ATTACHMENT 6
CFC/HALON SURVEY, RISK ASSESSMENT AND EQUIPMENT CONVERSION/REPLACEMENT REPORT

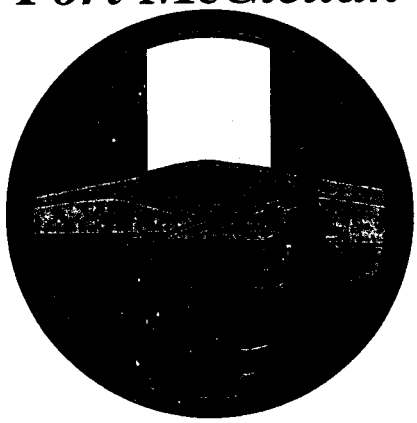
CFC / HALON SURVEY, RISK ASSESSMENT AND EQUIPMENT CONVERSION / REPLACEMENT

REPORT

for the

DIRECTORATE OF ENVIRONMENT
USACML & MPCEN & FM

Fort McClellan



Staying Beautiful

FORT McCLELLAN, ALABAMA

CONTRACT NO. DABT02-94-C-0025

by

REISZ ENGINEERING

Clay Horan
Patrick P. Shaw
Aleta L. Duvall, P.E.
Sabrina P. Key
Will Alexander
Al Reisz, P.E.

January 20, 1995

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

SUMMARY

Fort McClellan has completed an extensive site survey, cost and risk analysis, and compliance assessment of equipment containing Class I and II ozone depleting substances. This effort was conducted for the Directorate of Environment by Reisz Engineering, Huntsville. The field survey covered 140 buildings, identifying approximately 1,374 individual pieces of equipment containing Class I and II materials. Equipment type ranged from small refrigerators to large chillers. A CFC/Halon phaseout plan and equipment replacement/refurbishment schedule was developed for systems with greater than 20 pounds by establishing leak risk potential, cost assessments and replacement analysis. The leak risk analysis was developed to support compliance with federal regulations, which is required for systems with greater than 50 lbs. of refrigerant. Key findings of the survey address the large Class I chiller systems, compliance considerations and recommended alternatives. To meet the TRADOC CFC/Halon reduction schedule, Fort McClellan must begin retrofitting and/or replacing the larger chiller systems. To address compliance concerns, Fort McClellan must develop more accurate record keeping and maintenance of systems with greater than 50 lbs., and verify and update technician certification and qualification.

1.0 INTRODUCTION

1.1 Background

Fort McClellan has initiated several actions to address the Environmental Protection Agency's production ban and regulation of Class I and Class II ozone-depleting substances. Class I substances are chlorinated and brominated compounds with an ozone depleting potential of 0.2 or greater, including a general class of chlorofluorocarbons (CFCs). The list of Class I substances include CFC-11, CFC-12, CFC-113, CFC-114, CFC-115, trichloroethane (TCA), and Halons 1211 and 1301. Class II substances are CFCs and brominated compounds with an ozone-depleting potential of 0.2 or less, including HCFC-22 and other similar compounds. The ozone-depleting substances of concern at Fort McClellan include CFC-11, CFC-12, CFC 113 , Halon 1211, and Halon 1301 (Class I), and HCFC-22 (Class II). The production ban for Class I substances is January 1, 1996, while that for Class II substances is January 1, 2003 for HCFC-141b and 2020 for HCFC-22.

The effort described in this report was driven by such regulatory actions as Title VI of the Clean Air Act Amendments (CAAA) of 1990, the Montreal Protocol of 1987, and codified statutes 40 CFR 82. The accelerated production ban of Class I substances from the year 2000 to January 1, 1996 has accelerated evaluation of the impacts on institutional operations and equipment such as chillers, refrigerators, freezers and fire suppression systems. The Department of Defense has demonstrated an aggressive position on Class I use and has initiated several directives to address the elimination of Class I substances. In a key memorandum from TRADOC Headquarters, ATBO-GF (420-46a) dated September 30, 1992, the Department of Army established basic guidelines regarding chlorofluorocarbon (CFC) and Halon replacement. Fort McClellan responded with a CFC/Halon Action Plan, which was first drafted in 1992 (See Appendix B). The Action Plan was the result of preliminary studies conducted by the Directorate of Engineering and Housing (DEH) and the Directorate of Environment (DOE), and addresses all key elements of the relevant Army guidelines.

1.2 Scope and Objectives

Reisz Engineering was tasked by the Directorate of Environment (DOE) (Contract No. DABT02-94-c-0025) to perform an installation-wide inventory of equipment and systems containing CFCs and Halons. In addition to the inventory, Reisz Engineering was requested to develop a leak risk assessment, the associated conversion/replacement cost, schedule for high-risk systems, and guidance to assist in ensuring compliance with the CAAA. Details of the Scope of Work are provided in Appendix A.

The purpose of this study was to provide information, supported by field data, to assist Fort McClellan in developing an overall plan for the elimination of Class I and the reduction of Class II ozone-depleting substances. Reisz Engineering collected detailed

data of critical systems such as large chillers, critical fire suppression systems and high-risk (high leak) air conditioning/refrigeration equipment. Less detailed data and analyses were developed on small units such as water coolers, refrigerators, window units, and hand-held Halon extinguishers. Information on the smaller units served primarily as a means of estimating total quantities and distribution of the various CFC/Halons on the installation. In a Memorandum dated September 6, 1994 from DOE to the Directorate of Contracts (DOC), the requirements for the Scope of Work regarding the analysis of small equipment was modified. A copy of the Memorandum is provided in Appendix A. The Memorandum stated that only units with CFC/Halon quantities greater than 20 lbs. were required to be analyzed individually, with a schedule and cost for replacement/modification. Therefore, the smaller units (<20 lbs.) were not characterized individually, but in summary. The smaller units are not expected to pose a significant fiscal or regulatory burden upon Fort McClellan within the 10-year planning period.

In support of the CFC/Halon Action Plan, this report provides the following key information: a) a comprehensive survey of Fort McClellan buildings to identify CFC/Halon equipment, including tenant activities; b) an assessment of CFC equipment to rank and prioritize as high-, medium-, and low-risk systems greater than 20 lbs.; c) a cost assessment and schedule for replacement or retrofitting of systems rated as high-risk and greater than 20 lbs.; and d) recommendations for alternatives of CFC/Halon systems where necessary, and any actions necessary to comply with CAAA regulations.

1.3 Description of Work

Work was conducted by Reisz Engineering in three phases: 1) Field inventory and data reduction; 2) Risk assessment and prioritization; and 3) Cost analysis and schedule for retrofit/replacement projects.

1.3.1 Field Inventory and Data Reduction

DOE provided initial data to Reisz Engineering for the development of a list of buildings to be surveyed for CFC/Halon-containing equipment. Reisz Engineering was also provided a list of large (greater than 25 tons) chiller systems from the facility support contractor, Johnson Controls. The list included 79 air-conditioning units at 64 buildings with partial data regarding manufacturers, model numbers, serial numbers, refrigerant types, and estimated capacities. Dates of manufacture and quantities of each refrigerant were not included in the list.

The data provided by Johnson Controls were verified and completed by Reisz Engineering in a series of visual inspections and interviews. During the period of October 17 through January 3, 1995, site visits were conducted by Reisz Engineering's Field Inspection Team. Team members included Mr. Pat Shaw, Mr. Al Reisz, Mr. Clay Horan, Ms. Sabrina Key, and Ms. Aleta Duvall. During the site visits, the Team met with DOE personnel, gathered inventory data for air conditioning, refrigeration, food service, fire suppression, and mobile equipment/systems containing refrigerants and Halons, and conducted site

interviews. Walk-throughs were conducted for the 64 buildings identified by Johnson Controls and 76 additional buildings identified by DOE. Walk-throughs were conducted for the purpose of identifying and enumerating the following types of CFC-containing equipment:

- Chillers
- Condensers
- Window Air Conditioning Units
- Refrigerators
- Heat Pumps
- Water Coolers
- Ice Machines

and the following types of Halon-containing equipment:

- Fixed Fire Suppression Systems (Buildings)
- Portable Fire Suppression Equipment (Buildings and Vehicles)

During the field inventory, special emphasis was placed on identifying equipment in buildings occupied by tenant activities. Tenant buildings included in the survey are listed in Table 1.1.

Table 1.1 Tenant Buildings Surveyed

Commissary	Bldg. 2041
Post Exchange	Bldg. 1965
Burger King	Bldg. 1967
Army and Air Force Exchange Service	
Facilities Maintenance Warehouse	Bldg. 930
Snack Bar	Bldg. 1081
Shopette	Bldg. 1120
Class 6 Beverage Store	Bldg. 2042
Theater	Bldg. 2101
Gas Station	Bldg. 2109
Toyland	Bldg. 2291
Coffee Shop	Bldg. 3181
Defense Nuclear Agency	Bldg. 3191
DOD Polygraph Institute	Bldg. 3195
Marine Corps Administrative Detachment	Bldg. 1022
PSSP Detachment	Bldg. 503
Special Security Office	Bldg. 65
TRADOC Management Engineering Activity	Bldg. 143A
US Army Information Systems Command	Bldg. 144
USACIDC 3rd Region Field Office	Bldg. 63
USA Trial Defense Service Field Office Bldg.	Bldg. 143B
USA Reserves	Bldg.1510.01

Field survey data sheets were compiled for each item of equipment encountered during the inventory, and are provided in Appendix C. The CFC/Halon equipment identified above were subsequently categorized as Type I through V, depending on equipment characteristics. Details of the field survey findings and data reduction are presented in Section 2.0

1.3.2 Leak Risk Assessment

A leak risk assessment was conducted based on data collected during the field surveys. The objectives of the risk assessment were to help the DOE and DEH prioritize and plan for equipment retrofit/replacement during the ten-year planning period. The assessment considered as risk criteria the age, size, condition, extent of piping, type of refrigerant, type of purge unit, and maintenance history, where available. When records were not available, a semi-quantitative analysis was used in which weighting factors defined the risk ranking system. Details regarding development of the leak risk assessment system are provided in Section 3.0.

