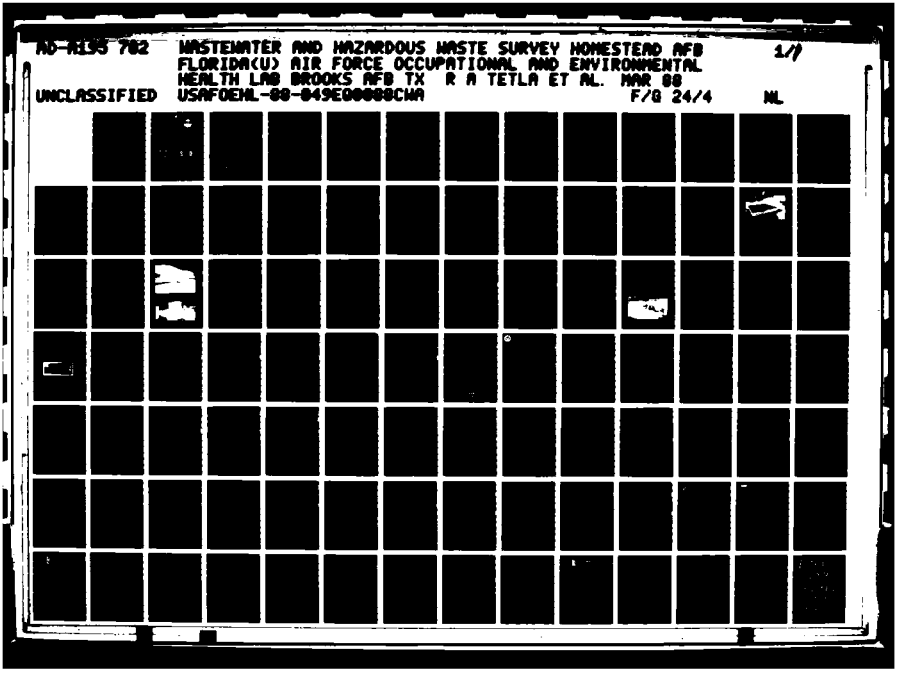
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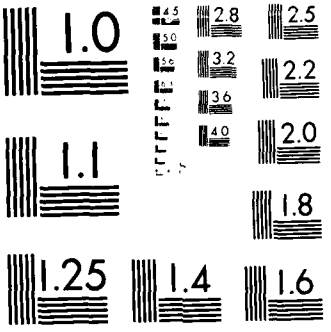

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USAFOEHL REPORT

88-049EQ0088CWA

Wastewater and Hazardous Waste Survey, Homestead AFB FL

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March 1988

Final Report

USAF Occupational and Environmental Health Laboratory
Human Systems Division (AFSC)
Brooks Air Force Base, Texas 78235-5501

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This report has been reviewed and is approved for publication.

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Wastewater and hazardous waste surveys were conducted at Homestead AFB by the USAFOEHL to address possible problems with oil/water separators and to evaluate the hazardous waste management program. The analytical results from the wastewater survey showed mercury, silver, benzenes, chlorinated benzenes, fuel components, and various purgeable halocarbons above the discharge limit presented in the Dade County Code 24-11. Characteristic hazardous waste results showed the separator located outside the jet engine test cell contained hazardous waste. The pH of wastewater discharged from the base filling station separator was out of compliance with the Dade County discharge limits. The results of the hazardous waste survey showed the base hazardous waste program to be running smoothly. The accumulation site managers have a good understanding of the overall waste management program.

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Item #19 cont'd

Recommendations: (1) Wastewater found to be out of compliance should be resampled to verify the chemical concentrations. (2) The separator located outside the jet engine test cell should be pumped out. The contents should be disposed of as hazardous waste. (3) Homestead AFB needs to update their waste analysis plan. (4) The base should do characteristic hazardous waste (EP Toxicity) analysis on neutralized battery acid. (5) Drums and bowsers at waste storage sites should be secured. (6) Paint booth wastewater should be routinely tested for characteristic hazardous waste. (7) The AGE accumulation site should be relocated. (8) Refueling maintenance should acquire metal pans to collect JP-4 drips and spills during maintenance. (9) Shops using PD-680 should convert to Sparkle Parts. (10) The base should investigate the purchase of Safety Kleen cleaning equipment. (11) The power production facility personnel should not dispose of waste paints and thinners down the floor drain; they should drum them. (12) The Hazardous Waste Training program should be upgraded to include inputs from the Bioenvironmental Engineering shop. (13) The base fuels lab should test all fuel brought to the fire training pit. (14) A container should pump out neutralized hydrazine at the aircraft fuel systems repair shop. (15) The motor pool should move its supply storage area away from the floor drain. (16) DRMO should specify an area where full batteries can be stored. (17) Entomology should give waste drums to a drum service contractor. (18) An oil water separation device should be installed at the water survival school.

ACKNOWLEDGEMENTS

The authors greatly appreciate the technical expertise and hard work provided by the other members of the survey team. Lt Col Robert D. Binovi, 1Lt Francis Slavich, Sgts Robert P. Davis and Roberto Rolon, without whose valuable assistance this survey could never have been accomplished.

We also acknowledge the help that 1Lt Ron Marchioni and the entire staff of the Bioenvironmental Engineering Section gave us during the survey. Thanks for making us feel welcome in the Sunshine State.

Contents

Illustrations

I. INTRODUCTION

On 8 May 1987 HQ TAC/SGPB requested USAF Occupational and Environmental Health Laboratory (USAFOEHL) to perform a wastewater characterization and hazardous waste survey at Homestead AFB, Florida (See request letter in Appendix A). A survey was requested to identify and address possible problems with oil/water separators and hazardous waste disposal and management practices.

The objectives of the survey were to characterize wastewater leaving the base and to evaluate the wastewater collecting in oil/water separators for hazardous waste characteristics. Wastewater characterization and characteristics hazardous waste parameters are presented in Tables 1 and 2, respectively. Water quality testing was conducted at four sites. Hazardous waste characteristics were tested at 24 sites. Recommendations and conclusions are based on comparisons between the survey results, the local wastewater discharge permit from Dade County (reference 1), and the Resource Conservation and Recovery Act - Code of Federal Regulations Title 40, section 261 (reference 5).

The survey was conducted by Lt Colonel Robert D. Binovi, 1Lts Robert A. Tetla and Francis Slavich, 2Lt Charles W. Attebery, SrA Peter Davis and SrA Roberto Rolon. The survey was performed from 10 Aug to 21 Aug 87.

II. BACKGROUND

A. Introduction

Homestead AFB, home of the 482 TFW, is located in Dade County, Florida approximately 2 miles west of Biscayne Bay. A drainage ditch approximately 20 feet wide surrounds 75 percent of the base. The water table under Homestead Air Force Base comes within 5-7 feet of the surface (reference 4).

The climate of Homestead AFB and surrounding area is sub-tropical maritime with an average annual precipitation of nearly 60 inches. Sixty percent of the rainfall occurs in the summer rainy season (May through October). Rainfall averages eight inches per month during this time period. The average high and low temperatures during the survey were 93 and 80 degrees Fahrenheit, respectively. The rainfall was 1.11 inches during this survey (reference 3).

B. Wastewater Disposal

1. Sewage Treatment System

Homestead AFB no longer operates a sewage treatment plant. Industrial wastewater typically flows through oil/water separators prior to entering the base sewer mains, which flow off base to a municipal treatment plant. Domestic sewage is combined with the industrial wastewater (reference 4).

2. Stormwater System

As mentioned before, the base has an extensive stormwater system that circles the base with conduit and open channels cut into the limestone underlaying the topsoil. The water generally drains off base to the east through a reservoir and flood control pumping station into an outfall canal to Biscayne Bay.

C. Wastewater Limitations

Since the base no longer operates its own sewage treatment plant, but discharges to a Publicly Owned Treatment Works (POTW), the wastewater is regulated by the local sewage discharge ordinance (Dade County Code 24-11) and the provisions of the National Pretreatment System. Provisions in the Dade County Ordinance prohibit the discharge of:

1. Any liquid with a temperature greater than 150 degrees Fahrenheit.

2. Single discharge of oil or grease exceeding 100 mg/L or daily average of 25 mg/L.

3. Gasoline, benzene, naphtha, fuel oil or other flammable or explosive liquid, solid, or gas.

4. Toxic or poisonous substances.

5. Garbage not properly shredded.

6. Wastewater with a pH less than 5.5 or greater than 9.5.

7. Water or waste containing concentrations greater than

Cyanides	0.01 ppm
Copper, total	0.5 ppm
Chromium, hexavalent	0.5 ppm
Chromium, total	1.0 ppm
Cadmium	0.5 ppm
Zinc, total	1.0 ppm

or other substance that will pass through the sewage treatment plant and exceed the state requirements for the receiving stream.

8. Any water or waste containing phenols in excess of 0.05 ppm.

9. Water containing unusual suspended solids or color.

10. Any toxic radioisotopes, without a special permit.

11. Any water or waste that will solidify or become viscous.

Wastewater was analyzed for characteristic Hazardous Waste parameters and compared to those listed in RCRA published in the Code of Federal Regulations Title 40 section 261 (5). Characteristics of a waste which classifies it a hazardous waste are presented in Table 1.

Table 1: Hazardous Waste Parameters

a. Ignitability: A substance is considered an ignitable hazardous waste if it has a flash point below 140 degrees Fahrenheit.

b. Corrosivity: A substance is considered a corrosive hazardous waste if it has a pH greater than or equal to 12.5 or less than or equal to 2.0.

c. Reactivity: A substance is considered a reactive hazardous waste if it contains 250 mg/L cyanide and/or 500 mg/L sulfide. These concentrations are listed in an interim guidance amendment to the Resource Conservation and Recovery Act (RCRA) (reference 2).

d. EP Toxicity: The concentrations of contaminants for the characteristic of EP Toxicity are listed below in mg/L:

Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0
Endrin	0.02
Lindane	0.4
Methoxychlor	10.0
Toxaphene	0.5
2,4-D	10.0
2,4,5-TP Silvex	1.0

III. PROCEDURES

A. Sampling Parameters and Site Locations:

1. Storm and Wastewater Sites - The following tables list the sampling parameters (Table 2) the corresponding sites (Table 3), and the analyses performed at each site (Table 4).

Table 2: Wastewater Characterization Parameters

Phenols (EPA Method 604)

Phenol
2-Chlorophenol
2-Methylphenol
4-Methylphenol
2-Nitrophenol
2,4-Dimethylphenol
4-Chloro-3-methlyphenol
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
2-4-Dinitrophenol
4-Nitrophenol
2,6-Dinitro-2-methyl-phenol
Pentachlorophenol

Inductively Coupled Plasma Metals Screen
(EPA Method 200.7)

Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Zinc
Antimony
Beryllium
Thallium

Purgeable Aromatics

(SW-846 EPA Method 8020)

Benzene
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene

Purgeable Halocarbons
(SW-846 EPA Method 8010)

Bromodichloromethane
Bromoform
Bromomethane
Carbon tetrachloride
Chlorobenzene
2-Chloroethylvinyl ether
Chloromethane
Dibromochloromethane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorofluoromethane
1,1-Dichloroethane
1,2-dichloroethane
Trans 1,2-Dichloroethane
1,2-Dichloropropene
1,3-Dichloropropene
Trans 1,3-Dichloropropene
Methylene chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride
Benzyl chloride
Bis (2-chloroethoxy) methane
Bis (2-chloro isopropyl) ether
Bromobenzene
Chloracetaldehyde
Chloral
Chloromethyl methyl-ether
Dichloromethane

Table 2 Continued

Ethylbenzene
Toluene
P-Xylene
M-Xylene
0-Xylene

Chemical Oxygen Demand (COD)
Oil and Grease (EPA Method 418.1)
Surfactants (MBAS)

Organochlorine Pesticides and PCBs (EPA Method 608) including:

Endosulfan II
Endosulfan Sulfate
Endrin Aldehyde
Chlordane
alpha-BHC
beta-BHC
Delta-BHC
Toxaphene
Aldrin
Endosulfan 1
DDD
DDE
Dieldrin
Endrin
Heptachlor
Heptachlor Epoxide
Lindane

Table 3: Wastewater Characterization Sample Site Identification

Site	Location	Sample Site Description
1	NDI, Building 755,	Sanitary manhole, S. of building
2	Lift station C, building 769,	Influent Channel of Lift station
3	Reservoir,	Outfall of dam
4	Dental Clinic, building 686,	Sanitary manhole

Table 4: Site/Analysis Table

Site	COD	O&G	Pest.	Vols.	Metals	HW	Phenols	Surf.	Chlor.	pH	T
1	x	x		x	x					x	
2	x	x	x	x	x		x		x	x	
3	x	x	x	x	x		x	x	x	x	
4	x			x	x		x	x		x	
5	x	x				x				x	x
6	x	x				x				x	x
7	x	x		x		x	x	x		x	x
8						x				x	x
9	x	x				x				x	x
10	x	x				x	x	x		x	x
11	x					x		x		x	x
12	x	x				x		x		x	x
13	x	x				x				x	x
14	x	x	x			x	x	x		x	x
15	x	x				x	x	x		x	x
16	x	x				x		x		x	x
17	x	x				x				x	x
18	x					x	x	x		x	x
19	x	x				x	x			x	x
20	x	x		x		x	x	x		x	x
21	x	x				x	x	x		x	x
22	x	x				x				x	x
23	x	x				x	x			x	x
24	x	x				x				x	x
25	x	x				x		x		x	x
26	x	x				x				x	x
27	x	x				x				x	x
28	x	x				x				x	x

NOTES:

COD = Chemical Oxygen Demand
O&G = Oils and Grease
Pest. = Pesticides and PCB (EPA Method 608)
Vols. = Volatile hydrocarbons (EPA Methods 8010 and 8020)
Mets. = Metals, EPA Method 200.7
HW = Characteristics hazardous waste (SW-846)
MBAS = Surfactants (MBAS)
Cl = Chlorides
T = Temperature

Table 5 contains the location of the sampling sites where samples for characteristic hazardous waste and uses were taken. Characteristic hazardous waste parameters have already been listed in Table 1.

Table 5: Characteristic Hazardous Waste Sample Site Identification

Site	Location	Site Description
5	base filling station separator	grit chamber
6	transportation washrack separator, Building 312	small separator next to washrack
7	engine shop separator, Building 750	small open separator; discharges to ditch
8	hush house separator	large separator; discharges to grade
9	transportation building separator, Building 312	sanitary manhole next to Bldg 312
10	726 TCS separator, Building 213	separator next to washrack
11	auto hobby shop separator, Building 207	large above ground separator sampled from sanitary manhole
12	31 CES heating shop separator, Building 180	small sump
13	31 CES equipment maintenance	large separator next to washrack
14	31 CES entomology separator	sanitary manhole
15	482 TFW separator, Building 223	large separator next to washrack
16	301 AFRES washrack separator, Building 4787	large separator next to washrack
17	31 CRS maintenance separator, Building 779	large separator next to building; discharges to canal
18	engine test cell separator	large separator next to washrack
19	AGE maintenance separator, Building 766	large separator next to washrack
20	31 EMS corrosion washrack separator, Building 720	large separator next to washrack

Table 5 Continued

Site	Location	Site Description
21	fire department separator	large separator in front of fire station
22	482 TFW AGE separator, Building 208	small sump/separator next to building
23	refueling maintenance separator, Building 711	small separator next to building
24	fuel systems repair separator,	large above ground separator, Building 708
25	refueling maintenance washrack separator, Building 711	large separators with no visible baffles next to washrack
26	31 CES grounds separator, Building 181	small separator
27	fire training pit	
28	munitions separator, Building 253	small separator

B. Sampling Procedures:

Equiproportional composite samples were taken hourly for 24 hours at sites 1-4. The sampling was accomplished using ISCO Model 2700 Automatic Composite Samplers. Samples were taken from oil/water separators by filling the sample containers with a mixed sample from portions of the aqueous and oil phases if oil was present. Analysis and preservation methods are presented in Table 6.

