                    |                 | X                      |                   |
| Forbes AFB, KS             | 34,000                                    | X               |                        |                   |
| F. E. Warren AFB,<br>WY    | NT                                        |                 |                        |                   |
| George AFB, CA             | 1,400                                     |                 | X                      |                   |
| Goodfellow AFB, TX         | 6,000                                     |                 | X                      |                   |
| Grand Forks AFB, ND        | (Lagoon)                                  |                 |                        | Lagoon            |
| Griffiss AFB, NY           | NT                                        |                 |                        |                   |
| Grissom AFB, IN            | 19,200                                    | X               |                        |                   |
| Gunter AFB, AL             | NT                                        |                 |                        |                   |
| Hamilton AFB, CA           | 10,000                                    | X               |                        |                   |
| Hill AFB, UT               | NT                                        |                 |                        |                   |
| Holloman AFB, NM           | 1,750                                     | X               |                        |                   |
| Homestead AFB, FL          | 10,500                                    | X               |                        |                   |
| Keesler AFB, MS            | 53,200                                    | X               | X                      |                   |
| Kelly AFB, TX              | NT                                        |                 |                        |                   |
| Kincheloe AFB, MI          | 7,000                                     | X               |                        |                   |
| Kingsley AFB, OR           | NT                                        |                 |                        |                   |
| Kirtland AFB, NM           | NT                                        |                 |                        |                   |

| <u>Air Force base</u>    | <u>Quantity of<br/>sludge and grit<br/>(lb/mo)</u> | <u>Disposal method</u> |                   |              |
|--------------------------|----------------------------------------------------|------------------------|-------------------|--------------|
|                          |                                                    | <u>Landfill</u>        | <u>Fertilizer</u> | <u>Other</u> |
| K. I. Sawyer AFB, MI     | 56,000                                             | X                      |                   |              |
| Lackland AFB, TX         | Unknown                                            | X                      |                   |              |
| Langley AFB, VA          | NT                                                 |                        |                   |              |
| Laredo AFB, TX           | NT                                                 |                        |                   |              |
| Laughlin AFB, TX         | 400                                                | X                      | X                 |              |
| L. G. Hanscom Fld, MA    | NT                                                 |                        |                   |              |
| Little Rock AFB, AR      | NT                                                 |                        |                   |              |
| Lockbourne AFB, OH       | 10,000                                             | X                      |                   |              |
| Loring AFB, ME           | 4,000                                              | X                      |                   |              |
| Lowry AFB, CO            | NT                                                 |                        |                   |              |
| Luke AFB, AZ             | 8,000                                              | X                      |                   |              |
| MacDill AFB, FL          | Unknown                                            | X                      |                   |              |
| Malmstrom AFB, MT        | 5,000                                              | X                      |                   |              |
| March AFB, CA            | 15,400                                             | X                      | X                 |              |
| Mather AFB, CA           | 385                                                |                        | X                 |              |
| Maxwell AFB, AL          | NT                                                 |                        |                   |              |
| McChord AFB, WA          | NT                                                 |                        |                   |              |
| McClellan AFB, CA        | 1,538,700                                          |                        | X                 |              |
| McConnell AFB, KS        | NT                                                 |                        |                   |              |
| McCoy AFB, FL            | 3,400                                              | X                      |                   |              |
| McGuire AFB, NJ          | Unknown                                            | X                      | X                 |              |
| Minot AFB, ND            | (Lagoon)                                           |                        |                   | Lagoon       |
| Moody AFB, GA            | 4,330                                              |                        | X                 |              |
| Mountain Home AFB,<br>ID | (Lagoon)                                           |                        | /                 | Lagoon       |
| Myrtle Beach AFB, SC     | 16,433                                             |                        | X                 |              |
| Nellis AFB, NV           | 2,700                                              | X                      | X                 |              |

| <u>Air Force base</u>      | <u>Quantity of<br/>sludge and grit<br/>(lb/mo)</u> | <u>Disposal method</u> |                   |                  |
|----------------------------|----------------------------------------------------|------------------------|-------------------|------------------|
|                            |                                                    | <u>Landfill</u>        | <u>Fertilizer</u> | <u>Other</u>     |
| Norton AFB, CA             | NT                                                 |                        |                   |                  |
| Offutt AFB, NE             | Unknown                                            | X                      |                   |                  |
| Otis AFB, MA               | 1,050,000                                          | X                      | X                 |                  |
| Patrick AFB, FL            | 566,000                                            | X                      | X                 |                  |
| Pease AFB, NH              | 3,500                                              | X                      |                   |                  |
| Perrin AFB, TX             | Unknown                                            |                        | X                 |                  |
| Plattsburgh AFB,<br>NY     | NT                                                 |                        |                   |                  |
| Pope AFB, NC               | NT                                                 |                        |                   |                  |
| Randolph AFB, TX           | 10,250                                             | X                      |                   |                  |
| Reese AFB, TX              | 6,030                                              | X                      | X                 |                  |
| Richards-Gebaur<br>AFB, MO | 74,000                                             |                        | X                 |                  |
| Robins AFB, GA             | 180,000                                            | X                      |                   |                  |
| Scott AFB, IL              | Unknown                                            | X                      |                   |                  |
| Selfridge AFB, MI          | 18,000                                             | X                      | X                 |                  |
| Seymour-Johnson<br>AFB, NC | NT                                                 |                        |                   |                  |
| Shaw AFB, SC               | 17,600                                             | X                      |                   |                  |
| Sheppard AFB, TX           | 44,000                                             | X                      |                   |                  |
| Tinker AFB, OK             | 64,000                                             |                        | X                 |                  |
| Travis AFB, CA             | 25,000                                             |                        | X                 |                  |
| Tyndall AFB, FL            | 8,800                                              | X                      | X                 |                  |
| Vance AFB, OK              | 2,000                                              | X                      |                   |                  |
| Vandenberg AFB, CA         | 1,250                                              | X<br>(sludge)          |                   | Lagoon<br>(grit) |
| Webb AFB, TX               | NT                                                 |                        |                   |                  |
| Westover AFB, MA           | NT                                                 |                        |                   |                  |

| <u>Air Force base</u>       | <u>Quantity of<br/>sludge and grit<br/>(lb/mo)</u> | <u>Disposal method</u> |                   |              |
|-----------------------------|----------------------------------------------------|------------------------|-------------------|--------------|
|                             |                                                    | <u>Landfill</u>        | <u>Fertilizer</u> | <u>Other</u> |
| Whiteman AFB, MO            | 16,860                                             | X<br>(grit)            | X<br>(sludge)     |              |
| Williams AFB, AZ            | 11,000                                             |                        | X<br>(desert)     |              |
| Wright-Patterson<br>AFB, OH | NT                                                 |                        |                   |              |
| Wurtsmith AFB, MI           | 1,200                                              | X                      |                   |              |

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NT = Installation does not operate its own sewage treatment plant.

## APPENDIX V

## PATHOLOGICAL WASTES

| <u>Air Force base</u>                                  | <u>No. beds</u> | <u>Pounds per week</u> | <u>Pounds per bed per week</u> | <u>Tissue (%)</u> | <u>Plastics (%)</u> | <u>Bandages (%)</u> | <u>Paper (%)</u> | <u>Other (%)</u> | <u>Remarks</u> |
|--------------------------------------------------------|-----------------|------------------------|--------------------------------|-------------------|---------------------|---------------------|------------------|------------------|----------------|
| Air Force Academy, CO                                  | 149             | 125.0                  | 0.84                           | 40.0              | 50.00               | 5.0                 | 5.0              |                  |                |
| Aeronautical Chart and Information Center, St Louis MO | 0               | 2.5                    | ---                            | 0.0               | 9.00                | 1.0                 | 90.0             |                  |                |
| Altus AFB, OK                                          | 50              | 300.0                  | 6.00                           | 50.0              | 10.00               | 30.0                | 10.0             |                  |                |
| Andrews AFB, Wash, DC                                  | 350             | 1000.0                 | 2.68                           | 90.0              | 6.50                | 1.0                 | 2.0              | 0.5              | Syringes       |
| Barksdale AFB, LA                                      | 75              | 125.0                  | 1.67                           | 20.0              | 30.00               | 30.0                | 20.0             |                  |                |
| Beale AFB, CA                                          | 50              | 125.0                  | 2.50                           | 60.3              | 10.00               | 29.6                | 0.1              |                  |                |
| Bergstrom AFB, TX                                      | 50              | 50.0                   | 1.00                           | 30.0              | 60.00               | 0.0                 | 10.0             |                  |                |
| Blytheville AFB, AR                                    | 30              | 100.0                  | 3.33                           | 70.0              | 28.00               | 1.0                 | 1.0              |                  | Trace drugs    |
| Bolling AFB, Wash, DC                                  | 0               | 5.0                    | ---                            | 0.0               | 99.00               | 0.5                 | 0.5              |                  |                |
| Brooks AFB, TX                                         | 0               | 860.0                  | ---                            | 95.0              | 3.00                | 1.0                 | 1.0              | 4.0              | Incinerators   |
| Cannon AFB, NM                                         | 40              | 45.0                   | 1.13                           | 98.0              | 1.00                | 1.0                 | 0.0              |                  |                |
| Carswell AFB, TX                                       | 250             | 750.0                  | 3.00                           | 3.0               | 15.00               | 65.0                | 17.0             |                  |                |

| Air Force base              | No.<br>beds | Pounds<br>per week | Pounds<br>per bed<br>per week | Tissue<br>(%) | Plastics<br>(%) | Bandages<br>(%) | Paper<br>(%) | Other<br>(%) | Remarks                |
|-----------------------------|-------------|--------------------|-------------------------------|---------------|-----------------|-----------------|--------------|--------------|------------------------|
| Castle AFB, CA              | 30          | 50.0               | 1.67                          | 10.0          | 10.00           | 40.0            | 30.0         | 10.0         | Serum                  |
| Chanute AFB, IL             | 150         | 270.0              | 1.80                          | 5.0           | 20.00           | 5.0             | 50.0         | 20.0         | Kitchen waste          |
| Charleston AFB,<br>SC       | 6           | 5.0                | 0.83                          | 0.0           | 64.00           | 30.0            | 6.0          |              |                        |
| Columbus AFB, MS            | 35          | 75.0               | 2.14                          | 20.0          | 10.00           | 10.0            | 60.0         |              |                        |
| Craig AFB, AL               | 12          | 28.0               | 2.33                          | 0.0           | 25.00           | 50.0            | 25.0         |              |                        |
| Davis-Monthan<br>AFB, AZ    | 90          | 150.0              | 1.67                          | 80.0          | 3.00            | 3.0             | 4.0          | 10.0         | Fifty-pound<br>portion |
| Dover AFB, DE               | 55          | 30.0               | 0.55                          | 10.0          | 25.00           | 25.0            | 35.0         | 5.0          | Cardboard              |
| Dyess AFB, TX               | 50          | 650.0              | 13.00                         | 0.5           | 40.00           | 1.0             | 40.0         | 18.5         | Drugs, etc.            |
| Edwards AFB, CA             | 45          | 45.0               | 1.00                          | 80.0          | 10.00           | 5.0             | 5.0          |              |                        |
| Eglin Aux. Fld<br>No. 9, FL | 0           | 5.0                | ---                           | 25.0          | 25.00           | 25.0            | 25.0         |              |                        |
| Eglin AFB, FL               | 225         | 850.0              | 3.78                          | 17.5          | 11.80           | 47.1            | 23.6         |              |                        |
| Ellsworth AFB,<br>SD        | 100         | 100.0              | 1.00                          | 95.0          | 0.00            | 2.5             | 2.5          |              |                        |
| England AFB, LA             | 40          | 20.0               | 0.50                          | 15.0          | 35.00           | 40.0            | 10.0         |              |                        |
| Ent AFB, CO                 | 0           | 35.0               | ---                           | 0.0           | 20.00           | 10.0            | 70.0         |              |                        |
| Fairchild AFB,<br>WA        | 100         | 100.0              | 1.00                          | 20.0          | 30.00           | 30.0            | 20.0         |              |                        |
| Forbes AFB, KS              | 100         | 5.5                | 0.06                          | 0.0           | 80.00           | 5.0             | 15.0         |              |                        |