1.3.3 Retrofit/Replacement Guidance

A retrofit/replacement guidance plan was developed based on an analysis of the highest-risk systems. The guidance plan provides both costs and schedules associated with the replacement of high-risk equipment. To provide flexibility in decision making, three levels of guidance were provided: 1) immediate replacement of all high-risk units; 2) a staggered schedule of conversion and replacement; and 3) conversion of all high-risk units. Details for the replacement/retrofit guidance are provided in Section 3.0. General guidance, cost and schedule are provided for moderate and low risk systems. General guidance developed for units containing less than 20 lbs. of CFC/Halon is provided in Appendix J.

1.3.4 Alternatives and Compliance Considerations

A brief recommendation of alternatives is provided, primarily as a guidance tool, rather than for specific instructions. The selection of a specific refrigerant will depend on detailed analysis and design of the system, and coordination with the equipment vendor. Regulations have been developed to address the operation and maintenance of systems, with particular emphasis on record keeping, leak detection and repair. Guidance was provided to assist in defining actions necessary to ensure compliance with these federal regulations.

2.0 CFC/HALON FIELD SURVEY FINDINGS

2.1 Background

Supporting data and results of previous CFC/Halon studies were obtained from DOE to develop an initial list of buildings to be surveyed. As stated in section 1.3.1 Johnson Controls (JC) provided an initial data set regarding large (greater than 25 ton) CFC systems. The JC data included a list of 64 buildings containing 79 conditioning units with system manufacturer names, model numbers, serial numbers, refrigerant types, and estimated capacities. The JC list did not contain information regarding actual amounts of refrigerant per chiller unit and dates of manufacture. Reisz Engineering verified and updated this list by visual inspections. The 64 buildings were considered highest priority in the list of 140 buildings identified by DOE as having chiller/air conditioning units and other CFC-containing equipment to be surveyed. A final list of 140 buildings was developed (see Appendix D). The survey resulted in a classification of equipment as Type I through V as shown in Table 2.1 below.

Table 2.1 Equipment Categories

Equipment	No. Units	Description
Type I	12	Cooling capacity of 175 tons or more with R-11, R-12, R-500 or R-502 (chillers)
Type II	75	Greater than 25 tons but less than 200 tons with R-22 (air cooled chillers, air cooled condensers, condensing unit, package units)
Type III	1014	All equipment less than 25 tons (refrigerators, freezers, heat pumps, water coolers, window a/c units, condensing units
Type IV	18	Mobile equipment air conditioning units
Type V	255	Halons 1211 and 1301 (all equipment)

2.2 Summary Findings

There are five general classifications of CFC/Halon equipment used at Fort McClellan: 1) 12 Type I components used for building cooling; 2) 75 Type II units containing medium quantities of R-22 (25-200 tons) for building cooling; 3) 1014 Type III units with small quantities of refrigerant (0.1 - 25 tons); 4) 18 air conditioning units in tactical vehicles; and 5) 255 permanent or portable Halon units. Types and total quantities of Class I and Class II refrigerants in use at Fort McClellan are shown in Figure 2.1. The survey

identified 1,119 pieces of equipment which contained approximately 24248.8 pounds of Class I and II refrigerants. For Halon 1211 and 1301, 255 units were identified which contained 2,266.1 pounds of Halons. The quantity of refrigerant in Type I and II equipment is shown in Figure 2.2.

Figure 2.1. Fort McClellan Total CFC and Halon Summary

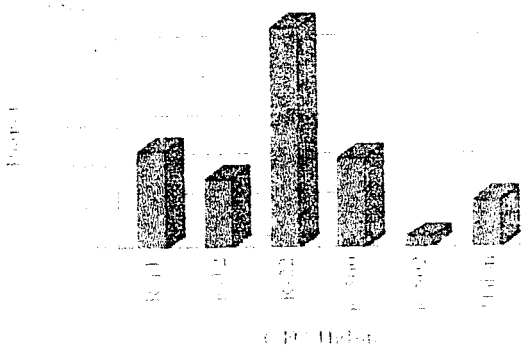
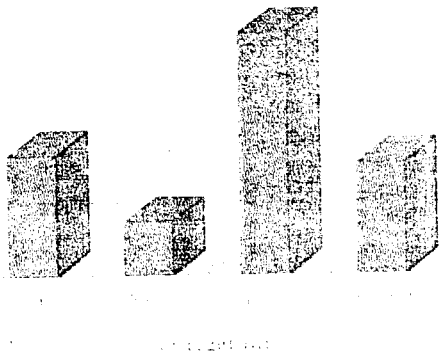


Figure 2.2 Facility-Wide Type I and II Chiller Refrigerant.

(Capacity > 25 tons)



The location, number of units and quantity of refrigerants located throughout the facility are summarized in Table 2.2. The list is not exhaustive, but covers the majority of CFC-containing equipment on the facility, particularly those units significant to daily operations. A brief description of the Type I through Type V systems surveyed and results of the survey are presented in the following sections.

Table 2.2 Summary of Equipment Locations and Quantities

Equipment Type	Type I	Type II				Type III					Type IV	Type V	Total
	Chillers	Air Cooled Chiller	Air Cooled Cond.	Cond. Unit	Package Unit	Water Cooler	HP/ Cond. Unit	Window A/C	Ref./ Freezer	Ice Machine	Vehicle A/C	Halons	
No. Units	12	58	5	11	1	268	89	128	483	46	18	255	1374
No. Bldgs.	8	46	5	10	1	93	53	23	71	26		6	
Refrigerant													
Lbs. R-11	4875												4875
Lbs. R-12	2145					107.2			837.3	82.8	192.5		3364.8
Lbs. R-22		7530	510	1610	80		1335	64			17.4		11146.4
Lbs. R-500	4450												4450
Lbs. R-502									405.7	6.9			412.6
Halon												2266.1	2266.1
Totals	**11470**	**7530**	**510**	**1610**	**80**	**107.2**	**1335**	**64**	**1243**	**89.7**	**209.9**	**2266.1**	**26514.9**

2.2.1 Type I Systems

Class I substances are used in a number of Type I systems, consisting of mechanical commercial air conditioning units, known as chillers. These chillers use either cooling water or air as a heat transfer medium between the conditioned space and the ambient environment. Chillers can be classified by compressor type, including centrifugal, reciprocating, scroll, rotary, and screw. Selection of a particular compressor type generally depends on the cooling capacity required. For the purposes of this study, reciprocating and centrifugal are the two main configurations for the Type I systems identified. Centrifugal compressors are used in large-capacity applications (200-plus tons), and reciprocating compressors are generally used in smaller-capacity applications (less than 200 tons). Type I systems have a lifetime of 23 to 40 years. The Environmental Protection Agency (EPA) anticipates that over time, existing Type I units will either be retrofitted or replaced by systems using non-CFC refrigerants in a vapor compression cycle or by alternative technologies.

Type I systems were identified at 8 locations. A summary of the Type I characteristics is shown in Table 2.3. Interviews with Johnson Controls personnel regarding past problems with the systems were performed as a follow-up procedure to the visual inspections to provide a status of the equipment. Questions concerning servicing records and leak-testing were asked to gain a better understanding of the potential for leakage or any history of leakage for each Type I system. A detailed leak risk and replacement retrofit analysis for Type I systems is provided in Section 3.0.

Table 2.3 Type I Equipment Summary

Bldg. No.	Capacity (tons)	R-Type	Manufact.	Model No.	Serial No.	Pressure	Year	Capacity Charge (lb)	Current Charge (lb)	Status
1876A	750	500	York	HT-N2G1-GAA	51406	Medium	1976	2000	1775	Motor and compressor recently rebuilt; leak test done; no leaks at present
1876B	900	500	York	OT-R3-C-1-ZAB	52618	Medium	1976	2450	1875	May have leaks; 650 Lbs. added at start of '94 season; no leak test done yet
3176A	350	11	York	OT C3 C3 B2 OJ		Low	*	850	850	No comments
3176B	350	11	York	OT C3 C3 B2 OJ		Low	*	850	850	No comments
503	200	11	Carrier	19DG6153CM	761824800	Low	1976	775	775	No major leaks at present
294A	190	12	Westnghse	TC191A	JU47	High	1976	760	700	Impellers changed resulting in new capacity of 145 tons
294B	190	12	Westnghse	TC191A	JU25	High	1976	760	700	Impellers changed resulting in new capacity of 145 tons
1081A	200	11	York	YTA2B2B1-CHD	YHTM-240895	Low	1984	600	600	No major leaks at present
1081B	200	11	York	YTA2B2B1-CHD	YGTM-240896	Low	1984	600	600	No major leaks at present
2281	200	11	Carrier	19DH5743CB	8147 32820	Low	1981	625	625	No major leaks at present
2278	175	12	Westnghse	TC 330 W2 CEAL	HT39	High	1975	625	600	No noticeable leaks over the past year
1965	200	11	Carrier	19DG5032CR	771025700	Low	1977	575	575	No major leaks at present

2.2.2 Type II Systems

Seventy-five Type II units were identified during field surveys. All of the type II units are either air cooled condenser, air cooled chillers, condensing units or package units. The configuration for the type II units was relevant in determination of risk level. Table 2.4 summarizes the survey results. An estimated 9500 pounds of R-22 refrigerant is contained in units ranging from 25 to 200 tons.