C. Hazardous Waste Survey

The first step of the survey was to review the base's hazardous waste management plan and the Bioenvironmental Engineer's industrial shop folders. From our review we established eight categories of waste generated on Homestead AFB and developed a waste disposal survey form (Appendix E) to inventory waste disposal practices on base. After this preliminary waste assessment, the survey team proceeded to visit all of the major industrial shops on Homestead AFB to observe industrial activities, discuss chemical waste disposal practices with shop personnel, and hand out waste disposal survey forms. The following individuals were contacted to discuss their respective areas of responsibility in the hazardous waste management program:

ILt Ron Marchioni, Chief, Bioenvironmental Engineering Section, Ext 791-6141
Judy Jackson, Hazardous Materials Specialist (contractor from the Hazardous Material Technical Center), Ext 791-8796

Emery Robertson, Property Disposal Specialist, (DRMO) Defense Reutilization Management Office, AUTOVON 791-7427
Rick Mock, Environmental Specialist, DRMO, AUTOVON 791-7425/26

Table 6: Analysis and Preservation Methods

Analysis	Preservation	Method	Where	Who
pH	none	A423	on-site	USAFOEHL
Temperature	none	E170.1	on-site	USAFOEHL
Chemical Oxygen Demand	none	Hach Mod.	Brooks AFB	USAFOEHL
Purgeable Halocarbons	HCL	S8010	Brooks AFB	USAFOEHL
Purgeable Aromatics	HNO_3	S8020	Brooks AFB	USAFOEHL
ICP Metals Screen	HNO_3	E200.7	Brooks AFB	USAFOEHL
As, Cd, Cr, Cu, Pb, Hg Ni, Se, Zn, Ag, Be, Ti, Sn, Sb				
Mercury	HNO_3	E245.1	Brooks AFB	USAFOEHL
Oils and Grease, Total Recoverable	H_2SO_4	E418.1	Brooks AFB	USAFOEHL
Chlorides	none	E325.1	contract lab	BIO
MBAS (surfactants)	none	E425.1	contract lab	BIO
Phenols	none	E604	contract lab	BIO
Organochlorine Pesticides and PCB	none	E608	contract lab	BIO
Characteristic Hazardous Waste (ignitability, Corrosivity, EP toxicity, Reactivity)	none	E625	Brooks AFB	USAFOEHL

Table 6 Continued

Notes: A - indicates Standard Methods for the Evaluation of Water and Wastewater. (reference 6)

E - indicates EPA Methods for Chemical Analysis of Water and Wastes. (reference 7)

S - indicates SW-846 Hazardous Waste Analysis Method.

BIO - Biospherics Inc., Rockville MD

Based on the information received in our waste survey forms, a summary of the annual forecasted wastes generated on Homestead AFB was calculated and is shown by category in Table 7 (See Appendix D for calculations). Almost 50% of the wastes generated at Homestead AFB are either waste oils or fuels. The remaining 50% is comprised mostly of waste paints and thinners, fluids, PD-680, and neutralized battery acid. In fact, 95% of all wastes are included in the first six categories.

Table 7: Categories of Waste on Homestead AFB

Category	Product	Total (Gal/Yr)	%Total Categories 1-8
1	Waste Oil	9096.0	31.6
2	Waste Fuel	4990.0	17.3
3	Waste Fluids	4510.0	15.7
4	Waste Paint and Thinners	3981.0	13.8
5	Waste PD-680	2428.0	8.4
6	Waste Battery Acid	2400.0	8.3
7	NDI and Photo Wastes	840.0	2.9
8	Waste Solvents and Strippers	564.0	1.96
	TOTALS:	28809.0	99.96

IV. RESULTS AND DISCUSSION

A. Wastewater Characterization Results

Testing results for wastewater characteristic parameters are listed in Appendix A. The following is a discussion of the significant results:

1. ICP Metal Screen and Chloride Results: Complete analytical results from the ICP metals screen for sites 1-4 and chloride analyses for sites 2 and 3 are presented in Appendix A, Table 1. Silver and zinc were found at site 1, NDI, at 302 and 200 µg/L, respectively. Copper, mercury, silver, and zinc were found in a sample of wastewater from site 4, the dental clinic, at concentrations of 119, 41.6, 721 and 340 µg/L, respectively. The Dade County Code 24-11 states mercury and silver are toxic substances prohibited from being discharged by Homestead AFB. Chloride results did not indicate problems with salt water intrusion.

2. SW-846 8010 (Purgeable Halocarbons) Analytical Results: SW-846 8010 analytical results are presented in Appendix A, Table 3. Discharges from lift station C (site 2), the reservoir (site 3), and the 31 EMS corrosion control washrack separator (site 20) showed detectable concentrations of purgeable halocarbons. Chloroform (52.7 µg/L), trans 1,2-dichloroethene (559.8 µg/L), methylene chloride (295.7 µg/L), and trichloroethylene (904.1 µg/L) were detected at lift station C. Chloroform and methylene chloride (2.9 µg/L and 433.5 µg/L, respectively) were detected at the reservoir. 1,1,1, trichloroethane (45.7 µg/L) was detected at the 31 EMS Corrosion Control washrack separator. These chemicals are typically associated with stripping and parts cleaning operations. The Dade County Code 24-11 prohibits Homestead AFB any discharge containing toxic substances such as purgeable halocarbons.

3. SW-846 8020 (Purgeable Aromatic) Analytical Results: SW-846 8020 analytical results are presented in Appendix A, Table 4. Discharges from lift station C (site 2), the reservoir (site 3), the dental clinic (site 4), and the 31 EMS corrrosion control washrack separator (site 20) had detectable concentrations of purgeable aromatics. Chlorobenzene (506 µg/L), 1,3-dichlorobenzene (929 µg/L), ethylbenzene (141 µg/L), toluene (72 µg/L), and p-xylene (207 µg/L) were detected at lift station C. Toluene (8 µg/L) was detected at the reservoir. Chlorobenzene (9.9 µg/L) was found at the dental clinic. Chlorobenzene (57 µg/L), 1,3-Dichlorobenzene (32 µg/L), and o-xylene (42 µg/L) were detected at the 31 EMS corrosion control washrack separator.

4. Phenols (EPA 604): Complete phenol analytical results are presented in Appendix A, Table 6. 2,4-Dichlorophenol (99 µg/L) was found at the 31 CES entomology shop (site 14), phenol and 2,4-dimethylphenol were identified at the AGE maintenance shop (site 19) at 19 and 14 µg/L, respectively. The 50 µg/L Dade County phenol limit was not exceeded by wastewater leaving the base from lift station C, as it was not detected.

5. Pesticides and PCBs (EPA 608): Complete pesticide and PCB analytical results are presented in Appendix A, Table 5. Lindane was detected in one sample from the reservoir, at a concentration of 0.07 µg/L. Three other reservior samples were negative for pesticide contamination, as were, all other samples.

6. Chemical Oxygen Demand (COD): Complete COD analytical results are presented in Appendix A, Table 2. The COD sample bottle from the hush house separator (site 8) was broken during shipment. Four samples had significantly high CODs; the transportation washrack separator (building 312), the engine shop, and the fuels maintenance washrack separator (building 711) were in the 1000-2000 mg/L range while a sample from the base filling station separator had a COD of 25,000 mg/L.

7. Oil and Grease: Complete oil and grease analytical results are presented in Appendix A, Table 2. Four of the oil & grease sample bottles were broken during shipment (sites 5, 8, 11, and 18). The sewage leaving the base through lift station C had an average oil and grease concentration of 6.7 mg/L meeting the discharge ordinance limit of 100 mg/L. Samples with levels higher than the limit were: the base filling station (118.8 mg/L), the engine shop (772 mg/L), the auto hobby shop separator (452 mg/L), the 31 CES equipment shop separator (984 mg/L), the 31 CES entomology shop separator (106.8 mg/L), the 482 TFW AGE separator (152.4 mg/L), and the refueling maintenance shop separator (198 mg/L). The average oil and grease concentration for the remaining 16 samples was 25.5 mg/L.

8. pH and Temperature: Complete pH and temperature results are presented in Appendix A, Table 2. Temperature and pH measurements were taken from each wastewater sample. The pH of the sewage leaving the base through lift station C was 6.89 (average value). The wastewater discharge from the base filling station separator (pH = 5.08) was less than the lower limit of 5.5 set in Dade County Code 24-11. pH values from all other samples were below 9.5 and above 5.5. All waste water temperature values were below 35°C. All values for temperature are within the discharge limitations set in the local ordinance.

9. Surfactants: Surfactant analytical results as determined by methylene blue active substances (MBAS) are presented in Appendix A, Table 2. MBAS tests were run on wastewater samples from 14 sites (sites 3, 4, 7, 10, 11, 12, 14, 15, 16, 18, 20, 21, 25, and 26). The sewage leaving the base through lift station C had an average surfactant concentration of 0.1 mg/L. The average concentration for the remaining samples was 6.1 mg/L.

B. Characteristic Hazardous Waste Results:

Hazardous waste results are presented in Appendix A, table 7.

1. Ignitability - The water sample taken at site 18, the jet engine test cell, was the only wastewater found to be hazardous from an ignitability standoint. The separator wastewater contained 5 percent petroleum distillates and was ignitable at 120°F.

2. Corrosivity - No samples were found to be corrosive hazardous wastes.

3. Reactivity - No samples were found to be reactive hazardous wastes.

4. EP toxicity - No samples were found to be EP Toxic hazardous wastes.

C. Hazardous Waste Program

The Hazardous Waste Program at Homestead AFB is operated fairly well. The Environmental Coordinator (DEEV) has the responsibility for all environmental programs on Homestead AFB and has help from a contractor person from the Hazardous Materials Technical Center, Ms Judy Jackson (Hazardous Waste Specialist), to oversee the program. Ms Jackson's responsibilities include: training shop personnel; inspecting accumulation sites; reviewing all finalized manifests; updating the base hazardous waste management plan; providing guidance on waste minimization; maintaining the operating logs at the Civil Engineering permitted storage site (Bldg. 813); and providing technical support to the Environmental Coordinator. DEEV is not involved with the specific day-to-day details of waste disposal. Theses details are primarily managed by the Defense Reutilization Management Office (DRMO) and the shops generating the wastes.

The shop generating the waste is responsible for logging quantities of wastes placed into storage containers, maintaining records of wastes stored at satellite accumulation sites, segregating, handling, and packaging the waste. Also, with the help of the Hazardous Waste Specialist, the shop is responsible for identifying and labeling the waste, filling out a DD Form 1348-1 (Figure 1), and transporting the waste to the Civil Engineering permitted hazardous waste storage site (Bldg 813). Certain shops also have the responsibility for appointing an accumulation site manager for their satellite accumulation site, and providing the names of newly appointed accumulation site managers to the environmental coordinator.

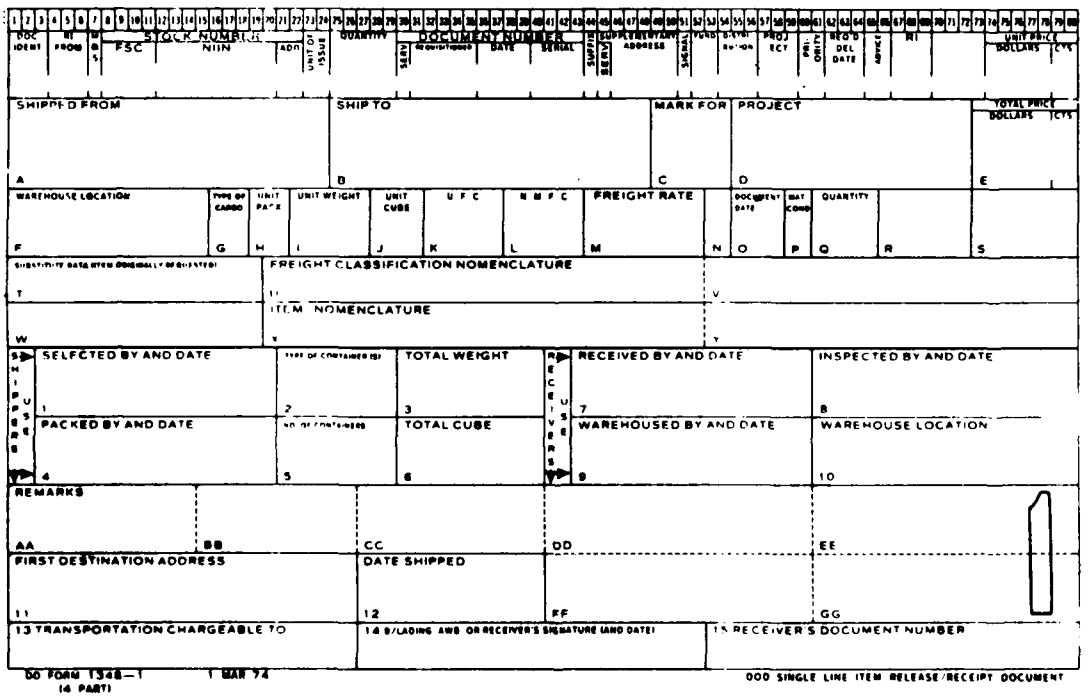

Figure 1. DD Form 1348 1

DRMO is contacted whenever a shop needs to dispose of a waste. DRMO takes accountability for the waste; however, the shop takes the waste to Civil Engineering's permitted storage site (Bldg 813). Civil Engineering takes physical custody of the waste until a contractor (currently, Chem Waste Management for hospital wastes, Ricky's Oil Service for waste oils and Underwood Industries for all remaining wastes) comes to pick up the waste. Civil Engineering will continue to take physical custody of waste on base until DRMO's new hazardous waste storage site is built, sometime in 1988-89.

Prior to disposal, DRMO fills out the United States Environmental Protection Agency (EPA) uniform manifest and lets DEEV review it, before contacting a contractor. The contractor, upon arrival at the base, goes to DRMO to allow either DRMO and/or CE to accompany the contractor to the Civil Engineering permitted accumulation site. The contractor takes the waste and transports it to their Treatment Storage Disposal Site (TSDS) for final disposal.

Unknown wastes have to be analyzed before disposal. The BEE has taken the responsibility to sample unknown wastes and other waste streams on an as needed basis. Samples are sent to the USAFOEHL/SA for analysis and results are sent back to the BEE who notifies the shop and DEEV of the results.

V. DESCRIPTION OF INDUSTRIAL ACTIVITIES AND WASTE DISPOSAL PRACTICES

This section documents the findings from the visits to the industrial shops. A listing of disposal practices by shop is in Appendix C.

1. Shop: 3613 CCTS Water Survival School (Turkey Point) — Building: 10
   Shop Supervisor: MSgt Gallag — AUTOVON: 791-8487

The Water Survival School generates wastes from the maintenance of boats used for water survival training. Waste oils and waste fluids (transmission, hydraulic and brake, about 25 gallons/month) are all drummed (stored on-site) and picked up by a contractor. The shop also generates a large amount of waste bilge water (approximately 150 gallons/month) which is stored at their waste accumulation site located next to the building. The base did not have a disposal contract for bildge waste during the survey. The last contract recently expired and was not renewed.

2. Shop: Photo Lab — Building: 101
   Shop Supervisor: Sgt Massey — AUTOVON: 791-8513

Base Photo Lab personnel are responsible for developing, processing and printing photographs. The Photo Lab uses fixers and developers. Used developers are poured down the drain while used fixers pass through a silver recovey unit before being discharged to the sanitary sewer. The discharge from the silver recovery unit is checked with litmus paper (as described in AFR 400-14) to assure that silver is not being discharged to the sewer. The silver recovery unit is cleaned out at the discretion of the lab.

3. Shop: 31 CSG/DEMS Paint Shop — Building: 174
Shop Supervisor: Mr Farrow — AUTOVON: 791-7187

This shop paints the interior and exterior of buildings, structures, and signs. Shop personnel generate approximately 25 gallons of paint waste, 10 gallons of waste thinners, and two gallons of stripping waste per month. About 85% of the paint waste is latex and the remainder is enamel. All paint wastes are drummed as hazardous waste and placed at the shop's collection site located adjacent the facility. This site is also used as the paint waste collection point for the base housing areas. The site is located on a grassy area, unlocked and unrestricted. There is a concrete, covered, patio behind the shop where some spray painting is done. Empty spray cans are thrown in the trash. Strippers are applied with rags and rinsed off. The rags are placed in drums and disposed of as hazardous waste.

4. Shop: 31 DES/DEME Power Production — Building: 176
Shop Supervisor: Sgt Hernandez — AUTOVON: 791-8740

31 DES/DEME personnel operate and maintain emergency gas and diesel powered generator units, and maintain above ground heating-oil tanks. The shop generates about 40 gallons of waste oil and approximately five gallons of waste automotive and diesel fuel per month. These wastes are stored in the shop's 200 gallon underground storage tank. The tank is serviced by contract on a quarterly basis. PD-680 is used in a wipe-on application for cleaning. Spent cleaning rags are sent to the base laundry. Approximately one gallon per month of waste paints (enamel and latex) and thinners are washed down the drain. Spent paint brushes are thrown in the trash. Approximately 20 lead-acid batteries per month are neutralized with sodium bicarbonate in the battery shop. The spent battery cases are turned in to DRMO. About five gallons of waste antifreeze per month is discharged to the sanitary sewer system.