| <u>Air Force base</u> | <u>No. beds</u> | <u>Pounds per week</u> | <u>Pounds per bed per week</u> | <u>Tissue (%)</u> | <u>Plastics (%)</u> | <u>Bandages (%)</u> | <u>Paper (%)</u> | <u>Other (%)</u> | <u>Remarks</u>             |
|-----------------------|-----------------|------------------------|--------------------------------|-------------------|---------------------|---------------------|------------------|------------------|----------------------------|
| F. E. Warren AFB, WY  | 30              | 50.0                   | 0.83                           | 20.0              | 30.00               | 30.0                | 20.0             |                  |                            |
| George AFB, CA        | 40              | 58.0                   | 1.45                           | 26.0              | 30.00               | 0.0                 | 30.0             | 14.0             | Glass, blood, etc.         |
| Goodfellow AFB, TX    | 25              | 1.0                    | 0.04                           | 0.0               | 70.00               | 10.0                | 20.0             |                  |                            |
| Grand Forks AFB, ND   | 50              | 15.0                   | 0.30                           | 93.0              | 5.00                | 1.0                 | 1.0              |                  |                            |
| Griffiss AFB, NY      | 40              | 8.0                    | 0.20                           | 90.0              | 0.00                | 10.0                | 0.0              |                  |                            |
| Grissom AFB, IN       | 25              | 50.0                   | 2.00                           | 85.0              | 10.00               | 5.0                 | 0.0              |                  |                            |
| Gunter AFB, AL        | 0               | 5.0                    | ---                            | 15.0              | 5.00                | 70.0                | 0.0              |                  |                            |
| Hamilton AFB, CA      | 55              | 25.0                   | 0.45                           | 40.0              | 6.00                | 12.0                | 30.0             | 12.0             | Splints, vials, test tubes |
| Hill AFB, UT          | 40              | Unknown                | Unknown                        | 6.0               | 80.00               | 1.0                 | 13.0             |                  |                            |
| Holloman AFB, NM      | 40              | Unknown                | Unknown                        | (-----)           | Unknown             | Unknown             | Unknown          |                  |                            |
| Homestead AFB, FL     | 90              | 750.0                  | 8.33                           | (-----)           | Unknown             | Unknown             | Unknown          |                  |                            |
| Keesler AFB, MS       | 400             | 15.0                   | 0.04                           | 5.0               | 25.00               | 70.0                | 0.0              |                  |                            |
| Kelly AFB, TX         | 0               | 0.0                    | ---                            | 0.0               | 3.00                | 96.0                | 1.0              |                  |                            |
| Kincheloe AFB, MI     | 30              | 25.0                   | 0.83                           | 20.0              | 10.00               | 50.0                | 20.0             |                  |                            |
| Kingsley AFB, OR      | 4               | 10.0                   | 2.50                           | 2.0               | 60.00               | 35.0                | 3.0              |                  |                            |
| Kirtland AFB, NM      | 0               | 25.0                   | ---                            | 0.0               | 20.00               | 0.0                 | 0.0              | 80.0             | Petri dishes               |

| Air Force base        | No. beds | Pounds per week | Pounds per bed per week | Tissue (%)          | Plastics (%) | Bandages (%)     | Paper (%) | Other (%) | Remarks  |
|-----------------------|----------|-----------------|-------------------------|---------------------|--------------|------------------|-----------|-----------|----------|
| K. I. Sawyer AFB, MI  | 50       | 10.0            | 0.20                    | 0.0                 | 30.00        | 30.0             | 20.0      | 20.0      | Cultures |
| Lackland AFB, TX      | 1000     | 2300.0          | 2.30                    | 21.1                | 26.30        | (-----52.6-----) |           |           |          |
| Langley AFB, VA       | 125      | 150.0           | 1.20                    | 0.0                 | 20.00        | 60.0             | 0.0       | 20.0      | Needles  |
| Laredo AFB, TX        | 25       | 57.0            | 2.28                    | 5.0                 | 50.00        | 0.0              | 45.0      |           |          |
| Laughlin AFB, TX      | 50       | 15.0            | 0.30                    | 90.0                | 8.00         | 2.0              | 0.0       |           |          |
| L. G. Hanscom Fld, MA | 0        | <1.0            | ---                     | ---                 | ---          | ---              | ---       | ---       |          |
| Little Rock AFB, AR   | 50       | 6.0             | 0.12                    | 80.0                | 0.00         | 15.0             | 5.0       |           |          |
| Lockbourne AFB, OH    | 50       | 150.0           | 3.00                    | 10.0                | 5.00         | 20.0             | 65.0      |           |          |
| Loring AFB, ME        | 100      | 90.0            | 0.90                    | 5.0                 | 0.00         | 95.0             | 0.0       |           |          |
| Lowry AFB, CO         | 0        | 5.0             | ---                     | 0.0                 | 100.00       | 0.0              | 0.0       |           |          |
| Luke AFB, AZ          | 70       | 100.0           | 1.43                    | (-----Unknown-----) |              |                  |           |           |          |
| MacDill AFB, FL       | 200      | 100.0           | 0.50                    | 45.0                | 25.00        | 0.0              | 15.0      | 15.0      | Formalin |
| Malmstrom AFB, MT     | 76       | 30.0            | 0.39                    | 80.0                | 10.00        | 0.0              | 10.0      |           |          |
| March AFB, CA         | 175      | Unknown         | Unknown                 | 3.0                 | 12.00        | 35.0             | 50.0      |           |          |
| Mather AFB, CA        | 103      | 130.0           | 1.26                    | 40.0                | 25.00        | 20.0             | 14.0      | 1.0       | Metal    |
| Maxwell AFB, AL       | 225      | 250.0           | 1.11                    | 15.0                | 5.00         | 70.0             | 0.0       | 10.0      | Unknown  |

| Air Force base        | No. beds | Pounds per week | Pounds per bed per week | Tissue (%)          | Plastics (%) | Bandages (%) | Paper (%) | Other (%) | Remarks             |
|-----------------------|----------|-----------------|-------------------------|---------------------|--------------|--------------|-----------|-----------|---------------------|
|                       |          |                 |                         |                     |              |              |           |           |                     |
| McChord AFB, WA       | 0        | 35.0            | ---                     | 1.0                 | 25.00        | 19.0         | 55.0      |           |                     |
| McClellan AFB, CA     | 0        | 15.0            | ---                     | 5.0                 | 10.00        | 10.0         | 60.0      | 5.0       | Glass               |
| McConnell AFB, KS     | 45       | 12.0            | 0.27                    | 100.0               | 0.00         | 0.0          | 0.0       |           |                     |
| McCoy AFB, FL         | 0        | 100.0           | ---                     | 2.0                 | 3.00         | 95.0         | 0.0       |           |                     |
| McGuire AFB, NJ       | 0        | 250.0           | ---                     | 0.0                 | 10.00        | 80.0         | 0.0       | 10.0      | Needles, glass      |
| Minot AFB, ND         | 100      | 150.0           | 1.50                    | 75.0                | 5.00         | 15.0         | 5.0       |           |                     |
| Moody AFB, GA         | 35       | 1810.0          | 51.71                   | 0.5                 | 10.00        | 20.0         | 10.0      | 59.5      | Glass, etc.         |
| Mountain Home AFB, ID | 50       | 20.0            | 0.40                    | 95.0                | 2.00         | 2.0          | 1.0       |           |                     |
| Myrtle Beach AFB, SC  | 50       | 1000.0          | 20.00                   | 1.0                 | 40.00        | 5.0          | 50.0      | 4.0       | Rubber, glass, etc. |
| Nellis AFB, NV        | 65       | 15.0            | 0.23                    | 0.0                 | 90.00        | 0.5          | 9.5       |           |                     |
| Norton AFB, CA        | 12       | 6.0             | 0.50                    | 5.0                 | 76.00        | 19.0         | 0.0       |           |                     |
| Offutt AFB, NE        | 125      | 2500.0          | 20.00                   | 30.0                | 30.00        | 30.0         | 0.0       | 10.0      | Miscellaneous       |
| Otis AFB, MA          | 10       | 50.0            | 5.00                    | 0.0                 | 80.00        | 20.0         | 0.0       |           |                     |
| Patrick AFB, FL       | 75       | 10.0            | 0.13                    | 75.0                | 5.00         | 10.0         | 10.0      |           |                     |
| Pease AFB, NH         | 0        | 10.0            | ---                     | 0.0                 | 50.00        | 50.0         | 0.0       |           |                     |
| Perrin AFB, TX        | 10       | Unknown         | Unknown                 | (-----Unknown-----) |              |              |           |           |                     |
| Plattsburgh AFB, NY   | 50       | 200.0           | 4.00                    | 90.0                | 0.00         | 10.0         | 0.0       |           |                     |