Table 2.4 Type II Survey Summary

Size (tons)	Total (tons)	Total No. Units*	Lbs. - R
25-49 tons	945	29	1890
50-99	1645	26	3290
100-139	1820	18	3640
140-200	340	2	680
Total	4750	75	9500

2.2.3 Type III Equipment

Small CFC-containing equipment was surveyed to provide an understanding of the approximate amounts and types of refrigerants used at Fort McClellan. Small equipment, designated as Type III equipment included the following items: refrigerators, small residential-sized AC units, water fountains, ice machines, and window AC units. The 140 buildings were entered and inspected to determine how many CFC-containing items were present. Amounts of refrigerant for ice machines, water fountains, window AC units, and refrigerators were estimated based on averages taken from manufacturer nameplates. In many cases, the nameplate was not visible or the data was missing. For instance, most water coolers surveyed contained approximately 0.4 pounds of R-12 refrigerant, so 0.4 pounds was assumed for all water fountains. This approach was used for the remaining small CFC items. For heat pumps and air conditioning units, nameplates often contained the actual amounts of refrigerant, but when this data was missing , a conservative estimate of 2 lbs. of refrigerant per ton of unit capacity was assumed. A brief summary of each type is provided in Table 2.5.

Servicing and repair of these items should be performed on an as-needed basis, and risk of leakage of CFCs from them are considered to be low. The small items are relatively new and overall condition of the items surveyed was good. A general methodology for the Type III equipment replacement/conversion was developed. A brief discussion of the various Type III units follows.

Table 2.5 Type III Equipment Summary

Component	Refrigerators			Walk-ins	Ice Machines	Water Coolers	Window AC	Condensers/ Heat Pumps	Total Refrigerant (Lbs.)
	Small	2-door	Freezers						
No. Units	402	45	19	17	46	268	128	89	1014
Refrigerant (lbs.)									
R-502	0.0	0.0	5.7	400.0	6.9	0.0	0.0	0.0	412.6
R-12	201	135.0	51.3	450.0	82.8	107.2	0.0	0.0	1027.3
R-22	0.0	0.0	0.0	0.0	0.0	0.0	396.8	1335.0	1399.5

Window AC Units

A total of 128 window AC units were identified during the survey. The majority of window AC units surveyed contained between 40.0 and 60.0 ounces of R-22 refrigerant, with 50.0 ounces (3.1 lbs.) being the average amount per unit. A total of 396.8 pounds of R-22 is contained in all the units.

Ice Machines

A total of 46 ice machines were identified during the survey. Ice machines consist of two main types: drink dispenser ice machines (ice-makers) and ice storage freezers. Both types were found primarily at AAFES facilities and anywhere food and beverages are sold on Fort McClellan. The main refrigerants in ice machines are R-12 and R-502 and the amount per unit was estimated to be 2.0 lbs. for R-12 ice machines, and R-502 ice machines.

Water Coolers

A total of 268 water coolers (fountains) were identified during the survey. These units existed in 93 buildings. R-12 is the refrigerant in water fountains and an average of 0.4 pounds was assumed for each fountain. A total of 107.2 pounds based on this average was determined.

Refrigerators, Freezers and Walk-in Coolers

A total of 483 refrigerators were identified during the survey. The term "refrigerator" describes any food storage appliance, including freezers, which contains CFC refrigerant. Large refrigerators include walk-in units and 6-door stand-up units. Seventeen walk-in

units were identified. Mid-sized units include 2-door refrigerators and 3-door freezers, and small units include personal cubicle refrigerators. The small cubicle refrigerators were the predominant type found in barracks, the Noble Army Community Hospital (NACH), and other similar buildings/activities. These units have been moved from year to year between offices and barracks. Large walk-in refrigerators and freezers exist primarily at AAFES facilities, NACH, Mess Halls and wherever food is sold. R-12 is the refrigerant used in all the small refrigerator units, averaging 0.5 pounds per unit. The walk-in coolers averaged 50 lbs. of CFC per unit in the 9 units using R-12 as well as the 8 units using R-502.

2.2.4 Type IV Systems

The motor pools on post were surveyed for tactical vehicles containing air conditioners which use CFC refrigerants. The National Guard telecommunication vehicles and FOX tactical vehicles were found to contain air conditioning systems. Table 2.6 gives the locations, types and quantities of refrigerant in these vehicles. The vehicle CFC equipment of greatest concern are those using the R-12 refrigerant.

Table 2.6. Type IV Conditioning Systems

Location	Vehicle/Item	R-Type	Amount R (lb)
National Guard	Mobile Telecommunication Unit	22	2.8
(1st Battalion)	Spare AC unit	22	2.2
	Spare AC unit	22	2.2
	Spare AC unit	22	2.8
	Spare AC unit	22	2.8
	Mobile Switchboard Unit	22	2.2
	Mobile Switchboard Unit	22	2.4
Building 350	FOX Tactical Vehicle #5557	12	17.5
	FOX Tactical Vehicle #5558	12	17.5
	FOX Tactical Vehicle #5559	12	17.5
	FOX Tactical Vehicle #5562	12	17.5
	FOX Tactical Vehicle #5561	12	17.5
	FOX Tactical Vehicle #5635	12	17.5
	FOX Tactical Vehicle #5716	12	17.5
	FOX Tactical Vehicle #147	12	17.5
	FOX Tactical Vehicle #148	12	17.5
	FOX Tactical Vehicle #101	12	17.5
	FOX Tactical Vehicle #102	12	17.5
		Total Lbs.	**209.9**
		Total Units	**18**

3.0 CFC EQUIPMENT REPLACEMENT/RETROFIT ANALYSIS

3.1 Leak Risk Analysis

The risk analysis was performed for the purpose of identifying and ranking units with the potential to leak refrigerant into the atmosphere. The risk analysis resulted in a priority list for replacement and/or retrofit to alternate refrigerants and equipment. Separate risk ranking systems were used for the Type I and II units. For the Type I units emphasis was placed on capacity, type, age and service records. For Type II units emphasis was placed on age, configuration, general condition and extent of piping. All Type I equipment are packaged systems of a common configuration, and therefore, extent of piping was not an acceptable risk criteria to use. In Type I and II units, the lower the risk value, the lower the risk. Type III, IV and V equipment pose very little risk due to their high degree of reliability, therefore no leak risk analysis was conducted for Type III, IV or V equipment.

3.1.1 Type I Risk Analysis

Two different methods were used for Type I risk analysis. A semi-quantitative risk analysis using a risk ranking method as described in Appendix F, and a more quantitative method based on a life cycle analysis was used also (see section 3.2.1). The semi-quantitative analysis accounted for system capacity (tons), type of refrigerant, amount of refrigerant, age of equipment, and repair history. A summary description of the 12 Type I units based on the semi-quantitative method is provided in Table 2.3. The 12 Type I units were prioritized according to the ranking system outlined in Appendix F, with results summarized in Table 3.1. A comparison of the life cycle cost analysis shows that the two methods produced comparable results. The lowest risk units in Table 3.1 were recommended for retrofitting in the phased program. Because the life cycle analysis does not account for such factors as repair history and other qualitative data, a combination of both Table 3.1 and Table 3.7 could provide the most logical replacement/retrofit scenario. Neither method is exacting, therefore some uncertainty will exist no matter what risk method is used. The DOE CFC/Halon Action Plan (Appendix B, Table 2) provides recommendations for system replacement and conversion. While it is not clear what criteria were used for the data shown in Table 2, the results from both the semi-quantitative and life cycle analysis compare favorably with the recommendations of Dr. Wang. The life cycle method, however, recommends immediate replacement of all units in 1996 as the most cost effective.

Table 3.1 Type I Semi-Quantitative Risk Results

Building/Chiller Size (tons)	Size (tons)	Age (yrs)	R - Type	PM Status	Total Risk
1876/900-ton	3	4	2	4	13
1876/750-ton	3	4	2	1.5	10.5
294/190-ton	1	4	2	1.5	8.5
294/190-ton	1	4	2	1.5	8.5
3176/350-ton	2	3	2	1	8
503/200-ton	1	4	2	1	8
2278/175-ton	1	4	2	1	8
1965/200-ton	1	4	2	1	8
3176/350-ton	2	2	2	1	7
2281/200-ton	1	3	2	1	7
1081/200-ton	1	2	2	1	6
1081/200-ton	1	2	2	1	6

3.1.2 Type II Risk Analysis

Type II equipment is considered moderate to low in risk, due primarily to the R-22 refrigerant used in the systems. Type II units were analyzed based on three parameters; age, configuration and current condition. Configurations included air-cooled chillers, condensing units, air cooled condensers and package units. These configurations are shown in Figure 3.1. The configuration establishes the extent of piping. Any unit known to be manufactured after 1985 was automatically considered low-risk due to age. While units manufactured between 1980 and 1985 were considered lower risk than those manufactured prior to 1980, their configuration and general condition became more of a factor. Units manufactured before 1970 were considered high-risk. Only the 80 ton unit at building 1060 was known be more than 20 years old. General condition was determined by visual inspection. The visual inspection provided information regarding piping condition (e.g. corrosion, fittings, bends and poor welds) and was weighed more heavily when actual age of a unit was not known. A summary of the risk analysis is given in Table 3.2. Details of the risk analysis are provided in Appendix G.