5. Shop: Liquid Fuels Maintenance — Building: 176
Shop Supervisor: TSgt Wood — AUTOVON: 791-7622

Liquid Fuels personnel maintain stationary fuel systems, and clean both above ground and underground fuel tanks. The most common waste is a JP-4 and sludge mixture from tank cleaning operations. Fifty-two 50,000-gallon underground tanks at bulk storage are cleaned every three years on a rotating basis. There are three 20,000 barrel above ground tanks and one 10,000 barrel above ground tank cleaned every five years. Approximately 50 gallons of waste (JP-4 and sludge mixture) is generated per tank during cleaning. The waste JP-4 and sludge mixture is drummed and taken to the permitted hazardous waste site (Bldg 813) for disposal as hazardous waste.

6. Shop: 482 CAMS/MAEW Armament — Building: 192
Shop Supervisor: Mr Adams — AUTOVON: 791-8928

This shop is responsible for maintaining weapon release equipment and gun systems for F-4 aircraft. The shop has a 30-gal PD-680 tank for parts cleaning that is changed out quarterly. The waste PD-680 is drummed and taken to the 482 AGE collection site before being picked-up by a contractor. A small amount of waste oil and paint thinner is also generated. These are collected in separate containers and taken to the 482 AGE site to be drummed separately as waste oil or hazardous wastes. The shop also performs spot painting with spray cans. The empty spray cans are thrown in the trash.

7. Shop: 482 CAMS/MAEFC Corrosion Control — Building: 193
Shop Supervisor: Mr Servello — AUTOVON: 791-8220

Personnel of the 482 CAMS Corrosion Control treat the F16A-B, F-4D aircraft, and associated parts for corrosion (partial stripping and painting). All thinners and waste paint (10 gallons/month) are mixed together and put into 55-gallon drums before being turned in to DRMO. Small parts are stripped using a plastic bead blasting unit. Used beads are placed in 55-gallon drums and disposed of as hazardous waste through DRMO. A sample of the blasting media, taken on 7 Nov 86 (see Table 8), showed high levels of Cadmium, and Chromium, 8.80 mg/L and 102.40 mg/L, respectively (apparently from the chromate primers used).

Shop personnel are also responsible for ordering aircraft soap and PD-680. MSCI aircraft soap diluted 14:1 with water is used to wash the aircraft. PD-680 is used at the washrack to clean the aircraft engine bays. There are no floor drains located in the shop and all floor drains at the washrack are connected to an oil/water separator which discharges to the sewer.

Table 8: Results of Characteristic Hazardous Waste Analyses on a Sample of Plastic Bead Media

Metal	Concentration (mg/L)	Metal	Concentration (mg/L)
Arsenic	< 0.01	Lead	< 0.02
Barium	< 1.00	Mercury	< 0.001
Cadmium	8.80[1]	Selenium	< 0.01
Chromium	102.40[1]	Silver	< 0.01

The sample was considered noncorrosive and nonreactive,

pH of leachate 6.02[2]

[1]This waste is considered a hazardous waste due to high levels of cadmium and chromium. According to 40 CFR 261, the maximum concentrations allowed are 5.0 mg/L (40 CFR 261).

[2]Standard pH units.

8. Shop: 482 CAMS Pneudraulics — Building: 194
Shop Supervisor: Mr Lechot — AUTOVON: 791-7284

Pneudraulics Shop personnel maintain in-shop repair capabilities on all pneudraulic and hydraulic aircraft components, and environmental systems for the F4-D.

Parts are cleaned in a 30-gallon vat containing PD-680. The vat is cleaned out annually and its contents are drummed, turned in to DRMO, and finally picked up by a contractor. Approximately 1 gallon/month of hydraulic fluid is disposed of in a hydraulic fluid bowser located at the 482 AGE accumulation site.

9. Shop: 482 AGE — Building: 200
   Shop Supervisor: Mr Becker — AUTOVON: 791-8612

Personnel are responsible for the inspection and repair of all AGE support equipment. This shop generates about 18 gallons of waste oil and fluids per month which are drummed and picked up by the base waste oil contractor (Ricky's Oil Service). The shop's collection site has a gravel bed and is curbed with cinder blocks. The site is not secured or covered. About one gallon per month of waste PD-680 is generated during parts cleaning. This is also drummed and picked up by Ricky's Oil Service. Waste JP-4 is drained into bowsers and used at the fire training pit during fire training exercises. The shop has its own above ground fuel tank for refueling the equipment.

10. Shop: 482 CAMS Wheel and Tire Shop — Building: 200
    482 CAMS Repair and Reclamation
    Shop Supervisor: Mr Sanchez — AUTOVON: 791-7371

Wheel and Tire Shop personnel tear down, clean and rebuild main and nose wheels of F-4 aircraft. This shop has a 30-gallon PD-680 degreasing tank that is cleaned out on a bimonthly basis. Waste PD-680 is placed in a 55-gallon drum and taken to the Civil Engineering accumulation site where it is picked up by the waste oil contractor.

Personnel of the Repair and Reclamation Shop do heavy mechanical maintenance on the F-4D aircraft. No solvents are used in this shop.

11. Shop: Auto Hobby Shop — Building: 204
    Shop Supervisor: Mr Creasman — AUTOVON: 791-8318

The Auto Hobby Shop is housed in a "garage type" building containing state-of-the-art equipment for maintenance and repair of privately owned vehicles. All floor drains are connected to an oil/water separator that is cleaned out on a quarterly basis.

This shop has one hot dip tank, containing an alkaline cleaner, that has never been changed and a degreasing PD-680 tank (approximately 25 gallons). PD-680 from the degreasing tank is changed out on a monthly basis, placed in a 55-gallon drum and taken to the Civil Engineering waste storage site. Waste PD-680 is ultimately picked up by the waste oil contractor.

There are no waste paints and thinners generated at the dry paint booth. Thinners used to clean equipment are mixed with the paint and stored for later use. Aircraft soap, diluted 10:1, is used to clean the floors. Waste antifreeze is disposed of down the drain. Waste oil is poured into a funnel located in one of the bays that is connected to a 250-gallon above ground tank (see Figure 2). This tank is pumped out by a contractor.

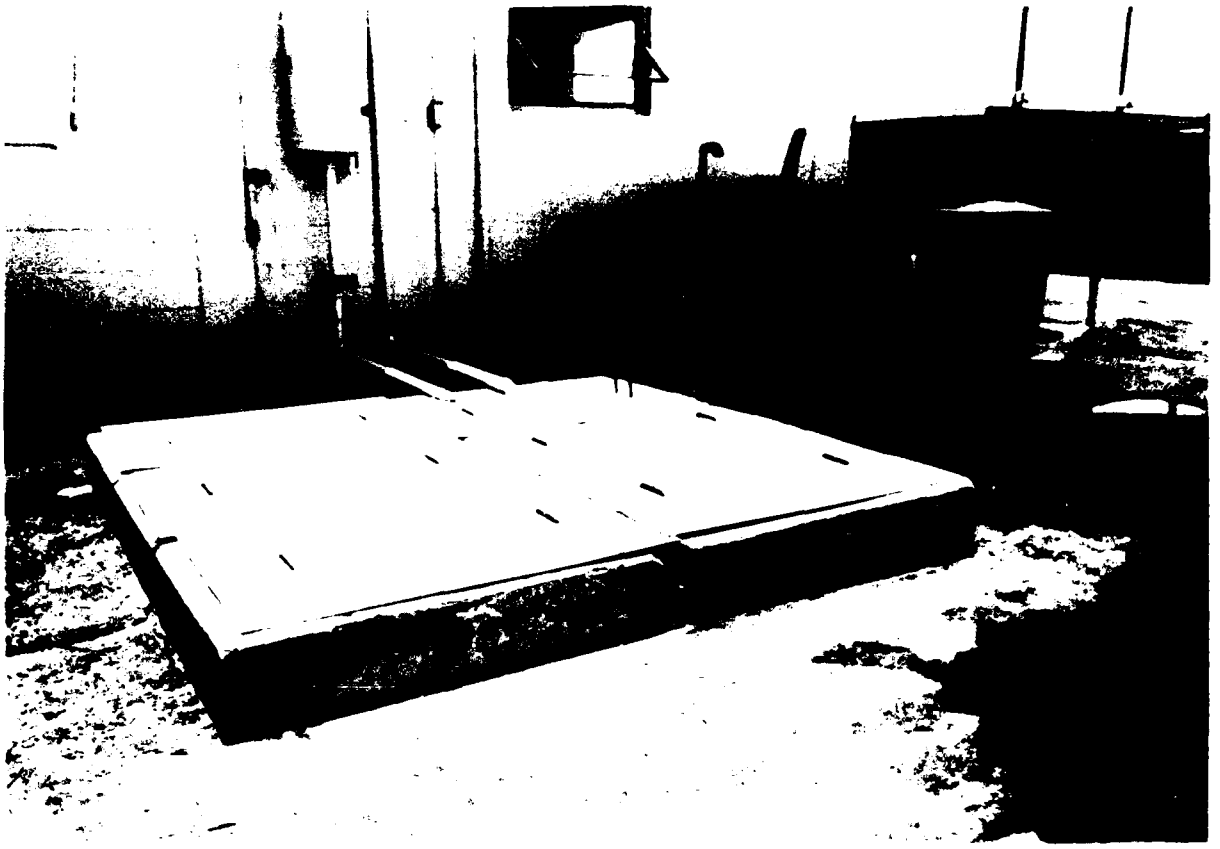

Figure 2. Oil Tank at the Auto Hobby Shop

12. Shop: 726th TCS Vehicle Maintenance — Building: 211
    Shop Supervisor: TSgt Quinn — AUTOVON: 791-8619

Vehicle Maintenance Shop personnel repair tactical vehicles, perform minor body work, and maintain the Battery Shop. Waste battery acid (20 gallons/mo) is neutralized with sodium bicarbonate and discharged to the sanitary sewer. Waste antifreeze is discharged down the drain into the sanitary sewer. Waste oil and waste hydraulic fluid are placed in a 1500-gallon underground tank located behind Building 209. When full, this tank is pumped out by a contractor. Automotive fuel drained from fuel tanks is returned to the tanks after repairs have been made. Paint wastes from vehicle painting are placed in a 55-gallon drum and disposed of as hazardous waste.

13. Shop: 31 EMS/MAECF Munitions — Building: 251
    Shop Supervisor: SSgt Meluskey — AUTOVON: 791-7582

Shop personnel are responsible for the corrosion control of captive/dummy air training missiles, including sanding and painting. The shop is also responsible for cleaning munitions, handling trailer bearing cone assemblies and related components. The shop has a waterfall paint booth. Waste sludge, paints, and thinners are drummed as hazardous waste and

stored at the shop's collection site. Wastewater from the booth is discharged down the drain. Recent analytical results (Table 9) showed that the water from the waterfall is not a characteristic hazardous waste. The collection site is not covered or fully diked; a work order to complete this work has been approved. Shop personnel also use a 10-gallon vat of PD-680 for parts degreasing. The PD-680 is changed every month and drummed as hazardous waste.

Table 9: Sample of Water from Waterfall Paint Booth

Metal	Concentration (mg/L)	Metal	Concentration (mg/L)
Arsenic	< 0.01	Lead	0.34
Barium	< 1.00	Mercury	< 0.001
Cadmium	0.05	Selenium	< 0.01
Chromium	0.15	Silver	< 0.01

Corrosivity and Reactivity:
Considered noncorrosive and nonreactive

pH of leachate 7.01[1]

Major Components: Sample is essentially water
Ignitability: Sample is not ignitable below 140°F

[1]Standard pH units.

14. Shop: 31 CRS Jet Engine Test Cell — Building: 268
Shop Supervisor: TSgt Krause — AUTOVON: 791-8287

Jet Engine Test Cell personnel troubleshoot engines, perform field tests and conduct engine rev-up procedures on the I-79 turbojet engines. Aircraft soap (4 gallon/month) is used to clean equipment and the interior of the run bay. Soap is rinsed off and drained to an oil/water separator. Oil (12 gallons/month), PD-680 (8 gallon/month), and jet fuel (6 gallons/month) are also drained to the oil/water separator. All floor drains are connected to an oil/water separator. There is an underground storage tank of unknown dimensions not in use outside the building.

15. Shop: 31 TRANS/LGTM Vehicle Maintenance — Building: 312
Shop Supervisor: Mr Brundige — AUTOVON: 791-8623

Vehicle Maintenance shop personnel are responsible for the maintenance of 650 government vehicles and heavy equipment. This shop has a dry paint booth generating approximately 45 gallons of paint waste/month. Waste paints and thinners are drummed and stored at the shop's accumulation site (near Bldg 312). When full, the drums are transported to the Civil Engineering accumulation site. Waste oil and waste fluids are stored in one of two 600-gallon above ground tanks. When full, these tanks are pumped out by a waste oil

contractor. Unserviceable batteries (40 batteries/month) are given to DRMO without being drained. This shop has 3 Safety Kleen degreasing units and 1 Safety Kleen carburetor cleaner. These units replaced PD-680 vats that were previousiy used in the shop to degrease parts. Waste antifreeze and aircraft soap used to wash the floor are both rinsed down the drain. The floor drain in this building is connected to an oil/water separator that leads to the sanitary sewer.

16. Shop: 31 CSG/DEMWE Entomology — Building: 371
Shop Supervisor: Mr Kost — AUTOVON: 791-8127

The Civil Engineering Entomology shop is responsible for pest control throughout the base. This includes chemical insecticide spraying of trees, homes, etc. The chemicals used in this shop are used up in process. Any leftover chemicals are drained and stored in containers for use at a later time. Alcohol used for cleaning fogging equipment and triple rinsing of pesticide barrels is drummed. These chemical mixtures of alcohol with either Malathion or Dibrom, are disposed of as hazardous waste.

17. Shop: 31 TRANS Fire Truck Maintenance — Building: 706
Shop Supervisor: TSgt Jenkins — AUTOVON: 791-8633

Fire Truck Maintenance personnel maintain fire fighting equipment. Maintenance includes safety inspections along with periodic lubrication and oil changes. This shop has a Safety Kleen degreasing unit that is changed out on a monthly basis. Waste oil and waste fluids (55 gallons every two months) are placed in a 55-gallon drum, taken to the motor pool and drained into a 500-gallon above ground tank (Bldg 312).

18. Shop: Aircraft Fuel System Repair — Buildings: 708 & 710
Shop Supervisor: SMSgt Stanley — AUTOVON: 791-7125

Aircraft Fuel System Repair personnel remove and replace aircraft fuel system components such as fuel bladders and external tanks. Shop personnel also service and repair F-16A/C hydrazine systems. Waste jet fuel (approximately 10 gallons/month) is placed in a bowser and taken to the fire training pit for burning. Hydrazine from the F-16A/C is neutralized in Building 708 with bleach and drained to a 1000-gallon underground tank. When the tank is full the Bioenvironmental Engineering Shop tests the neutralized hydrazine for residual chlorine and pH. If the neutralized hydrazine meets specifications, it is then pumped from the tank into the sanitary sewer.

19. Shop: 31st TRANS Refueling Maintenance — Building: 711
Shop Supervisor: Mr Burkholder — AUTOVON: 791-7527

TRANS Refueling Maintenance Shop personnel maintain refueling vehicles such as: R-9, R-8, C-300 Trucks, and MH2-A-B-C hosecarts. Paint waste and thinners (2 gallons/month), waste oils, and fluids (20 gallons/month) are drummed and taken to Building 312 where they are picked up by the waste oil contractor. Jet fuel (200 gallons/month), automotive fuel (5 gallons/month), and waste antifreeze (4 gallons/month), drained from equipment are emptied into the floor drain which discharges to a fuel/water separator connected to the sewer. Waste fuels separated in the separator enter a 700-gallon underground fiberglass

tank. When full, the tank is pumped out by POL personnel and the waste fuel is taken to the fire training pit. This shop also has a 7-gallon PD-680 degreasing tank that is cleaned out every month, or sooner if needed. Waste PD-680 is emptied to the floor drain.

20. Shop: 301 Pneudraulics — Building: 712
Shop Supervisor: Mr Parker — AUTOVON: 791-7876

This shop is combined with the 48th Hydraulics Shop. Shop personnel are responsible for maintaining hydraulic components and fuel systems of eight aircraft, four H-3CE helicopters and four C-130 aircraft. This shop generates approximately five gallons of hydraulic fluid per month. Waste hydraulic fluid is placed in a 55-gallon drum located at the 301 Corrosion Control accumulation site.