| Air Force base          | No. beds | Pounds per week | Pounds per bed per week | Tissue (%) | Plastics (%) | Bandages (%) | Paper (%) | Other (%) | Remarks                |
|-------------------------|----------|-----------------|-------------------------|------------|--------------|--------------|-----------|-----------|------------------------|
| Pope AFB, NC            | 0        | Unknown         | Unknown                 | 0.0        | 50.00        | 0.0          | 0.0       | 50.0      | Media for bacteriology |
| Randolph AFB, TX        | 40       | 655.0           | 16.38                   | 0.0        | 10.00        | 10.0         | 65.0      | 15.0      | Glass                  |
| Reese AFB, TX           | 30       | 200.0           | 6.67                    | 11.0       | 10.00        | 9.0          | 70.0      |           |                        |
| Richards-Gebaur AFB, MO | 33       | 40.0            | 1.21                    | 90.0       | 3.00         | 2.0          | 5.0       |           |                        |
| Robins AFB, GA          | 60       | 955.0           | 15.92                   | 32.5       | 25.00        | 35.0         | 7.5       |           |                        |
| Scott AFB, IL           | 300      | 102.0           | 0.34                    | 3.0        | 3.00         | 4.0          | 80.0      | 10.0      | IV glass bottles       |
| Selfridge AFB, MI       | 10       | 10.0            | 1.00                    | 25.0       | 25.00        | 25.0         | 25.0      |           |                        |
| Seymour-Johnson AFB, NC | 40       | 25.0            | 0.63                    | 0.0        | 5.00         | 75.0         | 20.0      |           |                        |
| Shaw AFB, SC            | 90       | 50.0            | 0.56                    | 10.0       | 15.00        | 5.0          | 70.0      |           |                        |
| Sheppard AFB, TX        | 300      | 60.0            | 0.20                    | 66.7       | 12.50        | 8.3          | 12.5      |           |                        |
| Tinker AFB, OK          | 75       | 102.5           | 1.37                    | 1.0        | 74.00        | 25.0         | 0.0       |           |                        |
| Travis AFB, CA          | 385      | 1500.0          | 3.90                    | 2.0        | 13.00        | 1.0          | 15.0      | 69.0      | Cloth (isolation ward) |
| Tyndall AFB, FL         | 60       | 105.0           | 1.75                    | 30.0       | 60.00        | 10.0         | 0.0       |           |                        |
| Vance AFB, OK           | 0        | 0.0             | ---                     | ---        | ---          | ---          | ---       | ---       |                        |
| Vandenberg AFB, CA      | 125      | 22700.0         | 181.60                  | 0.3        | 1.28         | 0.8          | 97.62     | 1.0       | Bottles, containers    |
| Webb AFB, TX            | 25       | 25.0            | 1.00                    | 95.0       | 3.00         | 2.0          | 0.0       |           |                        |

| <u>Air Force base</u>       | <u>No.<br/>beds</u> | <u>Pounds<br/>per week</u> | <u>Pounds<br/>per bed<br/>per week</u> | <u>Tissue<br/>(%)</u> | <u>Plastics<br/>(%)</u> | <u>Bandages<br/>(%)</u> | <u>Paper<br/>(%)</u> | <u>Other<br/>(%)</u> | <u>Remarks</u>           |
|-----------------------------|---------------------|----------------------------|----------------------------------------|-----------------------|-------------------------|-------------------------|----------------------|----------------------|--------------------------|
| Westover AFB, MA            | 100                 | 40.0                       | 0.40                                   | 60.0                  | 35.00                   | 2.0                     | 3.0                  |                      |                          |
| Whiteman AFB, MO            | 30                  | 100.0                      | 3.33                                   | 75.0                  | 10.00                   | 15.0                    | 0.0                  |                      |                          |
| Williams AFB, AZ            | 25                  | 125.0                      | 5.00                                   | 7.0                   | 13.00                   | 40.0                    | 39.0                 | 1.0                  | Rubber, needles,<br>etc. |
| Wright-Patterson<br>AFB, OH | 425                 | 360.0                      | 0.85                                   | 25.0                  | 25.00                   | 25.0                    | 25.0                 |                      |                          |
| Wurtsmith AFB, MI           | 25                  | 50.0                       | 2.00                                   | 50.0                  | 30.00                   | 15.0                    | 2.0                  | 3.0                  | Syringes                 |

APPENDIX VI  
CLASSIFIED WASTES

| <u>Air Force base</u>                                               | <u>Quantity<br/>(lb/mo)</u> | <u>Method of disposal</u>       |                             |                            | <u>Age of<br/>incinerator<br/>(yrs)</u> |
|---------------------------------------------------------------------|-----------------------------|---------------------------------|-----------------------------|----------------------------|-----------------------------------------|
|                                                                     |                             | <u>Incineration<br/>(lb/mo)</u> | <u>Grinding<br/>(lb/mo)</u> | <u>Pulping<br/>(lb/mo)</u> |                                         |
| Air Force Academy, CO                                               | 350                         | 0                               | 0                           | 350                        | ---                                     |
| Aeronautical<br>Chart and<br>Information<br>Center, St<br>Louis, MO | 85,000                      | 59,000                          | 8,500                       | 17,000                     | 3                                       |
| Altus AFB, OK                                                       | 5,000                       | 5,000                           | 0                           | 0                          | 3                                       |
| Andrews AFB,<br>Wash, DC                                            | 260,000                     | 247,000                         | 0                           | 13,000                     | 11                                      |
| Barksdale<br>AFB, LA                                                | 6,300                       | 1,260                           | 0                           | 5,040                      | 1                                       |
| Beale AFB, CA                                                       | 37,620                      | 0                               | 37,620                      | 0                          | ---                                     |
| Bergstrom AFB,<br>TX                                                | 1,750                       | 245                             | 0                           | 1,505                      | 4                                       |
| Blytheville<br>AFB, AR                                              | 30                          | 30                              | 0                           | 0                          | 9                                       |
| Bolling AFB,<br>Wash, DC                                            | 100                         | 100                             | 0                           | 0                          | ---                                     |
| Brooks AFB,<br>TX                                                   | 40                          | 25                              | 15                          | 0                          | 5                                       |
| Cannon AFB,<br>NM                                                   | 600                         | 540                             | 0                           | 60                         | 7                                       |
| Carswell AFB,<br>TX                                                 | 2,500                       | 2,500                           | 0                           | 0                          | Unknown                                 |
| Castle AFB,<br>CA                                                   | 200                         | 0                               | 200                         | 0                          | ---                                     |
| Chanute AFB,<br>IL                                                  | Unknown                     | (100%)                          | 0                           | 0                          | 3                                       |
| Charleston<br>AFB, SC                                               | 600                         | 600                             | 0                           | 0                          | ---                                     |

| <u>Air Force base</u>      | <u>Quantity<br/>(lb/mo)</u> | <u>Method of disposal</u>       |                             |                            | <u>Age of<br/>incinerator<br/>(yrs)</u> |
|----------------------------|-----------------------------|---------------------------------|-----------------------------|----------------------------|-----------------------------------------|
|                            |                             | <u>Incineration<br/>(lb/mo)</u> | <u>Grinding<br/>(lb/mo)</u> | <u>Pulping<br/>(lb/mo)</u> |                                         |
| Columbus AFB,<br>MS        | 400                         | 400                             | 0                           | 0                          | 10                                      |
| Craig AFB, AL              | 450                         | 405                             | 0                           | 45                         | 10                                      |
| Davis-Monthan<br>AFB, AZ   | 3,000                       | 3,000                           | 0                           | 0                          | 4                                       |
| Dover AFB, DE              | 400                         | 0                               | 400                         | 0                          | ---                                     |
| Dyess AFB, TX              | 60                          | 60                              | 0                           | 0                          | 9                                       |
| Edwards AFB,<br>CA         | 2,050                       | 100                             | 1,950                       | 0                          | 1/2                                     |
| Eglin Aux Fld<br>No. 9, FL | 100                         | 0                               | 0                           | 100                        | ---                                     |
| Eglin AFB, FL              | 80,000                      | 0                               | 0                           | 80,000                     | ---                                     |
| Ellsworth AFB,<br>SD       | 1,350                       | 540                             | 810                         | 0                          | 6                                       |
| England AFB,<br>LA         | 350                         | 350                             | 0                           | 0                          | 5                                       |
| Ent AFB, CO                | 2,450                       | 245                             | 0                           | 2,205                      | 7, 2                                    |
| Fairchild AFB,<br>WA       | 2,500                       | 2,500                           | 0                           | 0                          | 4                                       |
| Forbes AFB, KS             | 22                          | 22                              | 0                           | 0                          | 11                                      |
| F. E. Warren<br>AFB, WY    | 1,200                       | 24                              | 1,176                       | 0                          | 6                                       |
| George AFB, CA             | 100                         | 100                             | 0                           | 0                          | Unknown                                 |
| Goodfellow<br>AFB, TX      | 17,600                      | 17,600                          | 0                           | 0                          | 4                                       |
| Grand Forks AFB,<br>ND     | 5,000                       | 5,000                           | 0                           | 0                          | 2                                       |
| Griffiss AFB,<br>NY        | 6,000                       | 6,000                           | 0                           | 0                          | Boiler                                  |
| Grissom AFB,<br>IN         | 1,320                       | 753                             | 567                         | 0                          | 16                                      |

| <u>Air Force base</u>    | <u>Quantity<br/>(lb/mo)</u> | <u>Method of disposal</u>       |                             |                            | <u>Age of<br/>incinerator<br/>(yrs)</u> |
|--------------------------|-----------------------------|---------------------------------|-----------------------------|----------------------------|-----------------------------------------|
|                          |                             | <u>Incineration<br/>(lb/mo)</u> | <u>Grinding<br/>(lb/mo)</u> | <u>Pulping<br/>(lb/mo)</u> |                                         |
| Gunter AFB, AL           | 5                           | 5                               | 0                           | 0                          | Unknown                                 |
| Hamilton AFB,<br>CA      | 45                          | 45                              | 0                           | 0                          | Unknown                                 |
| Hill AFB, UT             | 28,000                      | 28,000                          | 0                           | 0                          | 3                                       |
| Holloman AFB,<br>NM      | 490                         | 90                              | 0                           | 400                        | 27                                      |
| Homestead AFB,<br>FL     | 3,600                       | 3,600                           | 0                           | 0                          | 5                                       |
| Keesler AFB,<br>MS       | 1,150                       | 1,150                           | 0                           | 0                          | 12                                      |
| Kelly AFB, TX*           | 716,000                     | 106,200                         | 0                           | 574,000                    | 28                                      |
| Kincheloe<br>AFB, MI     | 458                         | 458                             | 0                           | 0                          | Boiler                                  |
| Kingsley<br>AFB, OR      | 750                         | 750                             | 0                           | 0                          | 8                                       |
| Kirtland<br>AFB, NM      | 2,400                       | 2,400                           | 0                           | 0                          | 5                                       |
| K. I. Sawyer<br>AFB, MI  | 1,300                       | 1,300                           | 0                           | 0                          | 9                                       |
| Lackland AFB,<br>TX      | 31,600                      | 31,000                          | 0                           | 600                        | 1, 9                                    |
| Langley AFB,<br>VA       | 12,000                      | 10,080                          | 1,290                       | 0                          | ---                                     |
| Laredo AFB,<br>TX        | 360                         | 0                               | 360                         | 0                          | ---                                     |
| Laughlin<br>AFB, TX      | 100                         | 98                              | 0                           | 2                          | 12                                      |
| L. G. Hanscom<br>Fld, MA | 60,000                      | 60,000                          | 0                           | 0                          | 12                                      |
| Little Rock<br>AFB, AR   | 25                          | 25                              | 0                           | 0                          | 6                                       |