Figure 3.1 Type II Configurations

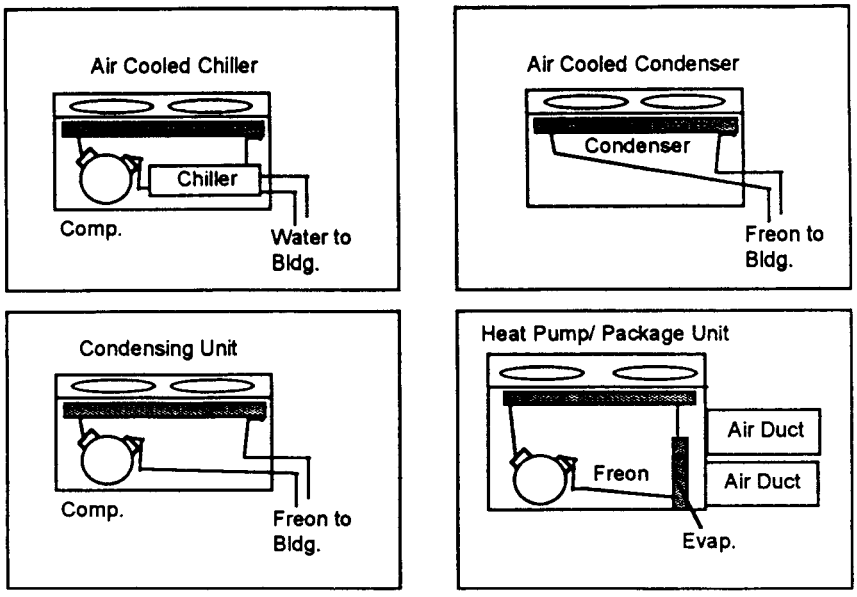


Table 3.2 Type II Risk Analysis Summary

Capacity	No. Units*	HCFC-22 (lb)	Risk
139 to 200 Tons	2	680	0 med/2 low
100 to 139 Tons	18	3640	12 med/6 low
50 to 100 Tons	26	3290	8 med/18 low
25 to 49 Tons	29	1890	10 med/19 low
Total	**75**	**9500**	**30 med/45 low**

3.2 Replacement/Retrofit Cost and Schedule Analysis

The DOE developed a CFC/Halon action plan to meet the TRADOC program. The TRADOC program established a schedule of reduction (Appendix A). The scheduled goal was to phase-out ozone depleting CFCs and Halons through conversion to environmentally safe alternatives. Table 3.3 is a schedule for Type I (listed by Bldg.), Type II and Type V CFC/Halon cumulative reduction. The TRADOC program phase-out schedule is shown at the bottom. The schedule shown in Table 3.3 assumes a phased elimination of the larger chiller systems shown in Table 3.6.

A detailed economic analysis was conducted for Type I equipment only. All Type I units are high risk systems, requiring detailed consideration. The economic analysis served two purposes; 1) to identify the cost for equipment retrofit/replacement and 2) for developing a priority and schedule for replacement. Details of the analysis are provided below.

Table 3.3 CFC/HALON Phased Reduction Schedule
(Lbs.)

		By Beginning Year										
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Balance of CFC/Halon (lbs.)		23,236	21,243	17,613	14,098	10,698	6,393	5,633	4,873	2,873	2,098	Total
Bldg.	**Action**											
1081A	Retrofit		600									600
1081B	Retrofit		600									600
2281	Retrofit		625									625
1876B	Replace			2,450								2450
2278	Replace				625							625
3176B	Replace					850						850
3176A	Replace						850					850
1965	Replace						575					575
294B	Replace							760				760
294A	Replace								760			760
1876A	Replace									2,000		2000
503	Replace										775	775
Eqpt.	**Action**											
Type II-a	Replace			1180								1180
Type II-b	Replace				2890							2890
Type II-c	Retrofit					2550						2550
Type II-d	Retrofit						2880					2880
Type V-e	Replace		168									
Type V-f	Replace			737		1361						
Total Reduction (lbs.)		0	1,993	6,360	9,875	14,636	18,941	19,701	20,461	22,461	23,236	
Cumulative % Reduction			8.58	27.37	42.50	62.99	81.52	84.79	88.06	96.66	100.00	
TRADOC Cumulative % Reduction		30	50	70	85	95	100					
Annual Reduction %			8.6	18.8	15.1	20.5	18.5	3.3	3.3	8.6	3.3	100.0

Type II-a: HCFC-22 units with medium risk, greater than 25 tons manufactured before 1980
Type II-b: HCFC-22 units with medium risk, greater than 25 tons manufactured after 1980
Type II-c: HCFC-22 units with low risk, greater than 25, first 25 (total risk 1.6 - 1.0)
Type II-d: HCFC-22 units with low risk, greater than 25, all remaining units

3.2.1 Type I Equipment

A cost analysis was performed to compare the life-cycle costs associated with the conversion and/or replacement options for each Type I system. The life cycle cost includes installation costs and a 6% design cost. Title VI of the CAAA restricts venting during servicing and requires that all units as a minimum be retrofitted with high efficiency purge units. It also requires that any capture and recycling of CFCs be conducted with the appropriate EPA-certified equipment. Therefore, the cost for all units using purge systems includes high efficiency purge systems installation. The National Institute of Standards and Technology BLCC 4.0 Building Life-Cycle Cost Program was utilized for the cost analysis.

Three scenarios were developed to examine the range of funding options available for the conversion/replacement of high-risk units:

1. Replacement of all high-risk units in 1996 (Table 3.4).
2. Retrofit of all Type I units in 1996, with subsequent replacement of each converted unit at the age of 28 years (Table 3.5).
3. Immediate conversion of newer units (installed after 1980) and subsequent replacement of older units (installed before 1980) in a staggered schedule designed to distribute project funding over a 10-year period (Table 3.6). This option provides a viable means of capturing and recycling R-type refrigerants from the converted units into the unconverted units as outside supplies become scarce.

In Tables 3.4 through 3.6, references to equipment room modifications are based upon the CAAA requirement which dictates that rooms housing refrigerant-containing equipment must comply with ANSI/ASHRAE 15-1992 (rev. 1994) standards. Specific modifications included in the requirement include:

1. Installation of refrigerant sensors in each room.
2. Installation of alarms in each room.
3. Installation of mechanical ventilation in each room.
4. Installation of purge and relief valves which vent outside each room.
5. Installation of self-contained breathing apparatus adjacent to each room door.

In addition to the basic cost criteria, energy efficiency and the relative ease of replacement versus conversion were considered as factors in the economic analysis. As a result, the option to replace all high-risk units in 1996 was selected as the most economically feasible. The selection was based primarily upon the observation that the energy efficiency of the proposed replacement units far exceeds that of the existing units (refer to Table 3.4). Detailed Type I cost analyses are provided in Appendix H. Table 3.5 provides an alternative conversion methodology where all units would be retrofitted in 1996. Out year costs for replacement of the units after a service life of 28 years indicates the total cost for both retrofit and ultimate replacement after useful service life of the equipment. Table 3.6 provides a phased replacement of equipment assuming funding could not be obtained for

the other two options. From Table 3.6, the retrofit/replacement schedule and cost can be considered as a risk analysis also, indicating which units should be replaced earlier due to age, size and potential for leakage.

Table 3.4 Replacement of All Type I Units in 1996

Bldg. No.	Manu.	Action	1996 Cost*
		Mod to Eqpt. Room	$26,203
		High EFF Purge	$0
1876	York	Replace Chiller	$213,993
		High EFF Purge	$0
1876	York	Replace Chiller	$288,235
		Mod to Eqpt. Room	$20,744
		High EFF Purge	$0
3176	York	Replace Chiller	$147,393
		High EFF Purge	$0
3176	York	Replace Chiller	$147,393
		Mod to Eqpt. Room	$20,744
		High EFF Purge	$0
503	Carrier	Replace Chiller	$121,190
		Mod to Eqpt. Room	$20,744
		High EFF Purge	$0
294	West	Replace Chiller	$121,190
		High EFF Purge	$0
294	West	Replace Chiller	$121,190
		Mod to Eqpt. Room	$20,744
		High EFF Purge	$0
1081	York	Replace Chiller	$121,190
		High EFF Purge	$0
1081	York	Replace Chiller	$121,190
		Mod to Eqpt. Room	$20,744
		High EFF Purge	$0
2281	Carrier	Replace Chiller	$121,190
		Mod to Eqpt. Room	$20,744
		High EFF Purge	$0
2278	West	Replace Chiller	$119,006
		Mod to Eqpt. Room	$20,744
1965	Carrier	Replace Chiller	$106,996
TOTAL		**Replace All Chillers**	**$1,921,568**

* Includes a 6% design cost

Table 3.5 Retrofit Cost and Schedule for All Type I Units in 1996*

Bldg. No.	Manuf.	Action	1996 Cost	2002 Cost	2003 Cost	2007 Cost	2010 Cost	Total Cost
		Mod Eqpt.Room	$26,203	$0	$0	$0	$0	$26,203
		High EFF Purge	$0	$0	$0	$0	$0	$0
1876	York	Retrofit	$81,885	$251,390	$0	$0	$0	$333,275
		High EFF Purge	$0	$0	$0	$0	$0	$0
1876	York	Retrofit	$109,180	$338,606	$0	$0	$0	$447,786
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
3176	York	Retrofit	$76,426	$173,151	$0	$0	$0	$249,577
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
3176	York	Retrofit	$76,426	$173,151	$0	$0	$0	$249,577
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
503	Carrier	Retrofit	$0	$142,369	$0	$0	$0	$142,369
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
294	Trane	Retrofit	$0	$139,803	$0	$0	$0	$139,803
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
		High EFF Purge	$0	$0	$0	$0	$0	$0
294	West	Retrofit	$54,590	$0	$0	$0	$0	$54,590
		High EFF Purge	$0	$0	$0	$0	$0	$0
294	West	Retrofit	$54,590	$0	$0	$0	$0	$54,590
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
1081	York	Retrofit	$54,590	$0	$0	$0	$76,850	$131,440
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
1081	York	Retrofit	$54,590	$0	$0	$0	$76,850	$131,440
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
		High EFF Purge	$9,826	$0	$0	$0	$0	$9,826
2281	Carrier	Retrofit	$54,590	$0	$0	$72,080	$0	$126,670
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
		High EFF Purge	$0	$0	$0	$0	$0	$0
2278	West	Retrofit	$54,590	$139,803	$0	$0	$0	$194,393
		Mod Eqpt.Room	$20,744	$0	$0	$0	$0	$20,744
1965	Carrier	Retrofit	$54,590	$0	$70,017	$141,277	$0	$265,884
TOTAL		**Retrofit All Chillers**	**$966,243**	**$1,358,273**	**$70,017**	**$213,357**	**$153,700**	**$2,761,590**