21. Shop: 307 AMU — Building: 714
Shop Supervisor: SMSgt Brooks — AUTOVON: 791-7789

Personnel of the 307 AMU maintain, launch and recover 97 F-4D aircraft. Waste hydraulic fluid (10 gallons/month) and jet fuel (10 gallons/month) are placed in 55-gallon drums and taken to the fire training pit.

22. Shop: 31 EMS/MAEFC Corrosion Control — Building: 720
Shop Supervisor: SSgt Ramirez — AUTOVON: 791-7248

Corrosion Control personnel treat the F16A-B and the F-4D aircraft, support equipment, and all associated parts for corrosion. Radomes and small parts are stripped in Building 720 with an epoxy stripper. F16A-B and F-4D aircraft are touched up (partial stripping and painting) at the aircraft washrack (Figure 3). All thinners and waste paint (30 gallons/month) are mixed together, put into 55-gallon drums, and turned in to DRMO. Empty paint cans (including spray cans) are thrown into the trash. A mixture of methyl ethyl ketone (MEK) and toluene is used to wipe down the aircraft after dry sanding to prepare the surface for painting. Chromate conversion coating (alodine, a chromic acid solution) is used to protect aluminum nose pieces. Nitric acid is occasionally used.

The aircraft washrack has a soap tank and a mixing tank. Soap is transferred to the mixing tank and diluted 16:1 with water. The diluted soap mixture is sent to various stations on the washrack via underground pipes. There are no floor drains in building 700 and all floor drains at the washrack are connected to an oil/water separator which empties to the sanitary sewer.

23. Shop: 31st Armament Shop — Building: 740
Shop Supervisor: TSgt Johnson — AUTOVON: 791-7238

Personnel of the 31st Armament Shop inspect, clean and maintain all F-16 and F-4 alternate mission equipment and F-16 internal gun systems. The shop has a 40 gallon PD-680 tank used for parts degreasing. Waste PD-680 is drummed and temporarily stored at the shop's accumulation site (Bldg 740, Figure 4) until it can be transported to the Civil Engineering accumulation site. In the near future the shop will be replacing PD-680 with Citrikleen degreaser.

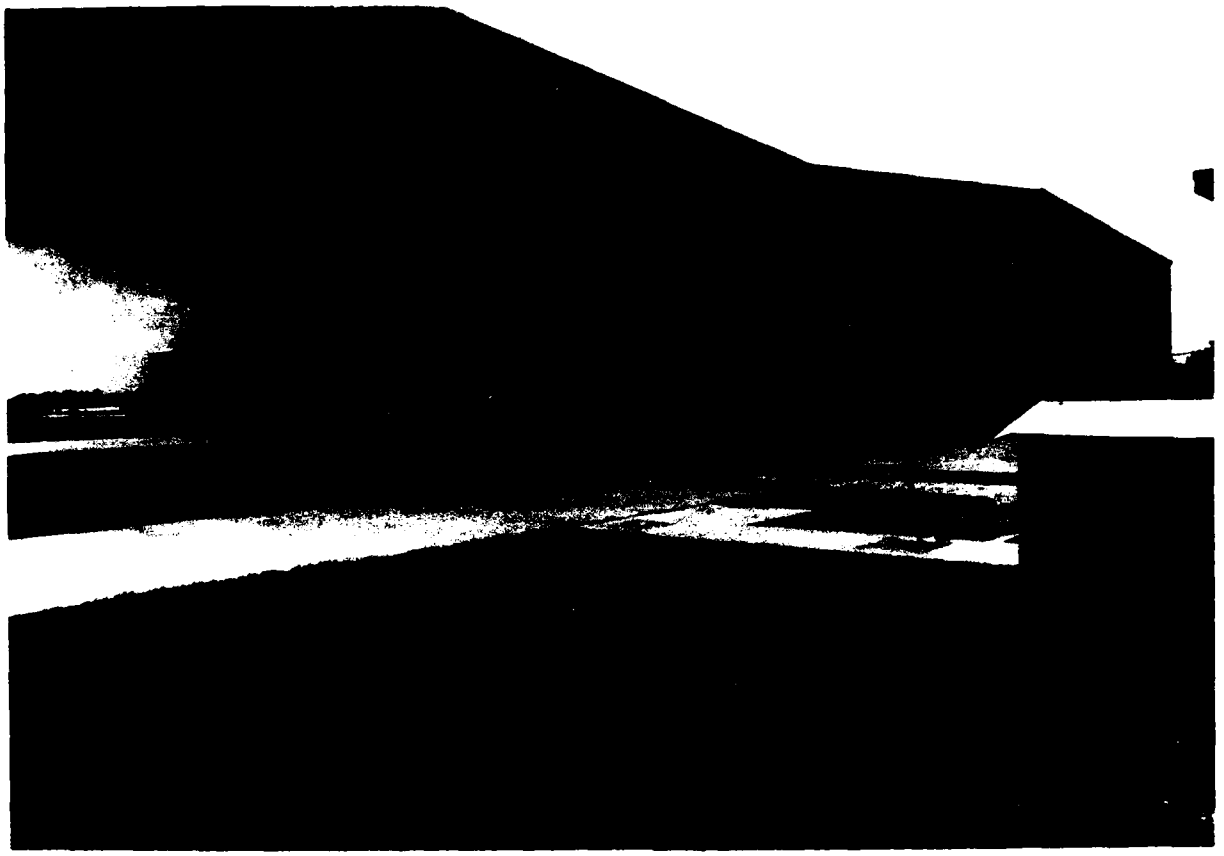

Figure 3. 31 Corrosion Control Aircraft Washrack

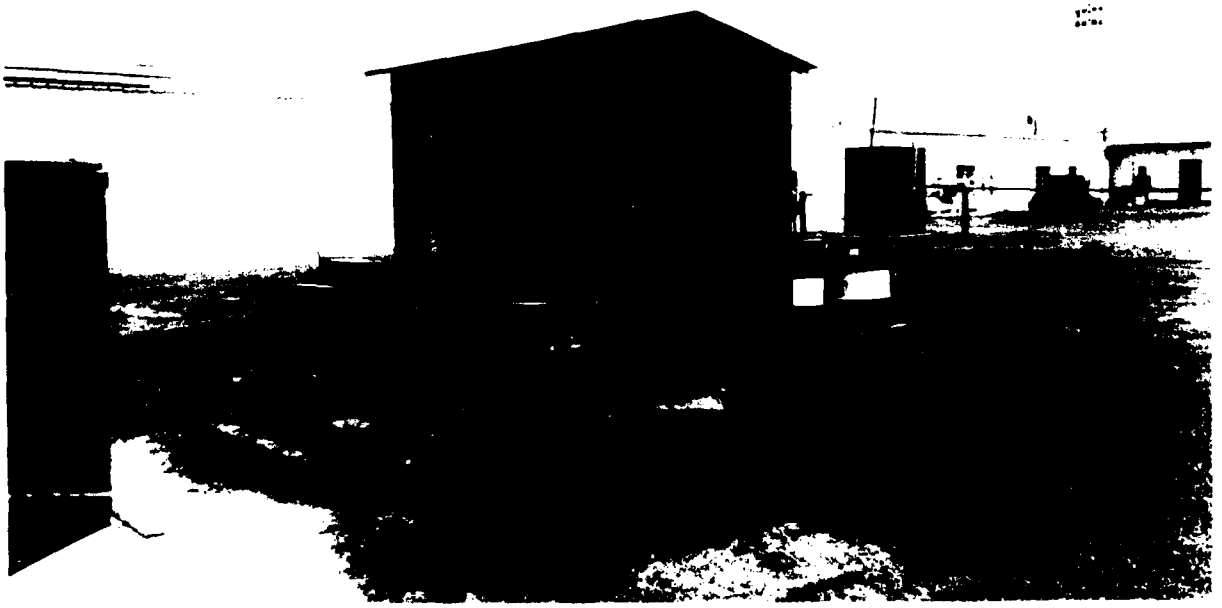

Figure 4. 31 Armament Shop Accumulation Site

24. Shop: 31 Phase Maintenance — Building: 741
Shop Supervisor: SMSgt Leighty — AUTOVON: 791-7435

Personnel from the phase docks accomplish hourly post flight inspections and unscheduled maintenance on F-4D and F-16 aircraft. Waste PD-680 is placed on rags and used to wipe down oily parts on the aircraft. Waste jet fuel, oils and fluids are drained to 55-gallon drums and taken to the engine shop's accumulation site. Oily rags are taken to the base laundry, cleaned and returned to the shop.

25. Shop: 31 EMS Wheel and Tire Shop — Building: 741
Shop Supervisor: SrA Bryant — AUTOVON: 791-7614

31 EMS Wheel and Tire Shop personnel build and tear down wheel and tire assemblies for the F-4D and F-16 aircraft. This shop has one PD-680 (50-gallon) tank that is used for cleaning wheel bearings. When dirty, the PD-680 is pumped from a 50-gallon tank to a 400-gallon holding tank. The waste in the holding tank usually consists of a mixture of water and PD-680. This waste is pumped into 55-gallon drums, stored at their accumulation site, taken to the Civil Engineering accumulation site on base, and finally disposed of by the waste oil contractor.

26. Shop: 31 Egress — Building: 741
Shop Supervisor: MSgt Babski — AUTOVON: 791-7509

Personnel in the Egress Shop are responsible for sealing canopies and touching up the paint on ejection seats. Any unused sealant is allowed to harden before being thrown in the trash. Empty paint spray cans are thrown in the trash.

27. Shop: 31 Pneudraulics — Building: 745
Shop Supervisor: Sgt Ober — AUTOVON: 791-8210

Personnel of the 31st Pneudraulics Shop disassemble, clean, inspect, reassemble, and bench check hydraulic and pneudraulic components on the F-4D and F-16 aircraft. Waste hydraulic fluid (3 gallons/month) is placed in a 55-gallon drum located at the 31 EMS Engine Shop accumulation site. This shop has a 165-gallon PD-680 tank that is used for degreasing parts. The PD-680 is changed every three months. Waste PD-680 is placed in 55-gallon drums which are taken to the Civil Engineering accumulation site when full.

28. Shop: 31 CRS/MACBEL Electric Shop — Building: 745
Shop Supervisor: MSgt Marold — AUTOVON: 791-8736

Electrical Systems personnel maintain aircraft electrical systems, aircraft batteries (lead-acid and NiCad batteries), constant speed drives, and generators on the F-4D aircraft. Lead-acid batteries are disposed of by pouring the sulfuric acid into a sink, neutralizing it with sodium bicarbonate, and rinsing the neutralized solution down the drain. The battery casings are turned in to DRMO. NiCad batteries that yield less than an ounce of sodium hydroxide (NaOH) need to be neutralized with boric acid as outlined in T.O. 802-3-1. NiCad battery casings are turned in to DRMO. Waste oil from generator maintenance is placed in a 55-gallon drum located inside the shop. When full, the drum is transferred into a 500-gallon tank located at the 31st EMS Engine Shop.

29. Shop: 31 CRS/MACP Engine Shop — Building: 750
Shop Supervisor: SMSgt Beaughn — AUTOVON: 791-8384

Engine Shop personnel are responsible for the teardown, buildup, inspection, and repair of jet engines installed in the F-4 and F-16 aircraft. This shop has a bearing room consisting of four 5-gallon tanks containing PD-680, carbon remover, fingerprint remover, and 7808 oil. When the tanks are cleaned out all these wastes are drummed and disposed of as hazardous wastes. Aircraft soap (55 gallons/month), used to wash engines at the engine washrack, is rinsed into the storm drain. Waste oils (80 gallons/month) and fluids (15 gallons/month) are placed in a 500-gallon above ground tank located at the washrack. Jet fuel (40 gallons/month) is drummed and taken to the fire training pit for burning. The oil/water separator servicing this shop drains into the storm water system.

30. Shop: 31 EMS/MACBEL NDI — Building: 755
Shop Supervisor: SSgt Booker — AUTOVON: 791-7846

31 EMS NDI personnel are responsible for x-ray inspection of F-16 and F-4 aircraft. The NDI laboratory personnel perform analysis of aircraft engine oil, and dye penetrant/magnetic particle inspection on aircraft and support equipment. Approximately 10 gallons per year of 1,1,1 trichloroethane is used in the Spectrometric Oil Analysis Program (SOAP) lab as a cleaner. One quart of oil per day is generated from use of the Baird Atomic Spectometer which determines the metal content in used oil. The used oil is placed in a 5-gallon drum, taken to the AGE shop and placed in an oil bowser. Other wastes generated include dye penetrant (110 gallons/6 months), emulsifier (110 gallons/6 months) and developer (220 gallons/yr) from the Fluorescent Dye Penetrant Inspection Unit (Figure 13). Waste penetrant and emulsifier are drummed and turned in to DRMO. Waste developer is discharged into the sanitary sewer. Film developing chemical wastes are produced by x-ray developing procedures. The fixer (15 gallons/quarter) is disposed of through a silver recovery before discharging into the sewer. The developer (15 gallons/quarter) is discharged to the sewer.

31. Shop: 31 CES AGE — Building: 763
Shop Supervisor: MSgt Mason — AUTOVON: 791-7769

Personnel from the 31 CES AGE Branch perform maintenance on all aerospace ground equipment. They perform daily service checks and deliver AGE equipment to required locations on the flight line. This shop has three Safety Kleen degreasing units used to clean parts. These units are cleaned out on a monthly basis by the Safety Kleen Corporation. Waste oils and fluids are placed in either a 200-gallon waste oil bowser or one of two 200-gallon waste hydraulic fluid bowsers. These bowsers are pumped out by a contractor on a monthly basis. Uncontaminated fuel is given to the fuels maintenance branch (POL) while contaminated fuel is turned in for use at the fire training pit. Aircraft soap is used for washing vehicles. Rinsewater drains into an oil/water separator that drains to the storm water system.

32. Shop: 301 AGE — Building: 791
Shop Supervisor: Mr Kuntz — AUTOVON: 791-8066

This shop inspects, repairs, removes, and replaces components on all assigned AGE equipment. Personnel are also responsible for minor corrosion control. The shop generates about 15 gallons per month of waste oil which are drummed and placed at the 301 Corrosion Control collection site. Waste JP-4 is placed in bowsers and taken to the 31 AGE collection site. A PD-680 vat (about 17 gals) is used for parts cleaning. The PD-680 is changed monthly. The spent PD-680 is drummed as mixed oil waste and serviced by the base waste oil contractor. About five gallons per month of waste antifreeze is discharged into the sanitary sewer system. Minor corrosion control work consists of sanding and touch-up painting with little or no waste generated.

33. Shop: 301 Corrosion Control and Sheet Metal — Building: 792
Shop Supervisor: Tim Tomasko — AUTOVON: 791-7297

Personnel are responsible for the working and refinishing of various sheet metal and aircraft parts. The shop performs small parts painting and applies alodine. Most of the paint used is polyurethane, however, some epoxy paints and primers are used. About 25 gallons of paint and thinner waste are generated per month. Paint, thinner, and stripping wastes are drummed as hazardous wastes and placed at the shop's collection site. The site is on gravel, undiked, uncovered, and unsecured. The shop is also responsible for regulating the aircraft usage of the washrack. Soap mixing is controlled by Corrosion Control and is always applied at a 4:1 dilution ratio. Some stripping of aircraft and parts is performed on the washrack. The stripper is rinsed off and discharged to the washrack's oil/water separator before entering the sanitary sewer system.

34. Shop: 301 AARS/MAFB Engine Propeller — Building: 792
Shop Supervisor: MSgt Pier — AUTOVON: 791-8895

Shop personnel are responsible for the build-up and teardown of T58-GE-5, T62T-16B, GTC85-71A and T56-A-15 power plants including removal and replacement of jet engine components, troubleshooting, and inspections. About 45 gallons of spent oil and fluids are generated on a monthly basis. This waste is drummed and stored at the 301st Corrosion Control collection site before being picked up by the contractor. A five-gallon PD-680 vat is used for parts cleaning. The PD-680 is changed every two months, drummed, and disposed of by contract. Approximately four 12 oz. cans of trichloroethane are used per month in a spray-on application to clean parts. Empty spray cans are thrown away. B&B 3100 engine gas path cleaner is diluted at a 10:1 to 1 ratio, and used at the 301 Corrosion Control washrack, and then rinsed down the drain into the washrack's oil/water separator before discharging into the sanitary sewer. About five gallons per month of waste JP-4 are placed in bowsers at either the 48th Drug Enforcement section or the 301st ISO docks.