\*35,800 pounds of classified material are buried on the base.

| Air Force base           | Quantity<br>(lb/mo) | Method of disposal      |                     |                    | Age of<br>incinerator<br>(yrs) |
|--------------------------|---------------------|-------------------------|---------------------|--------------------|--------------------------------|
|                          |                     | Incineration<br>(lb/mo) | Grinding<br>(lb/mo) | Pulping<br>(lb/mo) |                                |
| Lockbourne<br>AFB, OH    | 250                 | 250                     | 0                   | 0                  | 13                             |
| Loring AFB,<br>ME        | 1,000               | 1,000                   | 0                   | 0                  | 5                              |
| Lowry AFB, CO            | Unknown             | (100%)                  | 0                   | 0                  | 27, 4                          |
| Luke AFB, AZ             | 800                 | 800                     | 0                   | 0                  | 2                              |
| MacDill AFB,<br>FL       | Unknown             | (100%)                  | 0                   | 0                  | 2                              |
| Malmstrom<br>AFB, MT     | 3,700               | 1,100                   | 0                   | 2,600              | 15, 15                         |
| March AFB,<br>CA         | 11,000              | 11,000                  | 0                   | 0                  | 6                              |
| Mather AFB,<br>CA        | 280                 | 280                     | 0                   | 0                  | 8                              |
| Maxwell AFB,<br>AL       | 325                 | 325                     | 0                   | 0                  | 9                              |
| McChord AFB,<br>WA       | 120                 | 120                     | 0                   | 0                  | 5                              |
| McClellan<br>AFB, CA     | 2,500               | 2,250                   | 0                   | 250                | 7                              |
| McConnell<br>AFB, KS     | 400                 | 400                     | 0                   | 0                  | 8                              |
| McCoy AFB,<br>FL         | 1,720               | 1,720                   | 0                   | 0                  | 10                             |
| McGuire AFB,<br>NJ       | 1,200               | 1,200                   | 0                   | 0                  | 11                             |
| Minot AFB, ND            | 200                 | 100                     | 0                   | 100                | 15                             |
| Moody AFB, GA            | 0.5                 | 0.5                     | 0                   | 0                  | Boiler                         |
| Mountain Home<br>AFB, ID | 1,000               | 1,000                   | 0                   | 0                  | Boiler                         |
| Myrtle Beach<br>AFB, SC  | 2,080               | 2,080                   | 0                   | 0                  | 3                              |

| <u>Air Force base</u>      | <u>Quantity<br/>(lb/mo)</u> | <u>Method of disposal</u>       |                             |                            | <u>Age of<br/>incinerator<br/>(yrs)</u> |
|----------------------------|-----------------------------|---------------------------------|-----------------------------|----------------------------|-----------------------------------------|
|                            |                             | <u>Incineration<br/>(lb/mo)</u> | <u>Grinding<br/>(lb/mo)</u> | <u>Pulping<br/>(lb/mo)</u> |                                         |
| Neilis AFB, NV             | 2,000                       | 0                               | 0                           | 2,000                      | None                                    |
| Norton AFB,<br>CA          | 6,000                       | 6,000                           | 0                           | 0                          | 2                                       |
| Offutt AFB,<br>NE          | 108,840                     | 108,840                         | 0                           | 0                          | 12                                      |
| Otis AFB, MA               | 100                         | 100                             | 0                           | 0                          | Boiler                                  |
| Patrick AFB,<br>FL         | 18,400                      | 920                             | 0                           | 17,480                     | Burn barrel                             |
| Pease AFB, NH              | 100                         | 90                              | 0                           | 10                         | Unknown                                 |
| Perrin AFB, TX             | 140                         | 0                               | 140                         | 0                          | None                                    |
| Plattsburgh<br>AFB, NY     | 500                         | 500                             | 0                           | 0                          | 4                                       |
| Pope AFB, NC               | 105                         | 105                             | 0                           | 0                          | 2                                       |
| Randolph AFB,<br>TX        | 10,000                      | 0                               | 0                           | 10,000                     | None                                    |
| Reese AFB, TX              | 180                         | 180                             | 0                           | 0                          | 3                                       |
| Richards-Gebaur<br>AFB, MO | 100                         | 100                             | 0                           | 0                          | 15                                      |
| Robins AFB, GA             | 3,000                       | 0                               | 0                           | 3,000                      | None                                    |
| Scott AFB, IL              | 6,000                       | 0                               | 6,000                       | 0                          | None                                    |
| Selfridge AFB,<br>MI       | 150                         | 0                               | 0                           | 150                        | None                                    |
| Seymour-Johnson<br>AFB, NC | 750                         | 750                             | 0                           | 0                          | 10                                      |
| Shaw AFB, SC               | 1,800                       | 1,800                           | 0                           | 0                          | 5                                       |
| Sheppard AFB,<br>TX        | 150                         | 150                             | 0                           | 0                          | 9                                       |
| Tinker AFB, OK             | 6,320                       | 6,320                           | 0                           | 0                          | 3, 5                                    |
| Travis AFB, CA             | 5,000                       | 2,500                           | 0                           | 2,500                      | 6                                       |
| Tyndall AFB, FL            | 1,500                       | 1,500                           | 0                           | 0                          | 1                                       |

| <u>Air Force base</u>       | <u>Quantity<br/>(lb/mo)</u> | <u>Method of disposal</u>       |                             |                            | <u>Age of<br/>incinerator<br/>(yrs)</u> |
|-----------------------------|-----------------------------|---------------------------------|-----------------------------|----------------------------|-----------------------------------------|
|                             |                             | <u>Incineration<br/>(lb/mo)</u> | <u>Grinding<br/>(lb/mo)</u> | <u>Pulping<br/>(lb/mo)</u> |                                         |
| Vance AFB, OK               | 85                          | 85                              | 0                           | 0                          | 1                                       |
| Vandenberg<br>AFB, CA       | 19,244                      | 16,000                          | 3,052                       | 192                        | 3, 6                                    |
| Webb AFB, TX                | 35                          | 35                              | 0                           | 0                          | 15                                      |
| Westover AFB,<br>MA         | 30,000                      | 0                               | 30,000                      | 0                          | ---                                     |
| Whiteman AFB,<br>MO         | 500                         | 500                             | 0                           | 0                          | 17                                      |
| Williams AFB,<br>AZ         | 200                         | 0                               | 200                         | 0                          | ---                                     |
| Wright-Patterson<br>AFB, OH | 7,500                       | 4,900                           | 0                           | 2,600                      | 10, 20, 25                              |
| Wurtsmith AFB,<br>MI        | 940                         | 940                             | 0                           | 0                          | 8                                       |

## APPENDIX VII.

## LIQUID INDUSTRIAL WASTES AND FIRE FIGHTING TRAINING

| Air Force base                                          | Engine oil |          | Hydraulic fluid                     |          | Industrial fluids |          | Contaminated fuel |          | Fire fighting |               |
|---------------------------------------------------------|------------|----------|-------------------------------------|----------|-------------------|----------|-------------------|----------|---------------|---------------|
|                                                         | Gal/mo     | Disposal | Gal/mo                              | Disposal | Gal/mo            | Disposal | Gal/mo            | Disposal | Fires per qtr | Fuel gal/fire |
| Air Force Academy, CO                                   | 1,000      | C        | .....Included under engine oil..... |          |                   |          |                   |          | 4.0           | 100           |
| Aeronautical Chart and Information Center, St Louis, MO | 20         | D        | 1                                   | D        | 0                 |          | 0                 |          | 0.0           | 0             |
| Altus AFB, OK                                           | 500        | C        | 100                                 | C        | 100               | C        | 4,000             | C&F      | 13.0          | 500           |
| Andrews AFB, Wash, DC                                   | 3,000      | C        | 100                                 | C        | 200               | C        | 4,000             | C        | 12.0          | 300           |
| Barksdale AFB, LA                                       | 1,850      | C        | 450                                 | C        | 8,016             | S        | 6,100             | C        | 24.0          | 600           |
| Beale AFB, CA                                           | 18,800     | F        | .....Included under engine oil..... |          |                   |          |                   |          | 24.0          | 625           |
| Bergstrom AFB, TX                                       | 200        | ST       | 5                                   | F        | 10                | L        | 1,200             | F        | 3.0           | 300           |
| Blytheville AFB, AR                                     | 500        | ST       | 0                                   |          | 0                 |          | 1,000             | F        | 3.0           | 1,000         |
| Bolling AFB, Wash, DC                                   | 80         | C        | 2                                   | C        | 1                 | C        | 0                 |          | 8.0           | 900           |
| Brooks AFB, TX                                          | 55         | L        | 0                                   |          | 0                 |          | 0                 |          | 0.5           | 40            |
| Cannon AFB, NM                                          | 2,000      | D        | 235                                 | D        | 915               | L        | 1,160             | F&D      | 50.0          | 200           |

| Air Force base          | Engine oil |          | Hydraulic fluid |                               | Industrial fluids |          | Contaminated fuel |          | Fire fighting |               |
|-------------------------|------------|----------|-----------------|-------------------------------|-------------------|----------|-------------------|----------|---------------|---------------|
|                         | Gal/mo     | Disposal | Gal/mo          | Disposal                      | Gal/mo            | Disposal | Gal/mo            | Disposal | Fires per qtr | Fuel gal/fire |
| Carswell AFB, TX        | 1,800      | C        | 65              | C                             | 150               | L        | 200               | F        | 8.0           | 563           |
| Castle AFB, CA          | 2,400      | C        | 330             | C                             | 130               | C        | 4,050             | C        | 14.0          | 500           |
| Chanute AFB, IL         | 1,000      | C        | .....           | Included under engine oil.... |                   |          | 1,000             | C        | 16.0          | 5             |
| Charleston AFB, SC      | 1,900      | C        | 200             | C                             | 1,000             | C        | 2,300             | C        | 13.0          | 500           |
| Columbus AFB, MS        | 150        | D        | 10              | L                             | 250               | L&S      | 400               | F        | 13.0          | 400           |
| Craig AFB, AL           | 150        | C&L      | 20              | L                             | 350               | C&L      | 500               | F        | 15.0          | 500           |
| Davis-Monthan AFB, AZ   | 8,000      | D        | 20              | D                             | 0                 |          | 2,500             | E        | 43.0          | 500           |
| Dover AFB, DE           | 925        | C        | 200             | St                            | 220               | St       | 1,500             | C        | 9.0           | 400           |
| Dyess AFB, TX           | 2,000      | D        | 200             | D                             | 900               | D        | 100               | L        | 12.0          | 1,000         |
| Edwards AFB, CA         | 300        | D        | 800             | C                             | 30                | D        | 1,200             | C        | 13.0          | 500           |
| Eglin Aux Fld No. 9, FL | 980        | C        | 20              | C                             | 55                | C        | 400               | F        | 13.0          | 300           |
| Eglin AFB, FL           | 400        | C        | 718             | C                             | 12                | C        | 20                | C        | 26.0          | 300           |
| Ellsworth AFB, SD       | 2,540      | C        | 62              | C                             | 40                | L        | 1,700             | C        | 12.0          | 500           |
| England AFB, LA         | 1,864      | C        | 387             | C                             | 2,813             | C        | 4,923             | C&F      | 24.0          | 300           |
| Ent AFB, CO             | 2,100      | CF&D     | 15              | CF&D                          | 350               | CF&D     | 0                 |          | 12.0          | 50            |
| Fairchild AFB, WA       | 750        | C        | 200             | C                             | 100               | C        | 150               | F        | 12.0          | 635           |