* Includes a 6% Design Cost

Table 3.6 Phased Replacement Cost and Schedule of Type I Units*

BLDG. NO.	MANUF	ACTION	1996 COST	1997 COST	1998 COST	1999 COST	2000 COST	2001 COST	2002 COST	2003 COST	2004 COST	2005 COST	2007 COST	2010 COST	TOTAL COST
		MOD EQPT.ROOM	$20,744												$20,744
		HIGH EFF PURGE	$9,826												$9,826
1081A	YORK	RETROFIT		$56,180										$169,430	$225,610
		HIGH EFF PURGE	$9,826												$9,826
1081B	YORK	RETROFIT		$56,180										$169,430	$225,610
		MOD EQPT.ROOM	$20,744												$20,744
		HIGH EFF PURGE	$9,826												$9,826
2281	CARRIER	RETROFIT		$56,180									$160,018		$216,198
		HIGH EFF PURGE	$0												$0
1876B	YORK	REPLACE			$305,026										$305,026
		MOD EQPT.ROOM	$20,744												$20,744
		HIGH EFF PURGE	$9,826												$9,826
503A	CARRIER	REPLACE				$131,779									$131,779
		MOD EQPT.ROOM	$20,744												$20,744
		HIGH EFF PURGE	$9,826												$9,826
2287	WEST	REPLACE				$129,405									$129,405
		HIGH EFF PURGE	$9,826												$9,826
3176B	YORK	REPLACE					$164,565								$164,565
		MOD EQPT.ROOM	$20,744												$20,744
		HIGH EFF PURGE	$9,826												$9,826
3176A	YORK	REPLACE						$168,858							$168,858
		HIGH EFF PURGE	$9,826												$9,826
294B	WEST	REPLACE							$142,369						$142,369
		MOD EQPT.ROOM	$20,744												$20,744
1965	CARRIER	REPLACE							$125,695						$125,695
		MOD EQPT.ROOM	$20,744												$20,744
		HIGH EFF PURGE	$9,826												$9,826
294A	WEST	REPLACE								$145,898					$145,898
		MOD EQPT.ROOM	$26,203												$26,203
		HIGH EFF PURGE													$0
1876A	YORK	REPLACE	$0								$263,855				$263,855
		HIGH EFF PURGE	$9,826												$9,826
294C	CARRIER	REPLACE										$150,202			$150,202
		TOTAL	$269,675	$168,540	$305,026	$261,184	$164,565	$168,858	$268,063	$145,898	$263,855	$150,202	$160,018	$338,861	$2,664,745

* Includes a 6% design cost

3.2.2 Type II Equipment

The cost and schedule for replacement/retrofit of Type II systems to meet the cumulative Phaseout schedule shown in Table 3.3 is shown in Table 3.7. Type II equipment cost considered replacement of moderate risk units manufactured before 1980 (Type II-a) (see Appendix G). These units were considered for replacement because of the higher potential for leak due to age and general condition of the systems. Seven moderate risk units were known to be manufactured before 1980. The amount of R-22 removed from the equipment shown in Table 3.7 supports the cumulative schedule in Table 3.3, assuming that a replacement has been identified. Type II - b, c and d units would be replaced with HCFC-22 units, since no other alternative presently exist for HCFC-22. Type II-b units are all moderate risk units in Appendix G other than Type II-a. Type II - b, c and d equipment would be scheduled for retrofit from 1998 to 2000, assuming acceptable SNAP alternatives for HCFC-22 have been identified. Twenty-five Type-b units were classified as moderate risk manufactured after 1980 (Type II-b). The remaining 46 low risk units, would be retrofitted in 1998 and 1999.

Table 3.7 Type II Equipment Replacement/Retrofit Cost and Schedule

		Replacement/Retrofit Year					
Eqpt.	**Action**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Type II-a	Replace		$167,400				
Type II-b	Retrofit			NA			
Type II-c	Retrofit				NA		
Type II-d	Retrofit					NA	

3.2.3 Type III Equipment

The replacement of Type III equipment was not considered. It was assumed that the future replacement of such units will occur on an "as-needed" basis during the course of routine maintenance. Funding for such projects is normally provided for in the Operating and Maintenance budget of the equipment user. Refrigerant captured from Type III units should be recycled in the remaining unconverted units.

4.0 HALONS SURVEY RESULTS

Halons are gaseous or easily vaporizable halocarbons used primarily for fire suppression, but also for explosion protection. The two Halons used most widely in the United States are Halon-1211 (chlorodifluorobromomethane) and Halon-1301 (trifluoro-bromomethane). Halon-1211 is used mainly in streaming applications, while Halon-1301 is used in total flooding applications. Halons are used in a wide variety of fire protection applications because they combine five characteristics. First, they are highly effective against solid, liquid/gaseous, and electrical fires (referred to as Class A, B, and C fires, respectively). Second, they are clean agents; that is, they dissipate rapidly, leaving no residue and avoiding secondary damage to the property they are protecting. Third, Halons do not conduct electricity and can be used in areas containing live electrical equipment. Fourth, Halons are gaseous substances that can penetrate in and around physical objects to extinguish fires in otherwise inaccessible areas. Finally, Halons generally are safe for limited human exposure when used with proper exposure controls (Ozone Depleter Compliance Guide, p. 1331).

Despite these advantages, Halons have a very high ozone depletion potential (10 for H-1301 compared to 1 for CFC-11), with Halon-1301 being more destructive than Halon-1211. The greatest releases of Halon into the atmosphere occur not in extinguishing fires, but during testing and training, service and repair, and accidental discharges. For these reasons, EPA is encouraging the development and use of Halon substitutes for fire suppression (see Section 5.0, Alternatives).

4.1 Summary

Both Halon-1211 and Halon-1301 exist at Fort McClellan. Buildings 144, 252, 292, 328, 614, and 1929 and a total of 84 vehicles at Fort McClellan were found to contain Halon systems. Halon units are classified as portable and permanent units in buildings, and as portable units in tactical vehicles. A total of 2266.1 lbs. of Halon was found, 758.1 pounds of 1211, and 1508 pounds of 1301. The total represents permanent systems, portable and vehicle units. Summaries for Halon storage at all sites and equipment surveyed is shown in Table 4.1.

4.2 Portable Halon Units in Buildings

Portable Halon units, classified as streaming agents by EPA, include both Halon 1211 and 1301, and their intended application is small electrical fires. However, certain buildings in the survey contained portable Halon units in non-electrical areas such as hallways and individual offices. These units should be evaluated with streaming replacements identified under the EPA Significant New Alternatives Program (SNAP), (see Appendix K, Halon alternatives). Evaluation of Halon alternatives should include type of operation and fire to

be extinguished to ensure material compatibility. Critical use Halons such as total flooding in tactical vehicles will require identification of acceptable alternatives through TRADOC.

Table 4.1 Summary of Halon Use at Fort McClellan

Portable Units	Location	Type of Halon	No. Units	Quantity (lbs.)
Vehicles				
M-1 Tanks	UTES #1 - 67 Veh.	1301	201	1005.0
M-3 Tanks	UTES #1- 6 Veh.	1301	18	90.0
FOX Vehicles	Bldg. 350 - 11 Veh.	1211	22	266.2
		Total	**241**	**1361.2**
Building				
144	Computer Room	1211	1	80.0
144	Computer Room	1211	1	26.0
292	Room 0053	1211	1	16.0
292	Room 0053	1211	1	5.0
292	Room 1227	1211	1	19.0
292	Room 1227	1211	1	4.0
292	Room 1227	1301	1	5.0
328	Hallways	1211	1	5.0
614	Hallway	1211	1	2.5
1929	Front Desk	1211	1	5.0
		Total	**11**	**167.5**
Permanent Systems				
144	Computer Room	1211	1	329.4
252	Communication Room	1301	1	294.0
292	Room 0053	1301	1	114.0
		Total	**3**	**737.4**
Total Halon at Fort McClellan (Lbs.)			**255**	**2266.1**

4.3 Portable Halon Units in Vehicles

Both Halon-1301 and Halon-1211 portable units are used in tactical vehicles for suppressing electrical fires. Three types of tactical vehicles were found to contain Halon fire extinguishers: M-1 tanks, M-3 tanks, and FOX vehicles. The Halons in M-1 and M-3 tanks are stored in 5 lb canisters, 3 canisters per tank. The FOX vehicles contain 2 canisters per vehicle at 12.1 lb per canister.

4.4 Permanent Halon Systems

Three buildings contain permanent Halon fire suppression systems for total flooding. The permanent systems were located in or near rooms containing computer systems and other electrical equipment. The Halon units are stationary units that are intended to suppress large electrical fires. A total of 737.4 lbs. of Halon exist as permanent systems.