35. Shop: 48 ARRS/LGM Helicopter Maintenance — Building: 792
Shop Supervisor: TSgt Gentry — AUTOVON: 791-7975

The 48 ARRS/LGM performs phase inspections on their aircraft. This includes painting and supporting the water survival school and the Vice President's Drug Task Force. About 20 gallons per month of paint waste and thinners are drummed as hazardous

waste and stored at the 301st Corrosion Control collection site. About 75 gallons per month of waste oil and fluids are drummed and stored at the collection site. A 160-gal PD-680 tank is employed for parts cleaning. The PD-680 is changed about once every six months. The PD-680 is drummed and picked up by the waste oil contractor. Aircraft washing is performed at the 301st Corrosion Control washrack using aircraft cleaning compound, NSN 6850-01-184-3182. The shop generates about 55 gallons per month of waste jet fuel which is placed in bowsers and taken to the fire training pit to be burned.

VI. SUMMARY OF GENERAL WASTE DISPOSAL PRACTICES AT HOMESTEAD AFB

The waste disposal practices for different categories of waste are summarized in this section. A shop-by-shop summary of disposal practices is contained in Appendix C.

1. Waste oil from each shop is kept at an assigned accumulation site (see Appendix E) in either 55-gallon drums, above or below ground tanks or bowsers. Most waste oil is picked up by a contractor and burned as fuel. Some waste oil may be mixed with waste fuels and burned at the fire training pit.

2. Uncontaminated JP-4 from AGE is given to POL and reused. Contaminated JP-4 is burned at the fire training pit. JP-4 from maintenance on the refueling trucks is drained to a fuel/water separator and waste fuel from the separator drains to an underground tank where it is pumped out and then taken to the fire training pit.

3. A large amount of PD-680 is used for degreasing operations (approximately 2000 gallons/year). Waste PD-680 from most shops is placed in 55-gallon drums and held at their designated accumulation sites for pick up by the waste oil contractor. PD-680 used at AGE and the aircraft washracks is hosed off and enters the sewer system along with aircraft soaps. Since the survey, the base has converted 17 shops from PD-680 to Sparkle Parts, a company offering similar services as Safety Kleen.

Sparkle Parts personnel come to the shop and service their units as needed, drain the used degreasant, and refill the units on a present shedule for each shop. This eliminates the base's responsibility to purchase and dispose of the degreasant (normally PD-680).

4. Most waste hydraulic fluids generated on base are stored in 55-gallon drums and picked up by the contractor. Some waste hydraulic fluids may be mixed with waste fuels and burned at the fire training pit.

5. Paint waste and thinners are stored in 55-gallon drums and disposed of as hazardous waste.

6. Waste strippers are stored in 55-gallon drums and disposed of as hazardous waste. Strippers used on the aircraft washracks are rinsed down drains connected to oil/water separators discharging to the sanitary sewer system.

7. Most battery acids are neutralized first then rinsed down the drain. Unservicable batteries from the 31 TRANS/LGTM are turned into DRMO with the fluid still in the cells. By doing this, the shop does not have to neutralize battery acid.

8. Most waste antifreeze is disposed of down the drains leading to the sanitary sewer.

9. Waste fixers are sent through a silver recovery unit before being discharged to the sewer system.

10. NDI wastes (penetrant and emulsifier) are drummed and disposed of as hazardous wastes.

11. Empty paint spray cans are thrown in the trash.

12. Speedy Dry, used to clean fuel spills, is either thrown in the dumpster or drummed and disposed of as hazardous waste depending on what has been absorbed.

13. Sludges (paint waste) from waterfall paint booths on base are drummed and disposed of as hazardous waste. The wastewater in the paint booth is drained off into the sewer system.

14. Plastic media used in the 482nd Corrosion Control bead blasting unit is disposed of as hazardous waste.

15. Hydrazine is neutralized with bleach and then tested for residual chlorine and pH. If both the pH and residual chlorine are within specifications, the neutralized hydrazine is pumped from a 1000-gallon underground tank into the sanitary sewer.

16. Bilge waste from the Water Survival School is currently placed in 55-gallon drums and stored on site. At the time of the survey the shop had no contractor to take bilge waste.

17. Waste pesticides (alcohol and either Dibrome or Malathion) from triple rinsed pesticide drums and cleaning fogging equipment are drummed and disposed of as hazardous waste.

18. Oily rags from various shops are taken to the base laundry, washed and returned to the shop.

VII. CONCLUSIONS

A. Wastewater Survey

1. ICP Metals Results: Mercury and silver discharges from the dental clinic, and silver discharges from the NDI shop exceed the toxic substances discharge limitations of the Dade County Ordinance. The silver recovery units at these facilities may not be operating efficiently. Silver is used in x-ray processing at the NDI shop and dental clinic. Mercury is used

in the dental clinic for teeth restoration. Discharges of mercury are probably the result of poor mercury disposal techniques. Normal levels of chloride indicate that sea water infiltration into the base sewage is not a problem at this time.

2. Purgeable Halocarbons: Halocarbons were detected at four sites. The detection of any halocarbons in the Homestead AFB wastewater is in violation of the Dade County Code 24-11 which states that the discharge of toxic substances to the sanitary sewer system is prohibited. Chloroform, trans 1,2-dichloroethene, methylene chloride, trichloroethylene, and 1,1,1,2-tetrachloroethane were detected in effluent from Homestead AFB. Chloroform, detected in water samples collected at lift Station C and at the reservoir, is a trihalomethane. Trihalomethanes are commonly produced from the reaction of chlorine and organic precursors during disinfection in the water supply. Chloroform is also used as a solvent in many processes, commonly used in medical laboratories. Trans 1,2-dichloroethene is used as a degreasing and dry cleaning solvent, and is found as an impurity or decomposition product of trichloroethylene. Trichloroethylene is primarily used as a solvent for degreasing and dry cleaning.

3. Purgeable Aromatics: Aromatics were detected at three sites. The detection of any aromatics in the Homestead AFB wastewater is in violation of the Dade County ordinance which prohibits the discharge of fuel components and toxic substances to the sanitary sewer system. Chlorobenzenes, ethylbenzene, toluene, and p-xylene were detected at lift station C. Chlorobenzene, 1,3-dichlorobenzene, and o-xylene were found at the 31 EMS corrosion control washrack. Small amounts of chlorobenzene and ethylbenzene were detected at the reservior and dental clinic. Chlorobenzenes are components of metal polishes, insecticides, heat transfer mediums, and can be produced by the chlorination of toluene, a component of fuels and solvents. Ethylbenzene, and xylenes are also fuel components. Fuel components can enter the sewer system through a number of different paths including spills, aircraft and vehicle washings, and discharges from oil/water separators.

4. Phenols (EPA 604): The separator effluent from the entomology shop exceeded the phenol discharge limit of 50 µg/L. A likely source of the 2,4-dichlorophenol is 2,4-D, (2,4 dichlorophenoxy) acetic acid, a herbicide. 2,4-Dichlorophenol is used in the production of 2,4-D and is a common contaminant of the final product. 2,4-Dichlorophenol is very soluble in water; 2,4-D is not soluble in water. However, 2,4-D was not detected in the separator effluent.

5. Pesticides and PCBs (EPA 608): Lindane, a pesticide, was detected at the reservoir in one out of four samples; the other samples found no pesticides. Tree farms border two sides of the reservoir. The pesticide may have leached from these farms.

6. pH and Temperature: pH and temperature requirements listed in Dade County Code 24-11 are currently being met by Homestead AFB, except for wastewater from the base filling station (site 5) which had a pH of 5.08. Improper battery acid disposal is a likely cause for the low value.

7. Oil and Grease: Varying concentrations of oil and grease were found at sites 1-28. The levels detected at the base filling station, engine shop, auto hobby shop, 31 CES equipment shop, 31 CES entomology shop, 482 TFW AGE, and refueling maintenance

exceeded the 100 mg/L discharge limit. These oil and grease concentrations indicate the units are not working effectively and need to be cleaned, or the design capacities are being exceeded.

8. Surfactants: Surfactants were detected at low levels (<2 mg/L) in the base effluent from lift station C and should not cause a foaming problem to a properly operating sewage treatment plant.

9. Characteristic Hazardous Wastes: Results of ignitability tests showed that the engine test cell separator (site 18) contained ignitable hazardous waste (5% petroleum distillates ignitable at 120°F). The separator contents should be pumped out and disposed of as hazardous waste. Other separators were not receiving or did not contain waste which could be considered as a characteristic hazardous waste.

10. CE Transportation Washrack (located behind building 176): The CE washrack located behind the power production facility has a storm drain in the middle of the pad. The storm drain system is not equipped to handle oils, greases, and surfactants that can enter the system from the vehicle washrack. The storm drain system drains into the reservior.

11. The refueling maintenance washrack separator has no visible baffles and appears to be a large sand trap. The separator was filled with large amounts of fuel at the time of the survey. Lt Marchioni, the base BEE, immediately took action to have the separator cleaned out.

12. The maintenance dock oil/water separator, building 779, discharges to a nearby canal, as does the engine shop separator, building 750. Point source discharges need to be permitted under the National Pollution Discharge Elimination System or eliminate connecting to the sanitary system. Their discharge must meet the Dade County discharge ordinance.

B. Hazardous Waste Survey

1. Homestead AFB has some baseline chemical analyses data to characterize waste streams. Basically, the shops are responsible for identifying what goes into waste containers. When these containers become full, the shop contacts the Hazardous Waste Specialist who, based on the stock number or the results of prior analysis, determines the waste classification (hazardous or nonhazardous). More baseline analyses are needed to streamline waste disposal and to designate waste processes as hazardous or nonhazardous.

2. The Hazardous Waste Specialist is responsible for training accumulation site managers and other shop personnel. Shop personnel are trained annually. New accumulation site managers are trained immediately and then annually thereafter. The course is developed from the Tactical Air Command Hazardous Waste Training Manual and consists of two parts: (1) a basic overview of waste management, and (2) shop specific waste management practices. The course is effective, however, it should be expanded to include oil/water separators and emergency response.

3. Most shops have oil/water separators attached directly to the floor drains. Generally, personnel have gross misconceptions concerning the abilities and limitations of these

separators to effectively handle various industrial wastestreams. This contributes to the discharge of wastes that the separators are not designed to treat; thus, pollutants pass through the separator into the sanitary sewer system untreated. More education is needed.

4. DEEV is not involved with the specific day-to-day details of the disposal of wastes. The program is primarily managed at the shop level. The individual accumulation site managers are responsible for their own areas. This gets the waste disposed of, however, DEEV needs to develop overall management plans for waste minimization, etc.

5. Most of the waste storage sites on base are not secured, on an impermeable floor, diked, or covered. Secured waste storage sites would discourage intentional or unintentional cross contamination of wastes.

6. Some waste accummulation sites including the Transportation General Purpose Vehicle Maintenance supply rack are located near floor drains. The Aerospace Ground Equipment (AGE) accumulation site is located next to the washrack (Figure 5). Since these areas are not diked or curbed, spills have the potential of contaminating large areas because spilled wastes (oil, PD-680, hydraulic fluid) would enter the drainage system and discharge out at the sewage treatment plant.

Figure 5. AGE Accumulation Site

7. A disposal contract for waste bilge water is needed for the Water Survival School. Currently, all bilge waste is stored in 55-gallon drums (about 10-12 drums at the time of the survey) on the ground until an adequate accumulation site is finished.

8. Power Production disposes of waste paint and thinners by pouring them down the drain. This is an unacceptable method of disposing of these wastes; they should be collected, analyzed and disposed of accordingly.

9. Most battery acid is neutralized with sodium bicarbonate in a sink. Once neutralized, the acid is discharged to the sewer via floor drains. No analysis has been done to determine if neutralized acid contains heavy metals or is a characteristic hazardous waste. More baseline analyses are necessary.

10. The 482nd Corrosion Control Shop is currently painting aircraft in a building scheduled for demolition when the new 482nd Corrosion Control facility is built. The facility was being designed at the time of the survey. This facility should be designed with pretreatment capabilities to prevent toxic substances (heavy metals, chromated solvents) from entering the sewer.

11. The Auto Hobby Shop has installed an oil collection system (Figure 2) that allows shop personnel to pour oil from pans into a container inside the building that is connected to a 250-gallon above ground tank located outside the building. This system is simple and has proven better than having shop personnel pour oil from pans into a funnel left in a 55-gallon drum or tank. This should result in better waste-oil management.

12. Refueling Maintenance personnel drain fuel (approximately 40 gallons/truck) from fuel trucks into a fuel/water separator. Fuel in the separator enters a 700-gallon underground tank. When the tank is full, the fuel is pumped out and taken to the fire training pit for burning. This fuel should be tested and if possible, returned to the fuel supply for reuse on base.

13. The Photo Lab, Building 101, sends all waste fixers and developers through a silver recovery process. The silver recovery cartridges are replaced by shop personnel when they feel it is necessary. The dried material is turned in to the precious metal recovery officer at base supply. Shop personnel use litmus paper to check for silver discharge in the effluent. Monitoring for silver in the effluent should be done on a routine basis, using atomic absorption techniques.

14. The 31 EMS Munitions shop has a waterfall paint booth. When the system is cleaned, the sludge is skimmed off and the water is drained into the sewer. The waste sludge is placed in 55-gallon drums and disposed of as hazardous waste. The water may be a characteristic hazardous waste as well.

15. The assistant Fire Chief said that waste fuel taken to the fire training pit is supposed to be tested for contamination. If the waste fuel has more than 10% oils or fluids the fuel is not supposed to be burned in the pit. However, the assistant chief stated that all fuel brought to the fire training pit is not tested so some of the fuel burned may contain more than 10% oil.

16. The base uses a large quantity of PD-680 for degreasing operations. In general, waste PD-680 is placed in 55-gallon drums and disposed of by contract through DRMO.

17. The Wheel and Tire Shop has a 50-gallon tank containing PD-680. When the tank is cleaned out every 3-6 months, PD-680 is transferred to a 400-gallon tank containing water that is later pumped into 55-gallon drums and taken to DRMO.

18. The Wheel and Tire Shops accumulation site is curbed but not secured or covered. In addition, the curbing around the site has no drain valve that would enable shop personnel to drain any rainwater accumulating in the diked in area.

19. Aircraft fuel system repair has an underground tank to store neutralized hydrazine. When the tank is full it is tested by the bioenvironmental engineer for residual chlorine and pH. If these two parameters are within the acceptable range, the neutralized hydrazine is supposed to be pumped into the sanitary sewer for disposal. Hydrazine not within specs is neutralized until it is. During the survey the neutralized hydrazine tank was full, and tested (the results were within specifications). However, the shop could not get anyone on the base to pump the tank's contents into the sanitary sewer.

20. The base has started a program to test the integrity of its underground tanks. At the present time TAC has a contract with Heart Environmental Services who are surveying all TAC bases in Florida. Once the bases' compliance status is determined, the contractor will then approach the state to get a compliance agreement. Florida has already implemented underground tank regulations. Testing now may avert a major expenditure in restoration later.

21. The 31st Corrosion Control has an area specifically designed to strip parts (located on the washrack). However, due to poor design the holding tank for used stripper is located in the center of the stripping area. The stripping area is too small to strip parts; it has no shut off valve to close the system when it is not in use. Therefore, the tank fills up with rainwater or rinsewater from the washrack.

VIII. RECOMMENDATIONS

A. Wastewater Survey

1. Samples of the effluent from the following shops should be analyzed for SW-846, 8010 Purgeable Halocarbons: 482 CAMS/MAEFC Corrosion Control, building 193; 31 TRANS/LGTM Vehicle Maintenance, building, 312; 48 APRS/LGM Helicopter Maintenance, building 792; 31 CSG/DEMS Paint Shop, building 174; 301 AARS Corrosion Control, building 792; 31 EMS Phase Maintenance, building 741; and 31 EMS Armanent Shop, building 740. Sampling locations are based on the results of the chemical usage inventory.

2. Samples of the effluent from the following shops should be analyzed for SW-846, 8020 Purgeable Aromatics: 48 APRS/LGM Helicoptor Maintenance, building 711; Liquid Fuels Maintenance, building 176; and 31 CRS/MACP Engine Shop, building 750 to pinpoint the major sources of purgeable aromatic contamination in the base effluent. Site location selection is based on results from a chemical usage inventory.

3. The engine test cell separator contents should be pumped out and disposed of as hazardous waste. Any sludge remaining should be disposed of as hazardous waste also.

4. A training program designed to inform base personnel of the limitations of oil/water separators should be initiated. This subject should be included in the accumulation managers training.

5. The following separators need to be cleaned out due to the amount of oils and fuels contained in the separator:

(1) the base filling station separator
(2) the engine shop separator
(3) the auto hobby shop separator
(4) 31 CES entomology shop separator
(5) 482 TFW AGE separator
(6) refueling maintenance separator

6. The silver recovery unit at the NDI shop and dental clinic should be inspected and replaced, if necessary, since silver was detected at these locations.