| Air Force base       | Engine oil |          | Hydraulic fluid                     |          | Industrial fluids |          | Contaminated fuel |          | Fire fighting |               |     |
|----------------------|------------|----------|-------------------------------------|----------|-------------------|----------|-------------------|----------|---------------|---------------|-----|
|                      | Gal/mo     | Disposal | Gal/mo                              | Disposal | Gal/mo            | Disposal | Gal/mo            | Disposal | Fires per qtr | Fuel gal/fire |     |
| Forbes AFB, KS       | 4,000      | C        | 0                                   |          | 0                 |          | 0                 |          | 1.0           | 100           |     |
| F. E. Warren AFB, WY | 500        | C        | 0                                   |          | 0                 |          | 0                 |          | 3.0           | 833           |     |
| George AFB, CA       | 325        | C        | 50                                  | C        | 1,000             | St       | 150               | C        | 22.0          | 400           |     |
| Goodfellow AFB, TX   | 150        | C&D      | 5                                   | C&D      | 5                 | C&D      | 5                 | C&D      | 6.0           | 300           |     |
| Grand Forks AFB, ND  | 400        | C        | 20                                  | C        | 20                | C        | 550               | C        | 2.0           | 3,000         |     |
| Griffiss AFB, NY     | 2,500      | C        | 50                                  | C        | 600               | C        | 3,500             | C        | 1.0           | 60            |     |
| Grissom AFB, IN      | 1,070      | C        | 25                                  | C        | 270               | C        | 1,600             | F        | 6.0           | 700           |     |
| Gunter AFB, AL       | 400        | C&L      | 0                                   |          | 0                 |          | 0                 |          | 0.0           |               |     |
| Hamilton AFB, CA     | 100        | C        | 70                                  | C        | 300               | C        | 115               | C        | 5.0           | 500           |     |
| Hill AFB, UT         | 13,000     | L        | .....Included under engine oil..... |          |                   |          |                   |          |               |               | 300 |
| Holloman AFB, NM     | 400        | St       | 50                                  | St       | 100               | St       | 7,500             | F&St     | 10.0          | 250           |     |
| Homestead AFB, FL    | 800        | F        | 200                                 | F        | 200               | F        | 3,000             | F        | 12.0          | 117           |     |
| Keesler AFB, MS      | 1,200      | F        | 0                                   |          | 400               | S        | 385               | F        | 6.0           | 350           |     |
| Kelly AFB, TX        | 8,000      | C        | 0                                   |          | 12,000            | C        | 20,000            | E        | 7.0           | 875           |     |
| Kincheloe AFB, MI    | 100        | F        | 50                                  | F        | 15                | F        | 0                 |          | 2.0           | 100           |     |

| Air Force base        | Engine oil |          | Hydraulic fluid                     |          | Industrial fluids |          | Contaminated fuel |          | Fire fighting |               |
|-----------------------|------------|----------|-------------------------------------|----------|-------------------|----------|-------------------|----------|---------------|---------------|
|                       | Gal/mo     | Disposal | Gal/mo                              | Disposal | Gal/mo            | Disposal | Gal/mo            | Disposal | Fires per qtr | Fuel gal/fire |
| Kingsley AFB, OR      | 200        | C        | 0                                   |          | 12                | C        | 500               | F        | 18.0          | 83            |
| Kirtland AFB, NM      | 600        | L        | 30                                  | L        | 0                 |          | 50                | F        | 6.0           | 900           |
| K. I. Sawyer AFB, MT  | 1,780      | D        | 55                                  | D        | 2,700             | D        | 4,400             | F        | 10.0          | 1,200         |
| Lackland AFB, TX      | 275        | C        | 10                                  | C        | 100               | I        | 0                 |          | 6.0           | 25            |
| Langley AFB, VA       | 1,500      | C        | 300                                 | C        | 15                | C        | 1,200             | C        | 9.0           | 110           |
| Laredo AFB, TX        | 55         | D        | 110                                 | D        | 50                | L        | 944               | F        | 12.0          | 300           |
| Laughlin AFB, TX      | 50         | L        | 70                                  | L        | 0                 |          | 200               | F        | 13.0          | 900           |
| L. G. Hanscom AFB, MA | 150        | C        | 150                                 | C        | 3,000             | I        | 400               | F        | 12.0          | 1,100         |
| Little Rock AFB, AR   | 500        | C        | 50                                  | C        | 10                | C        | 2,500             | C        | 9.0           | 900           |
| Lockbourne AFB, OH    | 1,570      | C        | 380                                 | C        | 10                | C        | 3,470             | C        | 3.0           | 500           |
| Loring AFB, ME        | 1,964      | C        | .....Included under engine oil..... |          |                   |          | 5,000             | C        | 21.0          | 500           |
| Lowry AFB, CO         | 340        | C        | 20                                  | C        | 2,350             | L&S      | 0                 |          | 3.0           | 75            |
| Luke AFB, AZ          | 0          |          | 0                                   |          | 5,000             | D        | 15,000            | L        | 6.0           | 900           |
| MacDill AFB, FL       | 550        | C        | 150                                 | C        | 200               | L        | 1,200             | C        | 24.0          | 300           |
| Malmstrom AFB, MT     | 1,100      | L        | 60                                  | L        | 50                | L        | 240               | F        | 24.0          | 300           |

| Air Force base        | Engine oil |          | Hydraulic fluid                     |          | Industrial fluids |          | Contaminated fuel |          | Fire fighting |               |     |
|-----------------------|------------|----------|-------------------------------------|----------|-------------------|----------|-------------------|----------|---------------|---------------|-----|
|                       | Gal/mo     | Disposal | Gal/mo                              | Disposal | Gal/mo            | Disposal | Gal/mo            | Disposal | Fires per qtr | Fuel gal/fire |     |
| March AFB, CA         | 250        | C        | 0                                   |          | 1,400             | C        | 800               | C        | 1.0           | 750           |     |
| Mather AFB, CA        | 580        | C        | 180                                 | C        | 350               | C        | 9,445             | C&F      | 26.0          | 667           |     |
| Maxwell AFB, AL       | 418        | C        | 84                                  | C        | 4,000             | C        | 135               | C        | 10.0          | 55            |     |
| McChord AFB, WA       | 190        | C        | 275                                 | C        | 110               | C        | 1,000             | C        | 3.0           | 150           |     |
| McClellan AFB, CA     | 50,000     | C        | .....Included under engine oil..... |          |                   |          |                   |          |               | 6.0           | 650 |
| McConnell AFB, KS     | 555        | St       | 400                                 | St       | 5                 | St       | 1,900             | St       | 3.0           | 300           |     |
| McCoy AFB, FL         | 325        | C        | 30                                  | C        | 0                 |          | 2,600             | F        | 12.0          | 2,000         |     |
| McGuire AFB, NJ       | 19,600     | C        | 500                                 | C        | 24,000            | C        | 1,500             | C        | 6.0           | 500           |     |
| Minot AFB, ND         | 1,050      | F        | 0                                   |          | 2,100             | F        | 1,200             | F        | 3.0           | 500           |     |
| Moody AFB, GA         | 1,150      | C        | 40                                  | C        | 870               | C        | 600               | F        | 36.0          | 300           |     |
| Mountain Home AFB, ID | 600        | C        | 30                                  | C        | 25                | C        | 1,500             | C&F      | 24.0          | 300           |     |
| Myrtle Beach AFB, SC  | 1,650      | C        | .....Included under engine oil..... |          |                   |          |                   |          |               | 6.0           | 300 |
| Nellis AFB, NV        | 500        | D        | 50                                  | D        | 0                 |          | 1,000             | D        | 10.0          | 300           |     |
| Norton AFB, CA        | 1,000      | C        | Unknown                             |          | 1,500             |          | 4,500             | C        | 6.0           | 500           |     |
| Offutt AFB, NE        | 1,150      | C        | 40                                  | C        | 50                | C        | 400               | C        | 30.0          | 500           |     |
| Otis AFB, MA          | 525        | D        | .....Included under engine oil..... |          |                   |          |                   |          |               | 3.0           | 667 |

| <u>Air Force base</u>   | <u>Engine oil</u> |                 | <u>Hydraulic fluid</u>                    |                 | <u>Industrial fluids</u> |                 | <u>Contaminated fuel</u> |                 | <u>Fire fighting</u> |                      |     |     |
|-------------------------|-------------------|-----------------|-------------------------------------------|-----------------|--------------------------|-----------------|--------------------------|-----------------|----------------------|----------------------|-----|-----|
|                         | <u>Gal/mo</u>     | <u>Disposal</u> | <u>Gal/mo</u>                             | <u>Disposal</u> | <u>Gal/mo</u>            | <u>Disposal</u> | <u>Gal/mo</u>            | <u>Disposal</u> | <u>Fire per qtr</u>  | <u>Fuel gal/fire</u> |     |     |
| Patrick AFB, FL         | 440               | F               | 600                                       | F               | 0                        |                 | 0                        |                 | 10.0                 | 750                  |     |     |
| Pease AFB, NH           | 220               | C               | 5                                         | I               | 300                      | I               | 600                      | F               | 24.0                 | 800                  |     |     |
| Perrin AFB, TX          | 3,000             | C               | .....Total included under engine oil..... |                 |                          |                 |                          |                 |                      |                      | 1.0 | 300 |
| Plattsburgh AFB, NY     | 250               | C               | ..Total included under engine oil..       |                 |                          |                 | 700                      | C               | 3.0                  | 400                  |     |     |
| Pope AFB, NC            | 700               | C               | .Included under engine oil..              |                 | 0                        |                 | 2,500                    | F               | 26.0                 | 312                  |     |     |
| Randolph AFB, TX        | 515               | C               | 75                                        | C               | 0                        |                 | 4,765                    | C               | 27.0                 | 300                  |     |     |
| Reese AFB, TX           | 200               | L               | 75                                        | L               | 650                      | L               | 0                        |                 | 13.0                 | 1,250                |     |     |
| Richard-Gebaur AFB, MO  | 1,800             | C               | 50                                        | C               | 1,200                    | C               | 0                        |                 | 6.0                  | 110                  |     |     |
| Robins AFB, GA          | 3,208             | C               | 916                                       | C               | 4,916                    | C               | 17,033                   | C&F             | 18.0                 | 500                  |     |     |
| Scott AFB, IL           | 1,000             | C               | 900                                       | C               | 0                        |                 | 0                        |                 | 2.0                  | 250                  |     |     |
| Selfridge AFB, MI       | 100               | C               | 0                                         |                 | 0                        |                 | 50                       |                 | 6.0                  | 50                   |     |     |
| Seymour-Johnson AFB, NC | 310               | C               | Unknown                                   |                 | Unknown                  |                 | 5,000                    | C               | 13.0                 | 300                  |     |     |
| Shaw AFB, SC            | 1,000             | C               | 200                                       | C               | 800                      | C               | 3,000                    | C&F             | 39.0                 | 300                  |     |     |
| Sheppard AFB, TX        | 1,041             | C               | Unknown                                   |                 | 400                      | E               | 100                      | F               | 6.0                  | 2,000                |     |     |
| Tinker AFB, OK          | 4,000             | C               | 720                                       | C               | 51,611                   | C               | 15,108                   | C               | 12.0                 | 1,000                |     |     |