4.5 Replacement of Halon Systems

The Clean Air Act of 1990 does not prohibit the release of Halons from fire extinguishing equipment at the federal level. However it is Army policy to eliminate unnecessary release of Halon into the atmosphere. The Halon 1211 alternatives for streaming agents shown in Appendix K are acceptable by EPA and should be used. Emphasis should be placed on units not subject to regulation, such as carbon dioxide, dry chemical, water or Surfactant Blend A. For permanent mount total flooding applications using Halon 1301, carbon dioxide or water should be given priority as replacements. The decision for alternatives for critical uses such as tanks and FOX vehicles or computer rooms should be provided by TRADOC.

Many manufacturers, as well as the fire protection community, are now in the process of researching and developing alternatives to Halon-1211 and Halon-1301. EPA will review proposed substitutes with the intent not to replace, but to complement the guidance of the fire protection community in directing the transition away from Halons to substitutes posing lower overall risk (Ozone Depleter Compliance Guide, p. 1332).

Appendix K identifies some of the acceptable and promising alternatives for Halon uses as identified under the SNAP program. When assessing these substitutes, EPA must consider whether the substitute can replace Halon in all applications, or only in certain situations. By imposing "use conditions" EPA attempts to avoid overlap with other existing regulatory agencies such as Occupational Safety and Health Administration (OSHA), and to ensure that a substitute will be safe and effective in specific workplace situations.

5.0 Alternatives and Compliance Considerations

5.1 Alternatives and Phaseout

On March 18, 1994, EPA promulgated its plan for administering the Significant New Alternatives Policy (SNAP), and issued decisions on the acceptability and unacceptability of a number of substitutes (59 FR 13044). The SNAP was developed by EPA to establish which substitutes are considered acceptable, unacceptable or promising. EPA recommends end users, such as Fort McClellan, to follow SNAP guidance for replacement of Class I and II substances.

When choosing a Class II acceptable alternative, Fort McClellan should be aware that the acceptability determination shall not be construed to release itself from compliance with all other regulations pertaining to class II substances. These include: (a) the prohibition against venting during servicing under section 608, which was effective July 1, 1992; (b) recycling requirements under section 608, which were effective July 13, 1993; section (c) 609 regulations regarding MVACS which were effective August 13, 1992; and (d) the revised production Phaseout of class II substances under section 606, which was published on December 10, 1993. HCFC-22 does contribute to ozone depletion and will therefore be phased out according to the accelerated schedule (published 12/10/93, 58 FR 65018). Substitutes are listed as acceptable by end-use. These substitutes have only been found acceptable for use in the specific end-uses for which they have been reviewed, as described in the SNAP. Users of blends should be aware that EPA has evaluated and found acceptable in each case only the specific percentage composition submitted for review; no others have been evaluated.

Appendix K provides tables of SNAP alternatives. Additional information can be obtained from the Stratospheric Protection Hotline at 1-800-296-1996, Monday-Friday, between the hours of 10:00 a.m. and 4:00 p.m. (Eastern Standard Time).

5.2 Compliance Considerations

5.2.1 Alternatives

Anyone using a substitute must adhere to any conditions established in 40 CFR 82.174. No one may use a substitute after the effective date of a rulemaking adding it to the list of unacceptable substitutes (40 CFR 82.174(d)). Compliance with Class II substance requires adherence to the following regulations:

CAAA Section 608 - venting restrictions during servicing, effective July 1, 1992.

CAAA Section 608 - recycling requirement, effective July 13, 1993.

CAAA Section 609 - Motor Vehicle A/C servicing, effective August 13, 1992.

CAAA Section 606 - revised production phase-out, December 13, 1993.

EPA strongly recommends users of alternatives adhere to ASHRAE 15 - "Safety Code for Mechanical Refrigeration" and ASHRAE 34 - "Number Designation and Safety Classification of Refrigerants".

5.2.2 Service and Repair

EPA mandates training for all technicians who will operate equipment using Class I or II substances and/or who will operate refrigerant recovery or recycling machines during servicing. The certification program is detailed in 40 CFR 82.161. By November 14, 1994, anyone who maintains, services or repairs appliances, excluding motor vehicle air conditioning systems must be certified as one of four technician types described in 40 CFR 82.161(a). EPA allowed for a grandfathering program, which allowed technicians already trained in preparation of the Class I/II production bans to be certified without having to be completely retrained. Based on interviews with Johnson Controls, the technicians performing such services at Fort McClellan are presently certified. Fort McClellan should, however, verify that the organization providing the training for these technicians received EPA approval for their training programs or else the technicians would possibly have to be re-certified. To maintain, service or repair motor vehicle air conditioning systems, a Type II certification is required (40 CFR 82.161 (a)(5)), effective November 14, 1994.

EPA regulations also require establishments that service, repair or dispose of refrigeration or air conditioning equipment to certify by August 12, 1993 that they have acquired recovery or recycling devices that meet EPA standards. A copy of this form is provided in Appendix K.

5.2.3 Refrigerant Leaks

Owners of commercial refrigeration and industrial process refrigeration equipment and appliances with more than 50 pounds of refrigerant must repair substantial leaks, retrofit or replace the equipment. When owners detect such leaks, they must repair all leaks in the affected equipment within 30 days, or replace or retrofit the system within one year (40 CFR 82.156 (I)(3) and (4). Fort McClellan does not presently maintain a detailed service log for each system containing refrigerant in excess of 50 pounds. The Type I and II equipment identified in this effort will serve as an initial set of equipment for a leak risk program at Fort McClellan. A summary of leak repair requirements is provided in Table 5.1 below.

Table 5.1 Leak Rates Requiring Repair

System	Leak Rate	Requirement
Commercial refrigeration Industrial Process Eqpt.	Leak > 35%	Fix within 30 days or replace/retrofit in 1 year
Owners of appliances with Refrigerant > 50 lbs. (non-commercial/industrial)	Leak > 15%	Fix within 30 days or replace/retrofit in 1 year

Leak rates for commercial/industrial systems is defined in 40 CFR 82.156 (i) (l). Leak rate is determined by the amount of refrigerant added in one year to bring the system to full charge (e.g., 35 lbs. for a 100 lb. charge = 35% leak rate). Non-industrial/commercial appliances containing more than 50 lbs. must be repaired within 30 days if 15 percent of the total refrigerant charge would be released in a 12-month period or replaced or retrofitted within 1 year (40 CFR 82.156 (I)(2)). When equipment triggers the leak repair requirements, the owner must take one of two actions:

1. fix all leaks within 30 days of discovery or within 30 days of when the leak *should have been discovered (*40 CFR 82.156 (i)(4)); or
2. write a one-year retrofit or retirement plan for the leaking equipment and have it on file at the equipment site within 30 days (40 CFR 82.156(i)(3)). The one year plan must be maintained at the equipment site, and the original must be made available to EPA upon request.

The statement "should have been discovered" above refers to conditions such as maintenance schedules or other programs where the equipment leak would have been discovered, resulting in scenarios where equipment owners "intentionally shielded themselves from information that would have revealed the leak." (40 CFR 82.156(i)(4))

The field surveys did not identify records maintained by the maintenance contractors that would demonstrate compliance related to the regulations cited above. It is recommended that more detailed servicing records be maintained for the systems containing greater than 50 pounds (Appendix E). In addition, periodic review of revised regulations for 40 CFR 82 should be conducted by DOE to ensure maintenance compliance.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

A field survey, equipment assessment and leak risk analysis was performed for CFC/Halon equipment at Fort McClellan. Approximately 26,000 pounds of Class I and II refrigerants are contained in various equipment throughout Fort McClellan. The results of the effort will support an overall CFC/Halon elimination program, by focusing on areas of greatest need. Three key elements and a number of sub-elements are concluded from the study:

1. The 13 Class I refrigerant chiller systems (Type I) identified in 8 buildings should be replaced or retrofitted in the following order:

    a. Replace all chillers in 1996 at a cost of $1.9M. Assuming availability of funds, replacement of all units in 1996 will be the most cost effective.
    b. Retrofit all Type I units in 1996 to support TRADOC reduction goals at a 1996 cost of $996K in 1996. The total outyear cost would be approximately $2.76M.
    c. Retrofit the units in Building 1081 and 2281 in 1996, and perform a phased replacement of all other Type I units over a 10-year period at a cost of $2,664,745.

2. Only R-22 is used for building cooling in conditioning units greater than 25 tons (Type II units). R-22 will continue to be manufactured until 2020, and the use of R-22 will continue well after the year 2020. R-22 is a recommended transition refrigerant under the SNAP program. Fort McClellan should continue purchasing units using R-22 as needed.

3. Leak detection and repair (LDAR) records for systems containing greater than 50 pounds of refrigerant (Type I and II) were not readily available.

Smaller equipment does not represent a significant concern with regard to compliance, nor should it be considered as part of the overall TRADOC reduction program. Only Class I and II systems with refrigerant in excess of 20 pounds should be included in the reduction program. The replacement of all portable Halon 1211 systems shown in Table 4.1 in all buildings should be initiated immediately. The Halon 1211 alternatives for streaming agents shown in Appendix K are acceptable by EPA and should be used. Emphasis should be placed on units not subject to regulation, such as carbon dioxide, dry chemical, water or Surfactant Blend A. Carbon Dioxide or water should be given priority for total flooding permanent system applications that use Halon 1301. The decision to implement alternatives for critical uses such as tanks and FOX vehicles or computer rooms should be provided by TRADOC.