7. Paint stripping without the use of methylene chloride or phenolics should be used at the 31 EMS corrosion control. Wet sanding or bead blasting have been used elsewhere in lieu of the chemical strippers.

8. The battery acid should be neutralized before being discharged into the separator at the BX Service Station, and tested for characteristic hazardous waste.

9. All untreated industrial wastestreams should be pretreated and discharged to the sanitary sewer system. Applicable pretreatment standards are contained in 40 CFR. Analytical results indicate that some industrial discharges are also going to the storm drainage system. These are point source discharges that should be permitted by a State NPDES permit. No priority pollutants should be discharged into the storm drain.

10. Closing the storm drain in the middle of the CE transportation washrack behind the power production facility (building 176), should be considered to lower the possibility of accidental discharge of priority pollutants to the storm water drainage system.

B. Hazardous Waste Survey

1. Homestead AFB needs to update their waste analysis plan. This plan should include: a complete listing of all known waste streams with a brief description of the process or operation generating the waste; the results of a baseline chemical analysis (to fully characterize the waste); the required analysis (see analysis frequency); the sampling technique; and the parameters of analysis (see Appendix B, Table 1), in addition to the information already provided in the base's Hazardous Waste Management Plan. Since the base does not have a large number of waste streams, this type of sampling program will allow the base to establish, within a reasonable time, documented rationale for classifying each waste stream as either

hazardous or nonhazardous. For example, neutralized battery acid is disposed of as nonhazardous waste, yet, it has not been adequately analyzed for heavy metals to substantiate whether or not it is nonhazardous.

2. The base should do characteristic hazardous waste (EP Toxicity) analyses on neutralized battery acid. Presently, all neutralized battery acid (approximately 2400 gallons/year) is disposed of down the drain. Base personnel should proceed with more frequent analyses to document the waste as nonhazardous. Four analyses would be sufficient documentation.

3. Drums and bowsers at waste storage sites should be secured to prevent any intentional or unintentional mixing of wastes. Funding should be made available to upgrade each accumulation site with fencing, an impermeable floor such as a concrete pad, curbing, and a cover. Another option is to replace all existing sites with a permitted chemical storage facility (Figure 6), which may be more cost-effective than upgrading each accumulation site.

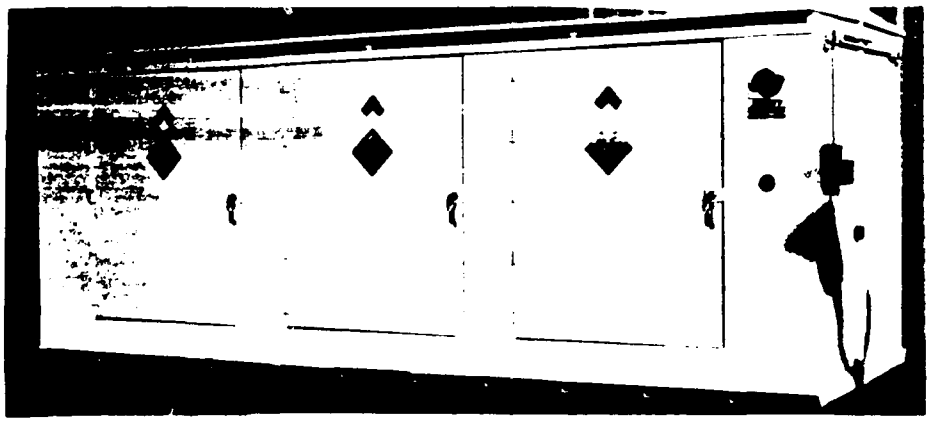

Figure 6. Chemical Storage Facility

4. The wastewater from the waterfall paint booth at 31st EMS Munitions Shop should be analyzed at least four times for characteristic hazardous waste parameters to confirm that it is not hazardous. This must be done to provide documented rationale for discharging this waste to the sewer system.

5. The AGE waste accumulation site should be relocated away from the washrack and any floor drains. The site should be curbed and secured to prevent wastes from entering the sewer from a leaking drum or accidental spillage.

6. The Refueling Maintenance personnel can reduce the amount of JP-4 entering the fuel/water separator by purchasing or acquiring metal pans to recover the fuel during maintenance. The JP-4 can then be tested to see if it meets specifications for fuel. If handled carefully, the fuel can be returned to the base fuel supply for reuse.

7. During the survey it was apparent the base used PD-680 in fairly large quantities for parts degreasing. Since our survey, 17 shops have contracted with Sparkle Parts. There are still a couple of shops using PD-680 for parts degreasing. PD-680 usage in these shops can be eliminated by converting these remaining shops to Sparkle Parts.

8. The Safety Kleen corporation has recently marketed a unit to clean painting equipment such as spray guns. Such a unit might be used in Corrosion Control and the Allied Trades to reduce the amount of paint wastes generated from these shops.

9. The Power Production Shop should not dispose of paint waste and thinners down the floor drains. These wastes should be drummed. Waste thinners are a hazardous waste due to high metals content and low flash point. One option for disposal is to take the waste to the CE Paint Shop and pour it in their paint waste and thinner drum. The Power Production Shop should have its own drum for these wastes.

10. The education and training program at Homestead should be upgraded by including inputs from the Bioenvironmental Engineering shop. The BEE could speak about capabilities and limitations of oil/water separators; health hazards associated with handling and transporting hazardous waste, etc. Training should be in accordance with 40 CFR 264.16.

11. The base's fuels lab should test all fuel brought to the fire training pit for the percentage of contamination. All waste fuel on the base should be fairly free of contamination if the shops properly segregate wastes. However, according to the assistant chief of the Fire Department this does not appear to be the case because a large amount of the fuel brought to the fire training pit contains oils and fluids. Any fuel containing over 10% contamination should be drummed and disposed of properly.

12. The Aircraft Fuel System Repair Shop should have a contract to pump out neutralized hydrazine meeting specifications. If this cannot be arranged, Civil Engineering should connect the tank with a locked valve that can be opened by either CE or the BEE to drain the tank to the sanitary sewer after it has been neutralized.

13. The motor pool should move its supply storage area away from the floor drain. This would eliminate any possible water contamination that would result from accidental spillage or any leaking drums.

14. Neutralization of battery acid can be eliminated if the base can get DRMO to accept batteries with battery acid still in the cells. DRMO can accept full batteries if they have an area to store the batteries that does not freeze.

15. The entomology shop can eliminate waste alcohol contaminated with pesticides (Malathion or Dibrom) along with waste pesticide drums by giving the drums to a drum service contractor (See Appendix F for information). These contractors take empty pesticides drums (not triple rinsed) at no cost. This would eliminate all pesticide wastes from this shop.

16. The Water Survival School can possibly eliminate bilge water waste by having Civil Engineering develop a process to separate the oil from the water in the wastes. One possible design is to build two parallel tanks (Figure 7). The bilge water can be placed in the first tank and once all the oil and water are separated, the oil can be filtered and placed in the second tank where it can be picked up by a DRMO contractor. Water drawn off the bottom can then be tested for characteristic hazardous wastes, and if the results show it to be nonhazardous the water can then be drained into an oil/water separator. If the water is hazardous, it should be drummed and disposed of properly.

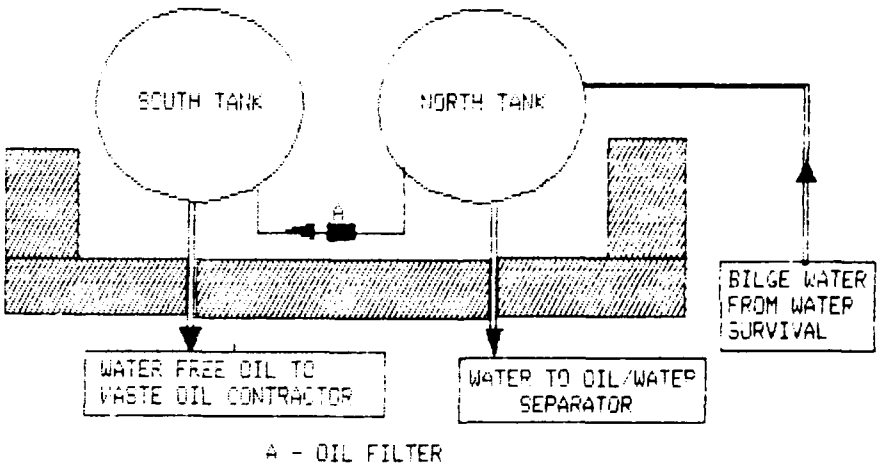

Figure 7. Example of Oil Separation Tanks

REFERENCES

1. Dade County Code 24-11. 1987.

2. RCRA Interim Guidance Ammendment - from telephone conversation between 2Lt Charles Attebery and RCRA Hotline Representative. (Jan 1987).

3. Telephone conversation between Lt Attebery, USAFOEHL/ECQ, and the weather squadron and public affairs, Homestead AFB, 27 Oct 1987.

4. Base wastewater and stormwater system maps and information supplied by the CE Squadron, Homestead AFB Aug 1987.

5. Code of Federal Regulations, Title 40, Section 261, Office of the Federal Register, Washington DC, (1987).

6. APHA, Standard Methods for the Examination of Water and Wastewater, 16th Ed., American Public Health Association, Washington DC, (1985).

7. USEPA, "Methods for Chemical Analysis of Water and Wastewater," EPA-600/4-79-020; March 1983.

8. "Hazardous Waste Management Plan, Homestead Air Force Base, Florida," 1987.

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Appendix A

Request for Hazardous Waste/Wastewater
Characterization Survey

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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS TACTICAL AIR COMMAND

LANGLEY AIR FORCE BASE VA 23665-5001

8 MAY 1987

REPLY TO
ATTN OF: SGPB

SUBJECT: Request for a Hazardous Waste/Waste Characterization Survey

TO: USAF OEHL/CC

The attached request, subject as above, from the 31st CSG/DEEV/31st Medical Group/SGPB, Homestead AFB FL, is forwarded for your consideration for support. Lt Marchoni (BEE Homestead) along with Mr Roland Allen (31st CSG/DEEV) are available for additional details. Lt Marchoni can be contacted at Autovon 791-6141 and Mr Allen at 791-8796.

FOR THE COMMANDER

JERRY P. DOUGHERTY, Colonel, USAF, BSC
Chief, Bioenvironmental Engineering Services
Office of the Command Surgeon

1 Atch
Homestead AFB FL/DEEV Ltr,
22 Jan 87

cc: USAF OEHL/ECQ
TAC/DEEV

:PARTMENT OF THE AIR FOR(
HEADQUARTERS 31ST COMBAT SUPPORT GROUP (TAC)
HOMESTEAD AIR FORCE BASE FL 33039-5000

REPLY TO
ATTN OF: DEEV

22 January 1987

SUBJECT: Request for a Hazardous Waste/Waste Characterization Survey

TO: USAF Hosp/SGPB
HQ TAC/SGPB
USAF OEHL/ECQ

1. Request a hazardous waste/waste characterization survey be performed at Homestead AFB, Florida. We would like assistance in the following areas:

a. Waste minimization practices

b. Survey of oil/water separators

2. Please contact me at AV 791-8796 if you have any questions. Your assistance in this matter is greatly appreciated.

ROLAND ALLEN
Environmental Coordinator

Appendix B

Analytical Results

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Table 1: ICP Metal Screen and Chloride Test Results (µg/L)

(EPA Method 200.7)

parameter	site			
	(1)	(2)	(3)	(4)
arsenic	<10	<10	<10	<10
cadmium	<10	<10	<10	<10
chromium	<50	<50	<50	<50
copper	<20	<20	<20	119
lead	<20	<20	<20	<20
mercury	<1	<1	<1	41.6
nickel	<50	<50	<50	<50
selenium	<10	<10	<10	<10
silver	302	<10	<10	721
zinc	200	<50	<50	340
antimony	<10	<10	<10	<10
beryllium	<10	<10	<10	<10
thallium	<10	<10	<10	<10
chloride		160	30	

Table 2: COD, Oil & Grease, Surfactants, pH, and Temperature Results

parameter	site	avg	avg			
	(1)	(2)	(3)	(4)	(5)	(6)
COD (mg/L)	130	103	14	625	25000	205
oil & grease (mg/L)	5.1	6.7	0.5	NG	118.8	20.8
surfactants (MBAS, mg/L)	NG	NG	0.l	<0.1	NG	NG
pH	7.34	6.70	6.95	7.60	5.08	6.30
temperature (°C)	NG	NG	NG	NG	30	29.5
	(7)	(8)	(9)	(10)	(11)	(12)
COD (mg/L)	1925	NG	1050	105	270	345
oil & grease (mg/L)	772	NG	39.6	452	NG	73.6
surfactants (MBAS, mg/L)	1.0	NG	NG	0.3	0.3	18.0
pH	6.25	6.22	5.78	7.22	6.28	6.20
temperature (°C)	28	31	30.5	28	27.5	29.5
	(13)	(14)	(15)	(16)	(17)	(18)
COD (mg/L)	110	750	325	165	50	730
oil & grease (mg/L)	984	106.8	58	27.2	6.2	NG
surfactants (MBAS, mg/L)	NG	21	0.3	5.6	NG	0.2
pH	6.88	6.82	6.30	6.25	6.25	6.68
Temperature (°C)	32	30	27.5	#30	31	29.5
	(19)	(20)	(21)	(22)	(23)	(24)
COD (mg/L)	80	175	43	255	70	55
oil & grease (mg/L)	28.0	54.4	0.6	152.4	28.6	6.6
surfactants (MBAS, mg/L)	NG	0.4	0.4	NG	NG	NG
pH	6.49	6.79	6.70	5.94	6.06	6.42
Temperature (°C)	28.5	28	30	32	31	31
	(25)	(26)	(27)	(28)		
COD (mg/L)	1125	160	25	1960		
oil & grease (mg/L)	198	23.4	29.4	441		
surfactants (MBAS, mg/L)	38	0.4	NG	NG		
pH	6.57	7.11	6.67	8.28		
Temperature (°C)	29	31	30	29.5		

NG - indicates no value given

Table 3: Purgeable Halocarbon Analytical Results (μg/L)

(SW-846 EPA Method 8010)

Parameter	Sites			
	(2)	(3)	(20)	(1,4,7)
Bromodichloromethane	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND	ND
Chloroform	52.7	2.9	ND	ND
Chloromethane	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
Dichlorofluoromethane	ND	ND	ND	ND
1,1-dichloroethane	ND	ND	ND	ND
1,2-dichloroethane	ND	ND	ND	ND
trans 1,2-Dichloroethene	559.8	ND	ND	ND
1,2-dichloropropene	ND	ND	ND	ND
cis 1,3-Dichloropropene	ND	ND	ND	ND
trans 1,3-Dichloropropene	ND	ND	ND	ND
Methylene chloride	295.7	433.5	ND	ND
1,1,2,2-tetrachloroethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Trichloroethylene	904.1	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
Benzyl Chloride	ND	ND	ND	ND
bis, (2-Chloroethoxy) Methane	ND	ND	ND	ND
bis, (2-Chloroisopropyl) ether	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND
Chloracetaldehyde	ND	ND	ND	ND
Chloral	ND	ND	ND	ND
Chlorotoluene	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	ND	ND	45.7	ND
Trichloropropane	ND	ND	ND	ND
Chloromethyl Methyl-ether	ND	ND	ND	ND
Dichloromethane	ND	ND	ND	ND

notes: ND - indicates not detected

Table 4: Purgeable Aromatics Analytical Results (μg/L)

(SW-846 EPA Method 8020)

Parameter	Sites				
	2	3	4	20	(1,7)
Benzene	ND	ND	ND	ND	ND
Chlorobenzene	506	ND	9.9	57	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	929	ND	ND	32	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
Ethylbenzene	141	ND	ND	ND	ND
Toluene	72	8	ND	ND	ND
p-Xylene	207	ND	ND	ND	ND
m-Xylene	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	42	ND

Table 5: Organochlorine pesticide and PCB analytical results (µg/L)

(EPA Method 608)

Parameter	Site		
	2	3	14
Aldrin	ND	ND	<2.0
DDD	ND	ND	<2.0
DDE	ND	ND	<2.0
Dieldrin	ND	ND	<2.0
Endrin	ND	ND	<2.0
Heptachlor	ND	ND	<2.0
Heptachlor Epoxide	ND	ND	<2.0
Lindane	A	ND	<1.0
p,pl-DDT	ND	ND	<2.0
Endosulfan I	ND	ND	<2.0
Endosulfan II	ND	ND	<2.0
Endosulfan Sulfate	ND	ND	<2.0
Endrin Aldehyde	ND	ND	<2.0
Chlordane	ND	ND	<2.0
alpha-BHC	ND	ND	<1.0
beta-BHC	ND	ND	<2.0
delta-BHC	ND	ND	<2.0
Toxaphene	ND	ND	<1.00
Aroclor 1016	ND	ND	ND
Aroclor 1221	ND	ND	ND
Aroclor 1232	ND	ND	ND
Aroclor 1242	ND	ND	ND
Aroclor 1248	ND	ND	ND
Aroclor 1254	ND	ND	ND
Aroclor 1260	ND	ND	ND

Notes: A - four 24-hour composite reservoir samples were analysed. One sample contained 0.07 µg/L Lindane; the other samples showed none detected.