| Air Force base           | Engine oil |          | Hydraulic fluid              |          | Industrial fluids |          | Contaminated fuel |          | Fire fighting |               |
|--------------------------|------------|----------|------------------------------|----------|-------------------|----------|-------------------|----------|---------------|---------------|
|                          | Gal/mo     | Disposal | Gal/mo                       | Disposal | Gal/mo            | Disposal | Gal/mo            | Disposal | Fires per qtr | Fuel gal/fire |
| Travis AFB, CA           | 2,950      | C        | Unknown                      | C        | 250               | C        | 7,411             | C        | 15.0          | 1,000         |
| Tyndall AFB, FL          | 385        | C        | 15                           | F        | 10                | F        | 300               | F        | 6.0           | 500           |
| Vance AFB, OK            | 190        | L        | 60                           | L        | 7,500             | C&S      | 300               | L        | 13.0          | 500           |
| Vandenberg AFB, CA       | 2,050      | C        | 23                           | C        | 230               | C        | (70#)             | F        | 20.0          | 50            |
| Webb AFB, TX             | 200        | C        | 25                           | C        | 10                | C        | 1,100             | F        | 12.0          | 1,400         |
| Westover AFB, MA         | 2,000      | C        | ..included under fluids..... |          | 700               | F        | 2,900             | F        | 9.0           | 1,000         |
| Whiteman AFB, MO         | 425        | C        | 40                           | C        | 0                 |          | 200               | F        | 12.0          | 1,250         |
| Williams AFB, AZ         | 660        | L        | 100                          | L        | 5                 | L        | 0                 |          | 3.0           | 1,000         |
| Wright-Patterson AFB, OH | 2,500      | C        | 500                          | C        | 4,000             | C        | 20,000            | C        | 6.0           | 1,000         |
| Wurtsmith AFB, MI        | 1,650      | L        | 55                           | L        | 30                | L        | 1,700             | L        | 3.0           | 3,000         |

Abbreviations used in disposal:

C - contract  
 D - dust control  
 F - fire department  
 St - storage  
 S - sewer/storm drain  
 L - land  
 E - evaporation  
 I - industrial waste plant

## APPENDIX VIII

## PESTICIDES AND HERBICIDES IN STORAGE

| <u>Air Force base</u>                                              | <u>Item</u>                                                                       | <u>Amount</u>           |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------|
| Air Force Academy,<br>CO                                           | DDT powder                                                                        | 75 lb                   |
|                                                                    | DDT liquid                                                                        | 135 gal                 |
|                                                                    | Dieldrin liquid                                                                   | 40 gal                  |
|                                                                    | Chlordane liquid                                                                  | 70 gal                  |
|                                                                    | Chlordane powder                                                                  | 180 lb                  |
|                                                                    | Toxaphene                                                                         | 20 gal                  |
|                                                                    | Lindane powder                                                                    | 50 lb                   |
|                                                                    | Lindane liquid                                                                    | 5 gal                   |
|                                                                    | Heptachlor                                                                        | 15 gal                  |
| Aeronautical<br>Chart and Infor-<br>mation Center,<br>St Louis, MO | DDT wettable powder (75 percent)                                                  | 50 lb                   |
|                                                                    | DDT (25 percent)                                                                  | 55 gal                  |
| Altus AFB, OK                                                      | UROX-22 nonselective soil sterilant                                               | } Total of<br>10-15 gal |
|                                                                    | Cholora 125 nonselective soil sterilant                                           |                         |
|                                                                    | Pre-san selective herbicide for crabgrass<br>and Poa Annua control of golf course |                         |
|                                                                    | "Tritac" nonselective herbicide for<br>control of bindweed                        |                         |
|                                                                    | Dowpon herbicide for control of cattails<br>in drainage ditches                   |                         |
| Andrews AFB,<br>Wash, DC                                           | None                                                                              |                         |
| Barksdale AFB, LA                                                  | None                                                                              |                         |
| Beale AFB, CA                                                      | DDT wettable powder (50 percent)                                                  | 100 lb                  |
|                                                                    | DDT wettable powder (100 percent)                                                 | 200 lb                  |
|                                                                    | DDT emulsion (57 percent)                                                         | 300 gal                 |
|                                                                    | DDT (5 percent, 2 percent chlordane oil<br>base)                                  | 150 gal                 |
|                                                                    | Malathion water emulsion (57 percent)                                             | 330 gal                 |
| Bergstrom AFB, TX                                                  | None                                                                              |                         |
| Blytheville AFB,<br>AR                                             | None                                                                              |                         |
| Bolling AFB,<br>Wash, DC                                           | None                                                                              |                         |
| Brooks AFB, TX                                                     | None                                                                              |                         |
| Cannon AFB, NM                                                     | DDT                                                                               | 480 lb                  |
| Carswell AFB, TX                                                   | None                                                                              |                         |

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| <u>Air Force base</u>   | <u>Item</u>                                                                                      | <u>Amount</u>               |
|-------------------------|--------------------------------------------------------------------------------------------------|-----------------------------|
| Castle AFB, CA          | Cyanogas                                                                                         | 150 lb                      |
| Chanute AFB, IL         | None                                                                                             |                             |
| Charleston AFB, SC      | DDT (2 percent)<br>DDT (75 percent)                                                              | 275 gal<br>50 lb            |
| Columbus AFB, MS        | DDT (20 percent concentrate)                                                                     | 100 gal                     |
| Craig AFB, AL           | None                                                                                             |                             |
| Davis-Monthan AFB, AZ   | MASDC has 11,750 pounds of DDT stored for disposal; awaiting instructions from DOD for 18 months | 11,750 lb                   |
| Dover AFB, DE           | None                                                                                             |                             |
| Dyess AFB, TX           | None                                                                                             |                             |
| Edwards AFB, CA         | None                                                                                             |                             |
| Eglin Aus Fld No. 9, FL | DDT emulsion (25 percent)<br>Wetttable powder concentrate (75 percent)                           | 75 gal<br>50 lb             |
| Eglin AFB, FL           | None                                                                                             |                             |
| Ellsworth AFB, SD       | None                                                                                             |                             |
| England AFB, LA         | None                                                                                             |                             |
| Ent AFB, CO             | None                                                                                             |                             |
| Fairchild AFB, WA       | None                                                                                             |                             |
| Forbes AFB, KS          | None                                                                                             |                             |
| F. E. Warren AFB, WY    | Chlordane<br>Dieldrin                                                                            | 15 gal<br>5 gal             |
| George AFB, CA          | None                                                                                             |                             |
| Goodfellow AFB, TX      | None                                                                                             |                             |
| Grand Forks AFB, ND     | DDT granules (5 percent)                                                                         | 1,200 lb                    |
| Griffiss AFB, NY        | DDT solution (5 percent)<br>DDT emulsion (25 percent)<br>Vapona (41.4 percent)                   | 125 gal<br>55 gal<br>55 gal |
| Grissom AFB, IN         | None                                                                                             |                             |

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| <u>Air Force base</u> | <u>Item</u>                          | <u>Amount</u> |
|-----------------------|--------------------------------------|---------------|
| Gunter AFB, AL        | None                                 |               |
| Hamilton AFB, CA      | None                                 |               |
| Hill AFB, UT          | Chlordane, dust (5 percent)          | 175 lb        |
|                       | Chlordane technical                  | 500 lb        |
|                       | Dieldrin emulsifiable (18, percent)  | 50 lb         |
|                       | Dieldrin (2-1/2 percent)             | 400 lb        |
|                       | Lindane emulsifiable (20 percent)    | 10 gal        |
|                       | Lindane wettable powder (75 percent) | 15 lb         |
| Holloman AFB, NM      | None                                 |               |
| Homestead AFB, FL     | DDT                                  | 110 gal       |
| Keesler AFB, MS       | None                                 |               |
| Kelly AFB, TX         | None                                 |               |
| Kincheloe AFB, MI     | Chlordane 6846-270-8262              | 25 gal        |
|                       | Chlordane 6846-270-8262              | 5 gal         |
|                       | Dieldrin                             | 3 gal         |
|                       | DDT 6840-2540                        | 40 lb         |
| Kingsley AFB, OR      | DDT                                  | 10 gal        |
| Kirtland AFB, NM      | 245 T herbicide                      | 55 gal        |
| K. I. Sawyer AFB, MI  | Mercurial fungicides                 | 600 lb        |
| Lackland AFB, TX      | None                                 |               |
| Langley AFB, VA       | None                                 |               |
| Laredo AFB, TX        | None                                 |               |
| Laughlin AFB, TX      | None                                 |               |
| L. G. Hanscom Fld, MA | None                                 |               |
| Little Rock AFB, AR   | None                                 |               |
| Lockbourne AFB, OH    | None                                 |               |
| Loring AFB, ME        | DDT dust (10 percent)                | 30 lb         |
| Lowry AFB, CO         | None                                 |               |
| Luke AFB, AZ          | None                                 |               |
| MacDill AFB, FL       | None                                 |               |