6.2 Recommendations

Based on the observation and findings from this study, the following recommendations are provided:

1. If economically feasible, replace all equipment as shown in Table 3.4 in 1996.
2. Retrofit and replace Type I systems in a phased manner as shown in Table 3.5.
3. Fort McClellan should develop a leak detection and repair (LDAR) program for all Type I units and Type II units listed as moderate risk (Appendix E). A report should be submitted quarterly to DOE from DEH indicating which units have been serviced and the amount of refrigerant lost or added to the system.
4. A leak repair program should be established as outlined in Section 5.0.
5. DOE should submit the refrigerant recovery and recycling device acquisition certification form in Appendix K to EPA.
6. DOE should maintain a list of personnel certified to work on Class I and II systems subject to the provisions of 40 CFR 82.161.
7. DOE should obtain hard copy verification that under the grandfathering clause for equipment servicing (40 CFR 82.161) those organizations that trained certified technicians at Fort McClellan, have been approved by EPA.
8. DEH/DOE should consider bar coding all Type I and Type II equipment for rapid identification as part of the LDAR program. The bar coding would enhance the existing preventative maintenance program, and reduce cost for record keeping and future equipment surveys.
9. A brief training/orientation should be held for all refrigerant servicing personnel to communicate clearly the elements of 40 CFR 82, with emphasis on leak detection and record keeping.

References

Ozone Depleter Compliance Guide, Thompson Publisher, p. 902., April, 1994

Wang, Dr. Shih-chi, DOE internal document, 1992

TRADOC Memorandum - ATBO-GF (420-46a), September 30, 1992

Item 0001 - Background: Fort McClellan Environmental Office has recently initiated a CFC/Halon Reduction Program. This program requires contract service to perform following tasks: 1) Inventory of currently existed equipment/system; 2) Leak risk assessment; and-3) Development of conversion/replacement guidance.

Requirement - The work will involve on-site investigation (approximately 180 hours) and preparation of a written report (approximately 50 hours). Tasks shall be performed according to the following requirements.

1) Inventory of Existing Equipment/Systems

- This inventory shall involve the performing of a complete field survey to gather information/data on all air conditioning (chillers, packaged or split systems, computer room units; window units, heat pumps, etc.), refrigeration (cold storage, walk-in or reach-in freezers, refrigerators, water coolers, etc.), food service (ice makers, ice cram makers, drink dispensers, refrigerated salad bars, etc.) fire suppression systems (fire extinguishers, halon systems, other mission related uses, etc.), and mobile applications (air conditioning systems on government vehicles) equipment/systems on Fort McClellan. The inventory shall include all tenant activities; i.e. Hospital, Commissay,. PX, Burger King, etc. The installation can only provide information on certain major items that contain CFC components. The contractor will be required to completely survey and gather a complete list through interviewing and visual inspecting of facilities and buildings. A point of contact will be provided from each major directorate to discuss possible locations on CFC type systems.

- The information/data to be collected for each piece of equipment/system during the field survey should include: facility or building number, type of machine, manufacturer, model and serial numbers, capacity (Tons), type equipment life, leak risk (to be described in the next section), and any other noteworty items.

2) Leak risk assessment

- This assessment shall be conducted while performing the field survey of the existing equipment/systems. Each equipment/system shall be rated as either "Low", "Medium", or "High" risk.

- The criteria to be considered when making this assessment shall include:

a) The age and general condition of the equipment/system.

Generally, the older the age, the poorer the condition, the higher the probability of a leak. However, in some small refrigeration equipment where the compressor and the condenser are integral with the unit, the risk should be considered low, despite the age.

b) The extent of the piping - The more extensive the piping (and the more components in a system), the higher the potential for leakage.

c) The use of the "old style" automatic purgers that produce excessive emissions should be rated as a higher risk.

d) Past experience of maintenance personnel with the equipment/system - Ask: Has leakage been a problem in the past? Contractor will be required to talk with the Facilities Engineer contractors to obtain this type information.

3) Development of conversion/replacement guidance.

- Based on the information/data obtained from the inventory/assessment, develop a priority list for removing (conversion or replacement) the existing equipment/systems. The "worst leakers" shall be removed from service at the earliest date. Also, a reasonable balance between the different type of CFC refrigerants to be removed from service shall be maintained.

- Based on the available technology and economics, identify equipment/systems that are suitable for conversion; and also identify those that are feasible for replacement. The basic concept to be used is to convert large equipment and replace small units. The contractor shall identify all needed projects to meet the requirements of CAA-90. The cost and schedule for each conversion or replacement project shall be estimated and provided in a written report.

-Discussion with the manufacturer may be required to determine if equipment can be converted. An economic analysis shall be conducted to determine whether conversion or replacement is the most feasible.

Item 0002 - Background: Fort McClellan Directorate of Environment conducted an installation wide Air Pollution Emission Inventory through a contract service in 1993. An update of this air emission inventory is required to reflect the most current status of air pollution sources and their emissions and to meet Alabama Department of Environmental Management (ADEM) regulatory requirements.

The work will involve on-site investigation (approximately 2340 hours) and off-site calculations and preparation of a written report (approximately 320 hours). Tasks shall be performed according to the following requirements:

a) The air pollution emission update shall be conducted as a follow up action to modify previous air pollution emission data in order to reflect the most current status of air pollution sources and their emissions.

b) During the on-site field investigation (first phase), the contractor will review previous air emission report, gather additional process operations data, material consumption data and interview installation personnel for the information needed to calculate air pollution emissions.

c) In the second phase, the contractor will involve the conversion of field data into source-specific emission rates. The emission rates will be determined through the use of emissions estimating techniques such as emission factors, mass balances, and computerized emission models. Emission factor calculations shall be conducted according to an EPA - recommended hierarchy.

d) Quality assurance of the emission techniques and calculations shall be performed for each source category. Approximately 10 percent of the emissions estimates for each source category shall be audited.

e) The air pollution emission update report shall include both actual emissions and potential to emit. Potential to emit may be calculated by either scaling up actual emissions form actual operating levels and run times to full time operation (8760 hours/year) at full capacity or calculating emissions based on established permit restrictions.

f) The inventory update shall establish potential emissions associated with the Plastic Forming Operations in TASC Building 2116, Firing Range Operations and Open Detonation Activities. Laundry and photo labs activities shall also be included as sources of air pollutant emissions.

g) The emissions from fuel storage tanks at Building 265, 296, 350, 503, 1876, 2109, 3131 and 3196 shall receive further review. The results of such review shall provide pertinent information to prepare documentations to the ADEM (ADEM Forms 108, 113a, or 197)

NOTE: EIGHT COPIES OF ITEMS 0001 AND 0002 SHALL BE PROVIDED IN THREE RING BINDERS WITH SLIDE IN COVER SHEETS FOR EACH PART OF THE CONTRACT.

END OF SECTION C

Chloroflorocarbon/Halon Survey
Contract Line Item No. 0001

Specifications/Methodology

Reisz Engineering will provide a report of survey of existing equipment/systems with chloroflorocarbon or halon. Also provided will be a leak risk assessment report for the inventoried equipment and guidance for conversion and replacement. The guidance will include a schedule for equipment/system with 20 pounds or more of CFC/Halon to keep Fort McClellan in compliance with the Clean Air Act. The schedule will prioritize equipment/systems and include cost and recommendations for repair/replacement according to worst condition and greatest likelihood of releasing CFC/Halon.

Interviews by Reisz Engineering will be conducted with the forty four installation directorates and required internal organizations to help determine the equipment to study. An investigation of the equipment/systems will be made by the Reisz Engineering project survey team, coordinated by the Project Team Leader. The surveyed equipment/systems will be visually inspected and conditions recorded. An assessment of risk of leak will be made by the Reisz Engineering project team and Project Team Leader. Information from the investigation will be processed by the Project Team Leader, the Sr. Environmental Engineer and Reisz Engineering Environmental Consultant under the direction of the Project Principal. Coordination will be kept by the Project Team Leader with the Fort McClellan point-of contact and weekly status reports made.

Equipment/systems with 20 pounds or more of CFC/Halon will be analyzed. This will be for an estimated 150 buildings and 10 vehicles that have equipment/systems with 20 pounds or more of CFC/Halon. At least 10% of the 1148 buildings on post will be surveyed to estimate the leak risk assessment and determine the replacement/conversion guidance for systems with less than 20 pounds of CFC/Halon. Military vehicles with less than 20 pounds of CFC/Halon will be surveyed and the CFC/Halon losses estimated. At least 10% of each type of vehicle will be surveyed. The building survey will be on air conditioning equipment, refrigeration units, food service equipment, fire suppression systems and vehicles.

A conversation/replacement guidance will be developed from field survey information and economic considerations (equipment cost, repair cost life cycle costing etc.). This report will include a priority list for conversion/replacement of equipment in the worst condition with respect to CFC/Halon leakage, with consideration given to a reasonable balance of the types of refrigerants removed. The effected equipment/systems will be recommended for either replacement or conversion as the case may be. All equipment/systems needing replacement/conversion in order for the installation to

comply with the Clean Air Act will be identified with corresponding estimated cost and schedule.

An interim review meeting and report will be made before the final presentation and report. A conversion/replacement guidance will be developed that will include the requirements pertaining to replacement/conversation of CFC/Halon equipment/systems, for Fort McClellan compliance with the Clean Air Act.

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA 23651-5000

REPLY TO
ATTENTION OF

S: 30 Sep 92

ATBO-GF (420-46a)

1 MAY 92

MEMORANDUM FOR

Commanders, TRADOC Installations, ATTN: DEH/DIS
Commander, Fort Chaffee, ATTN: DFE, Fort Chaffee, AR 72905-5000
Commander, NYAC & Fort Hamilton, ATTN: DEH Brooklyn, NY 11232-5000

SUBJECT: Chlorofluorocarbon (CFC) and Halon Action Plan and Guidance Package

1. Reference memorandum, HQ TRADOC, ATBO-GE, 7 Apr 92, subject: Clean Air Act Amendments (CAAA) - Title VI: Ozone-Depleting Substances.