ND - indicates none detected.

Table 6: Phenols Analytical Results (μg/L)

(EPA Method 604)

Parameter	Sites		
	14	19	2,3,4,7,10,12,15, 18,20,21,23,26
Phenol	ND	19	ND
2-Chlorophenol	ND	ND	ND
2-Methylphenol	ND	ND	ND
4-Methylphenol	ND	ND	ND
2-Nitrophenol	ND	ND	ND
2,4-Dimethylphenol	ND	14	ND
2,4-Dichlorophenol	99	ND	ND
4-Chloro-3-methylphenol	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND
2,4-Dinitrophenol	ND	ND	ND
4 Nitrophenol	ND	ND	ND
4,6-Dinitro-2-methyl-phenol	ND	ND	ND
Pentachlorophenol	ND	ND	ND

Note: ND - indicates not detected

Table 7: Characteristic Hazardous Waste Analytical Results

(EPA Method 625)

	EP Tox (mg/L)								lg.	Cor.	Reac.	
Site #	As	Ba	Cd	Cr	Pb	Hg	Ag	Se	DRGF	pH	CN/S	Class
5	<.01	<1.0	<.01	0.05	<.02	<.001	0.13	<.01	no	6.0	none	NH
6	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
7	<.01	<1.0	0.02	0.06	<.02	<.001	<.01	<.01	no	6.0	none	NH
8	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
9	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
10	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
11	<.01	<1.0	<.01	0.17	<.02	<.001	<.01	<.01	no	6.0	none	NH
12	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
13	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
14	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
15	<.01	<1.0	0.02	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
16	<.01	<1.0	0.02	0.11	<.02	<.001	<.01	<.01	no	6.0	none	NH
17	<.01	<1.0	<.01	0.21	0.13	<.001	0.02	<.01	no	6.0	none	NH
18	<.01	<1.0	<.01	0.07	<.02	<.001	<.01	<.01	120°F	6.0	none	HAZ
19	<.01	<1.0	0.05	0.06	<.02	<.001	<.01	<.01	no	6.0	none	NH
20	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
21	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
22	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
23	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
24	<.01	<1.0	0.12	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
25	<.01	<1.0	0.03	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH
26	<.01	<1.0	<.01	0.10	0.10	<.001	<.01	<.01	no	6.0	none	NH
27	<.01	<1.0	<.01	0.06	<.02	<.001	<.01	<.01	no	6.0	none	NH
28	<.01	<1.0	<.01	<.05	<.02	<.001	<.01	<.01	no	6.0	none	NH

Notes: - represents "not analyzed"
NH represents "not hazardous"
HAZ represents "hazardous"
lg. = Ignitability
Cor. = Corrosivity
Reac, Cn/S = Reactivity, cyanide or sulfide
Class = Classification (hazardous, nonhazardous)

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APPENDIX C

Waste Disposal Practices by Shop

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Waste Disposal Practices By Shop

Building	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
10 Turkey Point	Water Survival School	Bilge Waste	D
		Waste Oils	D
		Waste Fluids	D
		Waste Paints and Thinners	D
101	Photo Lab	Fixer	SRDD
	Developer		RDD
173	482 Corrosion Control	Waste Paints and Thinners	D
		Soaps	RDD
	PD-680		RDD
		Plastic Media (Bead Blasting)	D
174	CE Paint Shop	Stripping Waste	D
		Waste Paints and Thinners	D
176	DES Power Production	Waste Thinners	DD
		Battery Acid	NDD
		Soaps	RDD
		Waste Oils	D
		Degreasants	DD
176	Liquid Fuels Maintenance	JP-4 Sludge	D
192	482 Armament	Waste Paints and Thinners	D
		Waste Oils	D
		Waste Solvents	D
194	482 Hydraulics	Waste Hydraulic Fluid	D
		PD-680	D
200	482 Repair and Reclamation	PD-680	D

Note: See Last Page for Legend

Waste Disposal Practices By Shop

Building	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
204	Auto Hobby Shop	Soaps	DD
		Waste Oils	KIT
		Waste Fluids	KIT
		Used Antifreeze	DD
		PD-680	D
208	482 AGE	Waste Oils	D
		Waste Fluids	D
		Used Antifreeze	DD
		JP-4 Fuels	DD/B
		PD-680	D
211	726 Vehicle Maintenance	Paint Waste and Thinners	D
		Battery Acid	NRDD
		Waste Oils	KIT
		Soaps	DD
		Used Antifreeze	DD
		Automotive Fuel	RTT
251	31 Munitions	Paint Waste and Thinners	D
		Water from Paint booth	DD
		PD-680	D
		Sludge from Paint booth	D
268	31 Test Cell	Soaps	DDOW
		Waste Oils	DDOW
		Jet Fuel	DDOW
		Waste Solvents	DDOW
312	31 Vehicle Maintenance	Paint Waste and Thinners	D
		Waste Oils	KIT
		Waste Fluids	KIT
		Soaps	DD
		Used Antifreeze	DD
		Automotive Fuel	RTT
		PD-680	D
371	31 Entomology	Alcohol and (Malathion/Dibrom)	D

Note: See Last Page for Legend

Waste Disposal Practices By Shop

Building	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
706	31 Vehicle Maintenance	Safety Kleen	SBC
		Waste Oils	KIT
		Waste Fluids	KIT
		Soaps	DD
710	Aircraft Fuel System Repair	JP-4	D
		Hydrazine	NPSS
711	31 Refueling Maintenance	Waste Paints and Thinners	D
		Soaps	DD
		Waste Oils	D
		Waste Fluids	D
		JP-4	DD
		Automotive Fuel	DD
		Used Antifreeze	DD
		PD-680	DD
714	307 AMU	Waste Fluids	D
		JP 4	D
720	31 EMS Corrosion Control Shop	Waste Paints and Thinners	D
		Stripping Waste	D
		Soaps	DD
		PD-680	RDD/D
741	Armaments	Stripping Waste	D
		PD-680	D
741	31 Wheel and Tire	PD-680	D
741	31 Phase Maintenance	Soaps	D
		Waste Oils	D
		Waste Fluids	D
		PD-680	UIP
		Stripping Waste	DD

Note: See Last Page for Legend

Waste Disposal Practices By Shop (Cont.)

Building	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
745	31 Electric	Battery Acid	NDD
		Waste Oils	D
750	31 Engine Shop	Soaps	RDD
		Waste Oils	KIT
		Waste Fluids	D
		JP-4	D
		PD-680	RDD
		Carbon Remover	D
755	31 NDI	Penetrant	D
		Emulsifier	D
		Developer	DD
		Fixer	SRDD
		Waste Oil	B
763	AGE	Soaps	DD
		Waste Oils	D
		Waste Fluids	D
791	301 ARRS/MAFSE	Waste Oils	D
		Soaps	DD
		Waste Fluids	D
		JP-4	RTT
		Used Antifreeze	DD
		PD-680	D
792	301 Helicopter Maintenance	Waste Oils	D
		Waste Fluids	D
		Soaps	DD
		Waste Paints and Thinners	D
		JP-4	D
		PD-680	D
792	301 Hydraulics	Waste Fluids	D

Note: See Last Page for Legend

Waste Disposal Practice By Shop (Cont.)

Building	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
792	301 Engine Propeller	Soaps	DD
		Waste Oils	D
		Waste Fluids	D
		JP-4	D
		PD-680	D
		1,1,1 Trichloroethane	E
792	301 Corrosion Control	Waste Paints and Thinners	D
		Stripping Wastes	D
		Alodine	D
		Soaps	DD

Legend:

FTP - Fire Training Pit
KIT - Kept in Tank
SBC - Serviced by Contractor
RTT - Returned to Fuel Tanks
NDD - Neutralized first then Placed Down the Drain
DDOW - Down Drain to Oil/Water Separator
D - Drummed
E - Evaporated
DD - Down Drain
RDD - Rinsed off Down the Drain

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Appendix D

Forecasted Wastes on Homestead AFB

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Forecasted Wastes On HAFB

SUMMARY OF WASTES GENERATED AT HOMESTEAD AFB

CATEGORY 1: WASTE OILS

SHOP	PRODUCT	YEARLY QTY (GALS)
31st AGE	30 Wt and Steam Turbine Oil	1680.0
31st Phase Maintenance	7808 and Synthetic	48.0
31st CRS/MACP Engine	7808	960.0
31st Refueling Maintenance	Engine Oil	180.0
31st CRS/MACBEL Electric	7808	240.0
31st Trans Vehicle Maintenance	Motor Oil	1320.0
31st Fire Truck Maintenance	Engine Oil	12.0
Auto Hobby Shop	Motor Oil	1800.0
3613 CCTS/DOM Water Survival	Motor Oil	240.0
726 TCS/LGKV Vehicle Maint.	Motor Oil	480.0
301 ARRS/MAFSE	Engine Oil	180.0
482 AGE	Motor Oil and Synthetic	120.0
48 ARRS/LGM Helicopter Maint.	Diesel, Lube, Engine Oils	660.0
301 Engine Propeller	1010 and Synthetic	300.0
482 CAMS/MAEW Armament	Lube Oils	12.0
31st Power Production	Lube Oils	480.0
31st Test Cell	Engine Oil	144.0
31st NDI	Engine Oil	240.0
	TOTAL:	9096.0

CATEGORY 2: WASTE FUEL

31st Test Cell	JP-4	72.0
Liquid Fuels Maintenance	JP-4	850.0
307 AMU	JP-4	120.0
31st Phase Maintenance	JP-4	120.0
31st Jet Engine Maintenance	JP-4	480.0
31st Refueling Maintenance	JP-4	2400.0
31st Trans Vehicle Maint.	Automotive	120.0
31st Fuel System Repair	JP-4	120.0
726 TCS/LGKV Vehicle Maint.	Automotive	60.0
48 Helicopter Maintenance	JP-4	660.0
301 Engine Propeller	JP-4	60.0
	TOTAL:	4990.0

CATEGORY 3: WASTE FLUIDS

SHOP	PRODUCT	YEARLY QTY (GALS)
307 AMU	Hydraulic	120.0
31st AGE	Hydraulic	2400.0
31st Phase Maintenance	Hydraulic	60.0
31st Jet Engine Maintenance	Hydraulic	180.0
31st Refueling Maintenance	Hydraulic and Transmission	66.0
31st Pneudraulics	Hydraulic	36.0
301 Pneudraulics	Hydraulic	72.0
482 Hydraulics	Hydraulic	12.0
31st Trans Vehicle Maint.	Transmission, Brake, and Hydraulic	516.0
31st Fire Truck Maint.	Transmission	12.0
Auto Hobby Shop	Transmission	60.0
Water Survival School	Brake	4.0
726 TCS/LGKV Vehicle Maint.	Transmission, Brake, and Hydraulic	228.0
301 ARRS/MAFSE	Hydraulic	24.0
48 Helicopter Maintenance	Hydraulic	480.0
301 Engine Propeller	Hydraulic	240.0
	TOTAL:	4510.0

CATEGORY 4: WASTE PAINTS AND THINNERS

31st Refueling Maintenance	Paint and Thinners	24.0
31st Corrosion Control	Paint and Thinners	276.0
482 Corrosion Control	Paint and Thinners	1680.0
31st Trans Vehicle Maint.	Paint and Thinners	540.0
Water Survival School	Thinner	24.0
726 TCS/LGKV Vehicle Maint.	Paint	60.0
31st Munitions	Paint and Thinners	108.0
48 Helicopter Maintenance	Paint and Thinners	480.0
482 Armament	Thinner	3.0
31st Power Production	Paint and Thinners	66.0
31st CSG/DEMS Paint Shop	Paint and Thinners	420.0
301 Corrosion Control	Paint and Thinners	300.0
	TOTAL:	3981.0

CATEGORY 5: WASTE PD-680

SHOP	PRODUCT	YEARLY QTY (GALS)
482 CAMS/MAEW Armament	PD-680	120.0
482 Pneudraulics	PD-680	30.0
482 Wheel and Tire	PD-680	180.0
Auto Hoby Shop	PD-680	300.0
31st Munitions	PD-680	120.0
31st Refueling Maintenance	PD-680	84.0
31st Armament	PD-680	160.0
31st Wheel and Tire	PD-680	200.0
31st Pneudraulics	PD-680	660.0
31st Jet Engine Maintenance	PD-680	20.0
301 AGE	PD-680	204.0
301 Engine Propeller	PD-680	30.0
48 ARRS Helicopter Maintenance	PD-680	320.0
	TOTAL:	2428.0

CATEGORY 6: WASTE BATTERY ACID

31st CRS/MACBEL Electric	Battery Acid	960.0
31st Trans Vehicle Maint.	Battery Acid	720.0
726 TCS/LGKV Vehicle Maint.	Battery Acid	240.0
31st Power Production	Battery Acid	480.0
	TOTAL:	2400.0

CATEGORY 7: NDI AND PHOTO WASTES

31st NDI	Penetrant, Emulsifier, Developer, and Fixer	720.0
Photo Lab	Developer and Fixer	120.0
	TOTAL:	840.0

CATEGORY 8: WASTE SOLVENTS AND STRIPPERS

31st Phase Maintenance	Ammoniated Stripper	144.0
31st Jet Engine Maintenance	Carbon Remover	60.0
31st Corrosion Control	Paint Remover	120.0
31st Armaments	MEK	120.0
48 Helicopter Maintenance	Fluorocarbon Solvent	60.0
31ST GSC/DEMS Paint Shop	Paint Remover	24.00
301 Corrosion Control	Paint Remover	36.0
	TOTAL:	564.0

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APPENDIX E

Accumulation Sites

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WASTE OIL ACCUMULATION SITES

UNIT	LOCATION	STORAGE CONTAINER
301 ARRS/MAS/48 ARRS	791	55-Gallon Drums
301 ARRS/MAO	793	55-Gallon Drums
31 CRS/MACPJE	750	500-Gallon Drums
31 AGS/MAAM	727	250-Gallon Bowser
31 CES/Golf Course	2204	55-Gallon Drums
31 CES/Power Production	176	200-Gallon Tank
726/LGKV	211	300-Gallon Tank
US Customs	240	55-Gallon Drums
31 EMS/AGE/MAEAR	763	200-Gallon Bowser/55-Gallon Drums
31 EMS/MAEWM	740	55-Gallon Drums
DOAL	213	55-Gallon Drums
482 CAM Sq/MAEA	208	55-Gallon Drums
31 TFW/AMQP	782	55-Gallon Drums
31 Trans Sq/LGTM	312	2 600-Gallon Tanks
482 CAMS/AGE	192	55-Gallon Drums
Turkey Point	---	55-Gallon Drums
31 EMS/MAEC	249	55-Gallon Drums
Munitions Storage Area	284, 251, 252, 246	55-Gallon Drums
Auto Hobby Shop	204	250-Gallon Tank
31 TFW/LGSD	618	55-Gallon Drums
31 MED GP	990	55-Gallon Drums
Kings Bay Marina	---	55-Gallon Drums
Waste Oil Collection Facility	270	10,000-Gallon Tanks (Not in Operation)

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Appendix F

State of Florida Memorandum

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STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

MEMORANDUM

January 31, 1986

TO: Mosquito Control Directors

FROM: Office of Entomology

SUBJECT: Drum Service Company of Florida Agreement
Renewed Until December 31, 1986

The Office of Entomology has reached an agreement with Drum Service Company of Florida to continue the drum (removal, cleaning, and reconditioning) survey until December 31, 1986. The conditions of the agreement will be the same as those of 1985.

It is needful that all mosquito control districts have their drums (30 gallons and larger) recycled by Drum Service.

This service must be utilized. The toll free number of Drum Service is 1-800-432-6908 and their regular business telephone number is 305-~~525-4261~~ 889-2581.

Please read all of the attached information regarding the drum service agreement.