| <u>Air Force base</u> | <u>Item</u>                         | <u>Amount</u> |
|-----------------------|-------------------------------------|---------------|
| Malmstrom AFB, MT     | None                                |               |
| March AFB, CA         | None                                |               |
| Mather AFB, CA        | None                                |               |
| Maxwell AFB, AL       | None                                |               |
| McChord AFB, WA       | None                                |               |
| McClellan AFB, CA     | DDT 6840-766-9631                   | 1 lb          |
|                       | DDT 6840NL                          | 150 lb        |
|                       | DDT dust (10 percent) 6840-242-4213 | 99 lb         |
|                       | Lindane 6840-281-3462               | 15,966 lb     |
|                       | Insect repellent 6840-558-0918      | 9 lb          |
|                       | Chlordane 6840NL                    | 2,080 lb      |
|                       | DDT 6840-281-3462                   | 9,980 lb      |
|                       | DDT 6840-253-3892                   | 6,435 lb      |
|                       | DDT 6840-NL                         | 1,540 lb      |
|                       | DDT 6840-559-4514                   | 47 lb         |
|                       | DDT 6840-281-3462                   | 3,300 lb      |
|                       | DDT 6840-543-4038                   | 188 lb        |
|                       | DDT 6840NL                          | 168 lb        |
| McConnell AFB, KS     | None                                |               |
| McCoy AFB, FL         | None                                |               |
| McGuire AFB, NJ       | DDT emulsible (25 percent)          | 40 gal        |
|                       | Lindane emulsible (12 percent)      | 25 gal        |
|                       | Awaiting word on disposal from MAC  |               |
| Minot AFB, ND         | None                                |               |
| Moody AFB, GA         | DDT                                 | 3,695 gal     |
| Mountain Home AFB, ID | None                                |               |
| Myrtle Beach AFB, SC  | None                                |               |
| Nellis AFB, NV        | None                                |               |
| Norton AFB, CA        | None                                |               |
| Offutt AFB, NE        | None                                |               |
| Otis AFB, MA          | None                                |               |
| Patrick AFB, FL       | Sodium arsenite                     | 60 gal        |
| Pease AFB, NH         | None                                |               |

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| <u>Air Force base</u>   | <u>Item</u>                                         | <u>Amount</u> |
|-------------------------|-----------------------------------------------------|---------------|
| Perrin AFB, TX          | DDT                                                 | 145 gal       |
|                         | 2-4-D                                               | 15 gal        |
| Plattsburgh AFB, NY     | Chlordane (2 percent) + DDT (5 percent)             | 4 gal         |
|                         | DDT dusting powder (10 percent)                     | 75 gal        |
|                         | Dieldrin solution (0.5 percent)                     | 3 gal         |
|                         | Dieldrin emulsifiable concentrate (15 percent)      | 10 gal        |
| Pope AFB, NC            | None                                                |               |
| Randolph AFB, TX        | None                                                |               |
| Reese AFB, TX           | None                                                |               |
| Richards-Gebaur AFB, MO | Mercury base herbicide                              | 30 lb         |
|                         | Calocure                                            | 125 lb        |
|                         | Senesana                                            | 25 lb         |
| Robins AFB, GA          | DDT powder, wettable (75 percent)                   | 165 gal       |
|                         | Chlordane dust (5 percent)                          | 5 gal         |
|                         | DDT emulsible concentrate (25 percent)              | 5 gal         |
|                         | DDT (10 percent) + lindane oil solution (2 percent) | 30 gal        |
| Scott AFB, IL           | Chlordane dust 6840-543-7825                        | 1,970 lb      |
| Selfridge AFB, MI       | None                                                |               |
| Seymour-Johnson AFB, NC | None                                                |               |
| Shaw AFB, SC            | None                                                |               |
| Sheppard AFB, TX        | DDT dust (10 percent)                               | 360 lb        |
|                         | DDT emulsion (25 percent)                           | 30 gal        |
|                         | DDT dusting powder (10 percent)                     | 93 lb         |
|                         | DDT dust (75 percent)                               | 50 lb         |
|                         | Dieldrin concentrate (18 percent)                   | 40 gal        |
|                         | Dieldrin dust                                       | 500 lb        |
|                         | Chlordane dust                                      | 600 lb        |
|                         | BHC dust                                            | 600 lb        |
|                         | Lead arsenate dust                                  | 500 lb        |
|                         | Lindane                                             | 5 gal         |
| Tinker AFB, OK          | None                                                |               |
| Travis AFB, CA          | None                                                |               |
| Tyndall AFB, FL         | BHC dust (50 percent)                               | 1,000 lb      |
|                         | Lindane dust (1 percent)                            | 1,950 lb      |
|                         | DDT 25 (75 percent)                                 | 6,000 gal     |
| Vance AFB, OK           | DDT dust (10 percent)                               | 50 lb         |
|                         | DDT diluted powder (10 percent)                     | 85 lb         |
|                         | 2-4-D                                               | 25 gal        |

| <u>Air Force base</u>    | <u>Item</u>                        | <u>Amount</u> |
|--------------------------|------------------------------------|---------------|
| Vandenberg AFB, CA       | DDT (25 percent)                   | 140 gal       |
|                          | Dieldrin (15 percent)              | 120 gal       |
| Webb AFB, TX             | None                               |               |
| Westover AFB, MA         | None                               |               |
| Whiteman AFB, MO         | None                               |               |
| Williams AFB, AZ         | None                               |               |
| Wright-Patterson AFB, OH | DDT powder wettable (75 percent)   | 250 lb        |
|                          | DDT dust (10 percent)              | 10 lb         |
|                          | DDT oil solution (5 percent)       | 15 gal        |
|                          | DDT powder micronized (50 percent) | 15 lb         |
| Wurtsmith AFB, MI        | None                               |               |

## APPENDIX IX

## SEDIMENTATION FROM EROSION

| <u>Air Force base</u>                                   | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                                                                                                                                             | <u>Area currently denuded (acres)</u> |
|---------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Air Force Academy, CO                                   | Severe             | Ditching to prevent runoff, mulching, grading                                                                                                                                                                                | 16.00                                 |
| Aeronautical Chart and Information Center, St Louis, MO | Slight             | Due to limited construction of new facilities at this installation, no erosion problems have been encountered                                                                                                                | 0.00                                  |
| Altus AFB, OK                                           | Slight             | Level terrain does not erode                                                                                                                                                                                                 | 2.00                                  |
| Andrews AFB, Wash, DC                                   | Moderate           | None                                                                                                                                                                                                                         | 3.00                                  |
| Barksdale AFB, LA                                       | Slight             | None                                                                                                                                                                                                                         | 5.00                                  |
| Beale AFB, CA                                           | Moderate           | Minimum removal of vegetation, replacement of vegetation, paving, rip-raping, grading, and compacting                                                                                                                        | 10.00                                 |
| Bergstrom AFB, TX                                       | Slight             | None; area is generally flat and little runoff occurs except during infrequent, heavy thunder showers                                                                                                                        | 17.00                                 |
| Blytheville AFB, AR                                     | Slight             | None                                                                                                                                                                                                                         | 2.00                                  |
| Bolling AFB, Wash, DC                                   | Slight             | Recent construction projects on this base have been performed on level ground with no provisions made for erosion control                                                                                                    | 2.00                                  |
| Brooks AFB, TX                                          | Slight             | Grading and early completion of storm drainage structures; on a recent project turfing was accomplished immediately after final exterior wall completion; this practice helped immensely and helped to keep the site cleaner | 0.25                                  |
| Cannon AFB, NM                                          | Slight             | Watering, rolling, compaction                                                                                                                                                                                                | 5.00                                  |

| <u>Air Force base</u>   | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                                                                                      | <u>Area currently denuded (acres)</u> |
|-------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Carswell AFB, TX        | Slight             | Storm water routes stabilized, vegetation undisturbed where possible; mulch or plastic covering to protect slopes; aggregate blankets; asphalt penetration treatments | 4.00+                                 |
| Castle AFB, CA          | Slight             | Land is so flat that no requirement for erosion control exists                                                                                                        | 4.00                                  |
| Chanute AFB, IL         | Slight             | None                                                                                                                                                                  | 0.50                                  |
| Charleston AFB, SC      | Slight             | None required; terrain is very flat and level                                                                                                                         | 0.00                                  |
| Columbus AFB, MO        | Slight             | Gentle, sloping grades to prevent rapid runoff                                                                                                                        | 0.00                                  |
| Craig AFB, AL           | Slight             | None                                                                                                                                                                  | 0.00                                  |
| Davis-Monthan AFB, AZ   | Slight             | Dampening of dirt roads for dust control                                                                                                                              | 87.00                                 |
| Dover AFB, NJ           | Slight             | Maintain proper contours; no major problem                                                                                                                            | 2.00                                  |
| Dyess AFB, TX           | Slight             | Diversion ditches and dikes are used to prevent damage from rapid runoff when construction is located where erosion can occur                                         | 1.50                                  |
| Edwards AFB, CA         | Slight             | Road shoulders are maintained semi-annually by Air Force personnel                                                                                                    | 1.00-                                 |
| Eglin Aux Fld No. 9, FL | Slight             | None for normal on-grade construction; embankments are sodded, sprigged, or seeded as determined most appropriate for the particular grade consideration              | 0.00                                  |
| Eglin AFB, FL           | Slight             | Contour grading and sod                                                                                                                                               | 100.00                                |
| Ellsworth AFB, SD       | Slight             | Contractors are only allowed to remove sod within grading limits of the contract; are also required to park in a restricted area to reduce erosive effects of traffic | 2.00                                  |

| <u>Air Force base</u> | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                                                                                                                                                          | <u>Area currently denuded (acres)</u> |
|-----------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| England AFB, LA       | Slight             | This base has very flat terrain and erosion is not a problem; when revetments or steep slope ditches are constructed, seeding and/or straw and asphalt emulsion have been satisfactory to eliminate erosion                               | 2.00                                  |
| Ent AFB, CO           | Slight             | None during construction; seeding or sodding as soon as progress permits; in this semiarid region wind erosion is more significant than water erosion which occurs infrequently during heavy rainfall                                     | 4.00                                  |
| Fairchild AFB, WA     | Slight             | None                                                                                                                                                                                                                                      | 0.00                                  |
| Forbes AFB, KS        | Slight             | Grading as necessary to prevent runoff                                                                                                                                                                                                    | 0.00                                  |
| F. E. Warren AFB, WY  | Slight             | Seeded crested wheat grass                                                                                                                                                                                                                | 32.00                                 |
| George AFB, CA        | Moderate           | Normal practices for erosion control during construction; wetting down                                                                                                                                                                    | 15.00                                 |
| Goodfellow AFB, TX    | Slight             | Erosion is not a problem in this area; trench is dug using drag-line and dozer; composition of trench is approximately 2 feet of topsoil and 8 feet of caliche; caliche in bottom of trench will support trash trucks even in wet weather | 5.00                                  |
| Grand Forks AFB, ND   | Slight             | None needed; soil is not easily eroded                                                                                                                                                                                                    | 0.00                                  |
| Griffiss AFB, NY      | Slight             | Specifications require contractor to maintain grades and vegetative cover to prevent erosion                                                                                                                                              | 0.00                                  |
| Grissom AFB, IN       | Slight             | None                                                                                                                                                                                                                                      | 0.00                                  |
| Gunter AFB, AL        | Slight             | None; refer to Maxwell AFB, AL, statistics                                                                                                                                                                                                | 0.00                                  |
| Hamilton AFB, CA      | Slight             | Drainage structures and planting                                                                                                                                                                                                          | 0.00                                  |