If you have any questions in regards to this program, please do not hesitate to contact this office.

Thank you for your help!

WRO:rr

Enclosures

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

January 28, 1986

Mr. Mike Murphy
Drum Service Company
of Florida
803 Jones Avenue
Post Office Box 278
Zellwood, Florida 32798

Dear Mr. Murphy:

The Office of Entomology is very grateful to you and your organization for continuing the drum survey of mosquito control agencies for one more year.

This new agreement (per the January 10, 1986 meeting) covers the entire year of 1986 with the same restrictions as agreed to in 1985 arrangements.

Additionally, the Office of Entomology will make renewed efforts in the following areas: to include all mosquito control programs in the drum recycling program; to make sure that caps are placed on all containers; to have agencies call for service when the bulk of their drums have been generated for the season; and to encourage other county agencies to participate in the drum recycling program as long as they generate drums which contained chemicals not on the "P" list; and to practice protection of each drum so that it might have some recycling value.

A special memorandum will be sent to the mosquito control agencies informing them of the new agreement and the concerns raised by Drum Service of Florida.

Sincerely,

John A. Mulrennan Jr.

JOHN A. MULRENNAN, JR., Ph.D.
Director, Office of Entomology

P.O. BOX 210 • JACKSONVILLE, FLORIDA 32231

BOB GRAHAM, GOVERNOR

MOSQUITO CONTROL

SUMMARY OF 1985 DRUM PICKUPS

MOSQUITO CONTROL DISTRICT	CITY	STEEL DRUMS 55-GAL.	STEEL DRUMS 30-GAL.	PLASTIC DRUMS 30-GAL.	TOTAL
East Flagler County	Palm Coast		2	10	12
Charlotte	Punta Gorda			137	137
Brevard County	Titusville	21	10		31
East Volusia	New Smyrna Beach	6	66	70	142
Lee County	Ft. Myers	35	25		60
Jacksonville	Jacksonville	37	5	140	182
St. Lucie County	Ft. Pierce	2	46		48
Sarasota	*Sarasota*	1		50	51
Taylor County	Perry	12			12
Martin County	Stuart			26	26
Sebring	Sebring	6			6
Dade County	Miami	8	30	33	71
Broward County	Pembroke Pines	24	4		28
Monroe County	Key Largo	25	114	59	198
Polk County	Bartow	14		30	44
Collier County	Naples	2	89	67	158
	TOTALS:	193 +	391	622	1206
		= 584			

DRUM SERVICE CO. OF FLORIDA

POST OFFICE BOX 278
ZELLWOOD, FLORIDA 32798
PHONE AREA 305 — 889-2581

October 1, 1985

Gentlemen:

This letter presents our policies which cover the pickup, transportation, acceptance and purchase of used empty steel and plastic drums.

These policies reflect the current status of applicable regulations published by the U.S. Department of Transportation (DOT) and Environmental Protection Agency (EPA). Please note that some of these regulations prescribe severe penalties (including criminal sanctions) for violations; we hope you will understand why we must observe these policies without exception.

1. DRUMS MUST BE EMPTY

We will accept no drums that are not empty. We understand that some minor residue of the drum's prior contents will remain after normal emptying; to decide how much is allowable, we use the EPA's definition of an "empty" container (40 CFR 261.7). This regulation says: first, that the drum is as empty as it can be gotten using "...the practices commonly employed to remove materials from that type of container, e.g., pouring, dumping..."; but second, that in no event may there be more than one inch (or 3 percent by weight) of residue left in the drum.

Note that different types of products require different degrees of emptying (solvents vs. viscous paints, for example). Note also that the "one-inch" rule applies only as an outside limit; it does not authorize all drums to have one inch of residue. The first part of the regulation must be met: the drums must be as empty as they can be gotten using normal emptying methods. With all but a very few products (like tars, etc.), this will result in far less than one inch of residue.

A full copy of the regulation is attached as Exhibit 1.

2. DRUMS MUST NOT HAVE CONTAINED "ACUTELY HAZARDOUS" CHEMICALS

The EPA has published (at 40 CFR 261.33(e)) a list of chemicals considered to be "acutely hazardous." A copy of the list is attached as Exhibit 2.

We will not pick up any drums which contained any of the products on the EPA's 261.33(e) list. Note that this is

true even if the drums have been "triple rinsed" in accordance with 40 CFR 261.33(c). If you find you have any of these drums, please contact us and we will recommend a proper disposition.

3. DRUMS MUST BE PROPERLY PREPARED FOR TRANSPORTATION

The DOT requires that an uncleaned empty drum must be shipped:

a. With "all openings including removable heads and filling and vent holes tightly closed..."; and

b. With the original label (describing the drum residue) legibly in place (49 CFR 173.29(a)).

Our drivers carry extra drum plugs on their trucks and will replace plugs, if necessary, to enable pickup. Costs for such plugs are published in Exhibit 3.

There is no DOT placarding requirement for vehicles transporting empty drums and, because all drums picked up by our company are destined for reconditioning and reuse, there are no DOT shipping paper requirements.

4. CERTIFICATION OF THE REQUIREMENTS BY SHIPPER

We can pick up drums only after the shipper (on every load) certifies compliance with the above requirements. This certification appears on our drum Receiving Tickets (a copy of which - signed also by our driver - is left with you after pickup). A sample is enclosed as Exhibit 4.

5. INSPECTION

Drums are inspected at our receiving yard. Drums vary considerably in their reuse value due to many factors. Some major ones are:

(1) gauge of metal of construction;

(2) DOT specification status;

(3) nature of previous contents, difficulty of removal, and steps necessary to safely handle and dispose;

(4) interiors lined or unlined; and

(5) degree of damage and overall condition.

Some drums have no value and must be disposed of. Because of strict environmental regulation, these drums must first be cleaned before the drum carcass may be sent to a steel scrap recycler. For this reason charges will be made for drum disposal.

6. LOADING

Our drivers will stack and load drums in their trailers. Our offer to pick up drums is based on suppliers placing the drums "on the tailgate." In cases where a trailer is "dropped" at a supplier's plant, all loading will be done by the supplier's personnel.

7. PRICES

Prices paid for good, reusable drums and prices charged for replacement bungs and drum disposal charges are published in Exhibit 3.

Very truly yours,

DRUM SERVICE CO. OF FLORIDA

J. M. Murphy

fp
Encs.

EXHIBIT 1

Section 261.7 Residues of hazardous waste in empty containers.

(a)(1) Any hazardous waste remaining in either (i) an empty container or (ii) an inner liner removed from an empty container as defined in paragraph (b) of this section is not subject to regulation under Parts 261 through 265, or Part 122 or 124 of this chapter or to the notification requirements of Section 3010 of RCRA.

(2) Any hazardous waste in either (i) a container that is not empty or (ii) an inner liner removed from a container that is not empty, as defined in paragraph (b) of this section, is subject to regulation under Parts 261 through 265, and Parts 122 and 124 of this chapter and to the notification requirements of Section 3010 of RCRA.

(b)(1) A container or an inner liner removed from a container that has held any hazardous waste, except a waste that is a compressed gas or that is identified in Section 261.33(c) of this chapter, is empty if

(i) all wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g. pouring, pumping, and aspirating and

(ii) No more than 2.5 centimeters (one inch) of residue remain on the bottom of the container or inner liner, or

(iii)(A) No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner of the container is less than or equal to 110 gallons in size, or

(B) No more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 110 gallons in size.

(2) A container that has held a hazardous waste that is a compressed gas is empty when the pressure in the container approaches atmospheric.

(3) A container or an inner liner removed from a container that has held a hazardous waste identified in Section 261.33(c) of this chapter is empty if

(i) the container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate.

(ii) the container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or

(iii) in the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

Acetaldahyde, chloro-	Acetamide, N-(aminothioxomethyl)-
Acetamide, 2-fluoro-	Acetic acid, fluoro-, sodium salt
Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-, methyl ester	
3-(alpha-acetonylbenzyl)-4-hydroxycoumarin and when in concentrations greater than 0.3%	
1-Acetyl-2-thiourea	Acrolein
Aldicarb	Aldrin
Allyl alcoho	Aluminum phosphide
5-(Aminomethyl)-3-isoxazolol	4-alpha-Aminopyridine
Ammonium picrate (R)	Ammonium vanadate
Arsenic acid	Arsenic (III) oxide
Arsenic (V) oxide	Arsenic pentoxide
Arsenic trioxide	Arsine, diethyl-
Aziridine	Barium Cyanide
Benzenamine, 4-chloro-	Benzenamine, 4-nitro-
Benzene, (chloromethyl)-	Benzenethiol
1,2-benzenediol, 4-[1-hydroxy-2-(methyl-amino)	
Benzyl chloride	Berylliyum dust
Bis(chloromethyl)ether	Bromoacetone
Brucine	Calcium cyanide
Champhene, octachloro	Carbamimidoselenoic acid
Carbon bisulfide	Carbon disulfide
Carbonyl chloride	Chlorine cyanide
Chloroacetyaldehyde	p-Chloroaniline
1-(o-Chlorophenyl)thiourea	3-Chloropropianitrile

Copper Cyanide	Cyanogen
Cyanides (soluble cyanide salts), Not elsewhere specified	
Cyanogen chloride	Dichlorophenylarsine
Deildrin	Diethylarsine
O,O-Diethyl S-[2-(ethylthio)ethyl] phosphoredithioate	
Diethyl-p-nitrophenyl phosphate	Dimethoate
O,O-Diethyl O-pyrazinyl phosphorothioate	
Diisopropyl fluorophosphate	Dimethylnitrosamine
3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino)carbonyl] oxime	
O,O-Dimethyl O-p-nitrophenyl phosphorothioate	
alpha, alpha-Dimethylphenethylamine	4,4-Dinitro-o-cresol and salts
4,6-Dinitro-o-cyclohexylphenol	2,4-Dinitrophenol
Dinoseb	Diphosphoramide, octamethyl-
Disulfoton	2,4-Dithiobiuret
Dithiopyrophosphoric acid, tetraethyl ether	
Endosulfan	Endothall
Endrin	Epinephrine
Ethanamine 1,1-dimethyl-2-phenyl-	Ethanamine, N-methyl-N-nitroso-
Ethyl cyanide	Ethylenimine
Famphur	Fluorine
Fluoroacetamide	Fluoroacetic acid, sodium salt
Fulminic acid, mercury (II) salt (RT)	Heptachlor
1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,-endo-1,4:58-dimethanonaphthalene	
1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,-exo-1,4:58-dimethanonaphthalene	

1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo,-endo-dimethanonaphthalene

1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo,-exo-dimethanonaphthalene

Hexachloroexxhydro-exo,exo-dimethanonapthalene

Hexamethyltetraphosphate

Hydrazinecarbothioamide

Hydrazine methyl

Hydrocyanic acid

Hydrogen cyanide

Hydrogen phosphide

Isocyanic acid, methyl ester

Mercury, (acetato-O) phenyl-

Mercury fulminate (R,T)

Methane, oxybis(chloro-)

Methane, tetranitro (R)

Methanethiol, trichloro-

Metnamyl

Methyl hydrazine

Methyl isocyanate

2-Methyllactonitrite

Methyl parathion

alpha-Napthylthiourea

Nickel carbonyl

Nickel cyanide

Nickel (II) cyanide

Nickel tetracarbonyl

Nicotine and salts

Nitric oxide

p-Nitroaniline

Nitrogen dioxide

Nitrogen(II) oxide

Nitrogen(IV) oxide

Nitroglycerine (R)

N-Nitrosodimethylamine

N-Nitrosomethylvinylamine

Octamethylpyrophosphoramide

Osmium oxide

Osmium tetroxide

Parathion

Phenol,2-cyclohexyl-4,6-dinitrc-

Phenol, 2,4-dinitro-

Phenyl dichloroarsine

Phenol, 2,4,-dinitro-6-methyl

Phenylmercuric acetate

Phenol,2,4,6-trinitro-,ammonium salt (R)

N-Phenylthiourea

Phorate

Phosgene

Phosphine

Phosphoric acid, diethyl p-nitorphenyl ester

Phosphorodithioic acid, 0,0-dimethyl s-[2-(methylamino)-2-oxoethyl]ester

Phosphorofluric acid, bis(1-methylethyl)-ester

Phosphorothioic acid, 0,0-diethyl S-(ethylthio) methyl ester

Phosphorothioic acid, 0,0-diethyl 0-(p-nitrophenyl)ester

Phosphorothioic acid, 0,0-diethyl opyrazinyl ester

Phosphorothioic acid, 0,0-dimethyl 0-[-p-((dimethylamino)-sulfonyl) phenyl]ester

Plumbane, tetraethyl-

Potassium cyanide

Potassium silver cyanide

Propanenitrile

Propanol, 2-methyl-2-(methylthio)-, 0-[methylamino)carbonyl]amine

Propanenitrile, 3-chloro-

2-Propanone, 1-bromo

Propanenitrile, 2-hydroxy-2-methyl-

Propargyl alcohol

2-Propenal

2-Propen-1-ol

1,2-Propylenimine

2-Propyn-1-ol

4-Pyridinamine

Selenourea

Pyridine, (S)-3-(1-methyl-2-pyrralidinyl) and salts

Pyrophosphoric acid, tetraethyl ester Silver cyanide

Sodium azide

Sodium cyanide

Strontium sulfide

Strychnidin-10-one and salts

Strychnidine-10-one, 2,3-dimethoxy-

Sulfuric acid, thallium(I) salt

Tetraethyldithiopytophosphate

Tetraethyl lead

Tetraethylpyrophosphate

Tetranitromethane (R)

Thallic oxide	Thallium(III) oxide
Thallium(I) selenite	Thallium(I) sulfate
Thiofanox	Thiosemicarbazide
Thiourea, (2-chlorophenyl)-	Thiourea, 1-napthalenyl-
Thiourea, phenyl-	Toxaphene
Trichloromethanethiol	Vanadic acid, ammonium salt
Vandium pentoxide	Vandium(V) oxide

Warfarin, when persent at concentrations greater than 0.3%

Zinc cyanide

Zinc phosphide when present at concentrations greater than 10%

DRUM SERVICE COMPANY OF FLORIDA

P. O. BOX 278 · 803 JONES AVENUE
ZELLWOOD, FLORIDA 32798
PHONE 305/889-2581

10/1/85

APPROVED NBADA MEMBER

RECEIVING TICKET 59929

RECEIVED FROM: _____

C/O: _____ DATE: _____

ADDRESS: _____ TRAILER CAR NO.: _____

CITY & STATE _____ RECEIVED BY: _____

	55 GALLON EMPTY OPEN HEAD DRUMS	LIDS	RINGS	BUNGS FURNISHED BY DRUM SERVICE CO. OF FLORIDA
	55 GALLON EMPTY BUNG TYPE DRUMS			
				2" _____
	EMPTY JUNK DRUMS			¾" _____
	TOTAL EMPTY DRUMS			

1. This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the DEPARTMENT OF TRANSPORTATION. (49 CFR 172.204) 2. It is further certified that all containers are empty; that all plugs, lids and rings are securely in place. (49 CFR 173.29) 3. It is further certified that all containers are properly classified, described, and offered for shipment according to the applicable regulations of the ENVIRONMENTAL PROTECTION AGENCY (40 CFR Parts 260-263), and that they are EMPTY as defined in 40 CFR 261.7, and have not contained "acutely hazardous waste," as listed in 40 CFR 261.33 (e).

SHIPPER: _____ BY: _____

DRUMS SUBJECT TO COUNT AND INSPECTION AT DRUM SERVICE COMPANY YARD. OUR DRIVERS ARE NOT INSPECTORS. THEY MAY PICK UP SOME DRUMS WHICH HAVE NO VALUE TO US OR DRUMS FOR WHICH WE MUST CHARGE A FEE FOR PROPER DISPOSAL. CHARGES, WHERE APPLICABLE, WILL BE MADE IN ACCORDANCE WITH OUR CURRENT PUBLISHED SCHEDULE OF DISPOSAL CHARGES.

THIS IS YOUR RECEIPT FOR EMPTY DRUMS PICKED UP. PLEASE REFERENCE ALL INQUIRIES TO THE TICKET NUMBER SHOWN ABOVE. PLEASE MAKE ANY INQUIRIES WITHIN FIVE DAYS FROM THE PICKUP DATE.

DRUMS ARE PICKED UP SUBJECT TO DRUM SERVICE COMPANY'S WRITTEN POLICY. IF YOU DO NOT HAVE A COPY OF THIS POLICY, PLEASE CALL FOR ONE.

THANK YOU FOR YOUR BUSINESS

CUSTOMER COPY
LEAVE WITH CUSTOMER

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