| <u>Air Force base</u> | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                                                                                               | <u>Area currently denuded (acres)</u> |
|-----------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Hill AFB, UT          | Slight             | Very seldom is erosion a problem in a construction project; control of dust erosion is sometimes taken care of by watering as required                                         | 0.00                                  |
| Holloman AFB, NM      | Slight             | None required                                                                                                                                                                  | 5.00                                  |
| Homestead AFB, FL     | Slight             | None; soil in this area is primarily hard coral rock which does not erode easily; also, there is no appreciable elevation differential to create high water run-off velocities | 0.00                                  |
| Keesler AFB, MS       | Slight             | Grading to prevent rapid runoff during rain; vegetation reestablished as soon as possible                                                                                      | 10.00                                 |
| Kelly AFB, TX         | Slight             | Vegetative control; temporary berms or contours                                                                                                                                | 0.00                                  |
| Kincheloe AFB, MI     | Slight             | Construct snow fences for wind break                                                                                                                                           | 2.00                                  |
| Kingsley AFB, OR      | Slight             | Topography of base is relatively flat                                                                                                                                          | 0.00                                  |
| Kirtland AFB, NM      | Slight             | Very little required due to low rainfall in the Albuquerque area                                                                                                               | 2.00                                  |
| K. I. Sawyer AFB, MI  | Slight             | None required                                                                                                                                                                  | 0.00                                  |
| Lackland AFB, TX      | Slight             | Drainage ditches are cut so as to let the water run off                                                                                                                        | 6.00                                  |
| Langley AFB, VA       | Slight             | Erosion control not of prime importance due to flat terrain                                                                                                                    | 0.00                                  |
| Laredo AFB, TX        | Slight             | None; very low rainfall and high wind                                                                                                                                          | 0.00                                  |
| Laughlin AFB, TX      | Slight             | Sprigging                                                                                                                                                                      | 1.00                                  |
| L. G. Hanscom Fld, MA | Slight             | None at present                                                                                                                                                                | 0.00                                  |
| Little Rock AFB, AR   | Slight             | Seeded with suitable grass seed                                                                                                                                                | 100.00                                |

| <u>Air Force base</u> | <u>Erodibility</u> | <u>Erosion control practice</u>                                                                                                                                                                     | <u>Area<br/>currently<br/>denuded<br/>(acres)</u> |
|-----------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Lockbourne AFB,<br>OH | Slight             | Lockbourne terrain is very flat;<br>surface erosion of denuded soil<br>is not a problem; temporary fill<br>or excavation soil is stored in<br>protected areas away from ditches<br>and catch basins | 0.00                                              |
| Loring AFB, ME        | Slight             | Commonsense only; seeding, loaming,<br>site restoration                                                                                                                                             | 0.00                                              |
| Lowry AFB, CO         | Slight             | Grading to provide for proper<br>drainage                                                                                                                                                           | 0.00                                              |
| Luke AFB, AZ          | Slight             | Due to limited annual rainfall,<br>erosion is not a problem during<br>construction                                                                                                                  | 0.00                                              |
| MacDill AFB, FL       | Moderate           | None; haul broken concrete, etc.,<br>to shoreline for rip-rap; sites<br>are left bare until completion of<br>project, then sod and/or seed is<br>used for ground cover                              | 150.00                                            |
| Malmstrom AFB, MT     | Slight             | None required                                                                                                                                                                                       | 7.00                                              |
| March AFB, CA         | Moderate           | None                                                                                                                                                                                                | 0.00                                              |
| Mather AFB, CA        | Slight             | None needed because level terrain<br>results in slight runoff and<br>because of low annual rainfall                                                                                                 | 50.00                                             |
| Maxwell AFB, AL       | Slight             | None; however, future contract<br>specifications are being written<br>to follow latest directives for<br>construction site erosion<br>controls                                                      | 0.10                                              |
| McChord AFB, WA       | Slight             | Area not subject to erosion                                                                                                                                                                         | 0.00                                              |
| McClellan AFB, CA     | Slight             | None                                                                                                                                                                                                | 0.00                                              |
| McConnell AFB, KS     | Slight             | None                                                                                                                                                                                                | 10.00                                             |
| McCoy AFB, FL         | Slight             | All ground on base is level and<br>therefore constitutes no erosion<br>problem                                                                                                                      | 0.00                                              |
| McGuire AFB, NJ       | Slight             | Dust control by water tank truck                                                                                                                                                                    | 2.00                                              |

| <u>Air Force base</u> | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                                                                                                    | <u>Area currently denuded (acres)</u> |
|-----------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Minot AFB, ND         | Slight             | This area is relatively flat and little consideration is given to erosion control                                                                                                   | 1.00                                  |
| Moody AFB, GA         | Slight             | Due to the mostly level terrain, erosion is almost nonexistent; however, where the terrain is not level, use of temporary drainage, sodding, seeding, burlap retainers is practiced | 1.00                                  |
| Mountain Home AFB, ID | Moderate           | None                                                                                                                                                                                | 5.00                                  |
| Myrtle Beach AFB, SC  | Slight             | Proper drainage of construction areas                                                                                                                                               | 1.00                                  |
| Nellis AFB, NV        | Slight             | Landscaping                                                                                                                                                                         | 70.00                                 |
| Norton AFB, CA        | Slight             | Landfill is stabilized with area drainage to prevent storm water from entering filled area                                                                                          | 0.00                                  |
| Offutt AFB, NE        | Moderate           | All contractors are controlled by project specifications; these require that adequate drainage be provided during entire construction period                                        | 17.00                                 |
| Otis AFB, MA          | Slight             | None; does not apply now                                                                                                                                                            | 0.00                                  |
| Patrick AFB, FL       | Slight             | No current erosion problems during construction; areas denuded during construction are restored to original condition or better by seeding and/or sodding                           | 1.00                                  |
| Pease AFB, NH         | Slight             | None                                                                                                                                                                                | N/A                                   |
| Perrin AFB, TX        | Slight             | None; no construction planned or in progress now                                                                                                                                    | N/A                                   |
| Plattsburgh AFB, NY   | Slight             | None                                                                                                                                                                                | 0.00                                  |
| Pope AFB, NC          | Slight             | N/A                                                                                                                                                                                 | 2.00                                  |
| Randolph AFB, TX      | Slight             | Sod, grass                                                                                                                                                                          | 5.00                                  |
| Reese AFB, TX         | Slight             | None                                                                                                                                                                                | 2.00                                  |

| <u>Air Force base</u>    | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                                                                                                      | <u>Area currently denuded (acres)</u> |
|--------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Richard-Gebaur AFB, MO   | Slight             | New construction negligible; reseeding or sodding                                                                                                                                     | 0.00                                  |
| Robins AFB, GA           | Slight             | None                                                                                                                                                                                  | 0.00                                  |
| Scott AFB, IL            | Slight             | None                                                                                                                                                                                  | 4.00 to 5.00                          |
| Selfridge AFB, MI        | Slight             | When necessary sheet piling used                                                                                                                                                      | 0.00                                  |
| Seymour-Johnson AFB, NC  | Slight             | Erosion control practices not required because of flat area                                                                                                                           | 0.00                                  |
| Shaw AFB, SC             | Slight             | None                                                                                                                                                                                  | 0.00                                  |
| Sheppard AFB, TX         | Slight             | Contractor's responsibility; normally use some sort of an emulsion with a spray application                                                                                           | 6.00                                  |
| Tinker AFB, OK           | Moderate           | Topsoil stockpiled; replaced when resodding is accomplished                                                                                                                           | 20.00                                 |
| Travis AFB, CA           | Slight             | None                                                                                                                                                                                  | 60.00                                 |
| Tyndall AFB, FL          | Slight             | Normal construction drainage                                                                                                                                                          | 0.00                                  |
| Vance AFB, OK            | Slight             | Sod and terrace                                                                                                                                                                       | 0.00                                  |
| Vandenberg AFB, CA       | Severe             | Check dams, spray-on (temporary), ice-plant sprigging, pave areas, mulch and seed, curb and off-culverts (roads), jute mesh and seed, rip-rap, ditch lining (steep) intercept ditches | 0.00                                  |
| Webb AFB, TX             | Slight             | None                                                                                                                                                                                  | 2.00                                  |
| Westover AFB, MA         | Slight             | None required ordinarily; area landscaped and seeded upon completion of construction                                                                                                  | 0.00                                  |
| Whiteman AFB, MO         | Slight             | Grading and sodding                                                                                                                                                                   | 0.00                                  |
| Williams AFB, AZ         | Slight             | None                                                                                                                                                                                  | 0.00                                  |
| Wright-Patterson AFB, OH | Slight             | Flat area                                                                                                                                                                             | 0.00                                  |

| <u>Air Force base</u> | <u>Erodibility</u> | <u>Erosion control practices</u>                                                                       | <u>Area<br/>currently<br/>denuded<br/>(acres)</u> |
|-----------------------|--------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Wurtsmith AFB, MI     | Slight             | Grading of site to prevent runoff; condition of soil (sand) prevents most erosion at construction site | 0.75                                              |

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| 11. SUPPLEMENTARY NOTES.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | 12. SPONSORING MILITARY ACTIVITY<br>AFWL (DEZ)<br>Kirtland AFB, NM 87117    |                      |
| 13. ABSTRACT<br>(Distribution Limitation Statement B)<br>A questionnaire survey of Air Force solid waste practices was conducted on all active Air Force installations. Information is presented on 98 major installations in the zone of interior (ZI) in the following areas: base and family housing solid wastes; grease disposal; garbage grinders; solid wastes generated in sewage treatment; pathological and classified wastes; liquid industrial wastes; fire fighting training, herbicides and pesticides, on-base landfill operations; and sedimentation from erosion. |  |                                                                             |                      |

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|                                                                                                                                                                                                                                                                            | ROLE   | WT | ROLE   | WT | ROLE   | WT |
| Environics,<br>Solid wastes,<br>Municipal refuse<br>Questionnaire<br>Civil Engineering<br>Sewage treatment<br>Pathological wastes<br>Classified wastes<br>Liquid industrial wastes<br>Fire fighting training<br>Pesticides<br>Herbicides<br>Landfill operations<br>Erosion |        |    |        |    |        |    |

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