2. Recent scientific evidence confirmed that ozone depletion is occurring more rapidly than earlier believed. As a result, President Bush announced an accelerated phase-out of Class I CFCs and most other ozone depleting substances. Under this new schedule, the United States will end CFC production by the end of 1995, or 5 years ahead of current international deadlines. TRADOC's program goals were outlined to all installation commanders in the above referenced memorandum. These goals, although practical and achievable, significantly impact the way we operate and maintain our air conditioning, refrigeration and fire suppression systems.

3. As currently allowed by EPA, we can continue to use CFC equipment beyond 1995. But at some point, refrigerant taxes and shortages will dictate that we ultimately phase-out all CFC applications. As a result, we established a realistic CFC equipment reduction glide path for TRADOC. This timetable requires a 30 percent reduction by the end of 1995. This allows us time to overcome the "learning curve," allows technology to progress further, and helps to spread out funding requirements over a longer period. The targets become increasingly more difficult until we gradually approach complete phase-out by the end of 2000. Specific annual reduction targets can be found in the enclosure. Each installation will phase-out purchase of ozone depleting substances by 1 Jan 93.

4. In order to achieve these ambitious goals, each installation must develop and implement an action plan. This plan should include a detailed inventory of equipment, leakage risk

DEPARTMENT OF THE ARMY
US ARMY CHEMICAL AND MILITARY POLICE CENTERS & FORT MCCLELLAN
FORT MCCLELLAN, ALABAMA 36205-5000

REPLY TO
ATTENTION OF

ATZN-FEE

31 March 1993

MEMORANDUM FOR Commander, HQ U.S. Army TRADOC, ATTN: ATBO-GF (Mr. Bill Dancy) Fort Monroe, Virginia 23651-5000

Subject: Chlorofluorocarbon (CFC) and Halon Action Plan

1. Per your request, our environmental staff has developed a CFC/Halon Action Plan.

2. A copy of this action plan is attached.

3. Point of contact for this action is Dr. Shih-chi Wang, or Mr, Waymon Pence at (205) 848-3539 or DSN 865-3539.

FOR THE COMMANDER:

R.J. Abernathy

Encl

ROBERT J. ABERNATHY
Director of Engineering and Housing

FORT McCLELLAN CFC/HALON ACTION PLAN

1. Purpose and Requirements
2. Goals and Objectives
3. Overall Strategy
4. Inventory
5. Leak Risk Assessment
6. Long Range Execution Plan
7. Management of Refrigerant Stockpiles
8. Operation, Maintenance and Inspection Procedures
9. CFC Recovery/Recycling/Reclamation
10. Training and Certification
11. CFC Disposal
12. Elimination of Halon Applications
13. Mobile Applications
14. Discussion

1. Purpose and Requirements

In September 1987, the United States and 22 other countries signed the Montreal Protocol on Substances that Deplete the Ozone Layer. The Protocol called for production and consumption of Chlorofluorocarbons (CFCs) and Halon to be frozen at 1986 levels beginning July 1, 1989 and January 1, 1992 respectively, and for the CFCs to be reduced to 50 percent of 1986 levels by 1998.

Since the signing of the Protocol in 1987, additional evidence became available indicating that depletion of the stratospheric ozone layer was occurring more quickly than had been anticipated. In response to this evidence, the Parties to the Protocol at their meeting in London in June 1990 amended the Protocol schedule for CFCs and Halons to require a complete phaseout by January 1, 2000.

The Title VI of the Clean Air Act (CAA) Amendments of 1990 includes requirements for controlling ozone-depleting substances which are generally consistent with, but in some cases more stringent than those contained in the revised Montreal Protocol and also calls for a phaseout by January 1, 2000. In addition, Title VI provides provisions to reduce emissions of all ozone-depleting substances.

The CAA that the U.S. Congress passed in 1990 also calls for an accelerated phaseout of CFCs if new scientific evidence revealed a greater threat to ozone than expected. In February 1992, the U.S. Senate, by a 96-0 vote, found the evidence alarming enough to justify a faster phaseout. As a result, the U.S. Environmental Protection Agency (EPA) is in the action to announce an accelerated phaseout of CFCs and most other ozone depleting substances. Under this new schedule, the United States will end CFC production/ consumption by the end of 1996, or 4 years ahead of current international deadlines.

Major elements/requirements contained in the Title VI of CAA-90 are:

a. Production/Consumption Phaseout

Production and consumption of CFCs, halons and halogenated organic solvents will be progressively restricted during the next 10 years.

b. Elimination of Appliance/Industrial Process Refrigerant Releases

Beginning July 1,1992, it will be unlawful to release to the atmosphere CFCs, halon, HCFCs, methylchloroform, or carbon tetrachloride in the course of servicing, repair, or disposing of an appliance or industrial process refrigeration device. Future requirements will mandate that restricted materials be removed from appliances prior to disposal.

c. Recycling of Motor Vehicle Refrigerants

Beginning January 1, 1992, persons servicing motor vehicle air conditioners must use EPA approved refrigerant recycling equipment and must be trained and certified to conduct such services.

d. Revising of Federal Procurement Regulations

In April 1992, EPA issued regulations requiring all Federal agencies to revise procurement regulations to reflect the goals of Title VI, CAA-90, and to maximize acquisition of EPA approved safe substitutes. Federal agencies must implement new procurement rules by April 1993.

e. Replacing with Safe Substitutes

In November 1992, EPA published rules making it illegal to replace restricted CFCs, HCFSs, halons, or halogenated solvents with a prohibited substitute if a safe substitute has been identified. EPA will publish a list of safe substitutes and prohibited substitutes.

As a major Federal facility for military training, Fort McClellan must comply with these rules and regulations. This document was developed to initiate actions for implementing the requirements contained in these rules and regulations.

2. Goals and Objectives

In response to the newly established rules and regulations for the protection of stratospheric ozone, the United States Army Training and Doctrine Command (TRADOC) has recently initiated a CFC/Halon Reduction program to comply with these new requirements.

The TRADOC's goal is to phase-out ozone depleting CFSs and halons through conversion to environmentally safe alternatives. To achieve this goal, the TRADOC has developed following equipment reduction time table:

End of CY	Annual Reduction (%) *	Cumulative Reduction (%)*
1993	5	5
1994	10	15
1995	15	30
1996	20	50
1997	20	70
1998	15	85
1999	10	95
2000	5	100

* The above percentage reduction refers to equipment cooling capacity tonnage (CFCs) or poundage (halons), not the number of systems taken out of service.

The objectives of this action document are:

a. To identify and to prioritize Fort McClellan's uses of CFCs and halons;

b. To develop projects for replacing or converting equipment and guidelines for complying with regulatory requirements in a systematic and timely manner; and

c. To pursue recovery and recycling programs and to eliminate purchase of CFCs/halons at the earliest date.

This action plan is a dynamic document and shall be modified as needed to contain Fort McClellan's up-to-date requirements/activities in helping overcome this global environmental concern.

3. Overall Strategy

Following approaches will be used to achieve TRADOC's CFC/Halon reduction goal and to meet our program objectives:

a. Having a complete and through understanding of the current use of CFCs and halons on Fort McClellan is essential to start this program. Our current uses of CFCs and halons will be characterized by performing an installation-wide field survey/inventory. The information and data collected from this inventory will be used to develop our scope of work and to identify our program needs.

b. After having the information and data on our current uses, the next step will be the determination of the priority for replacement or conversion of our existing systems. The priority will be determined by conducting an assessment of the potential for leakage. The "Worst Leaker" will be removed from service at the earliest date.

c. Once we have the scope of the work and identified the project priority, the next step will be the making of decisions as to whether to convert existing systems to use alternate refrigerants or to replace them with new systems. The considerations for this process will include: 1) available technology; and 2) economics. The basic concept to be used is to convert large equipment and replace small units.

d. When above mentioned actions are completed, we will concentrate our efforts on planning and implementing the identified projects. Each project plan will include: 1) a detailed description of associated tasks; 2) a cost estimate or budget; and 3) an execution schedule. The projects will be planned and implemented in a manner that maintains a reasonable balance between the different types of CFC refrigerants that will be removed from service. This will help to ensure that sufficient stockpiles for each refrigerant will be available for maintenance long after the January 1, 1993 deadline for new CFC purchases. The project implementation will be monitored by the Installation Environmental Office and each project progress will be reported to the TRADOC by February 1 of each year.

e. A program to effectively manage our remaining CFC stockpile is critically and urgently needed after the deadline of January 1, 1993 for the elimination of new CFC purchases. We will

require every CFC equipment maintenance activity to initiate their CFC recovery/recycling efforts as soon as possible to adapt to this change.

f. Other approaches used to achieve the program goal include:

1) Enhancing the recovery/recycling projects to ensure full compliance with the "No Release" law;

2) Establishing operation/maintenance/inspection procedures to ensure proper use/handling of existing CFCs and halons; and

3) Training and certification of all maintenance personnel.

g. Summary of Planning Strategy

1) Concerning the conversion/replacement of CFC/Halon equipment:

* Characterizing the current use
* Developing scope of work/projects
* Prioritizing the needed projects
* Determination of needed actions (conversion vs replacement)
* Planning/implementing projects

2) Concerning the use/handling of existing CFCs/halons:

* Characterizing the current use
* Managing refrigerant stockpiles
* Enhancing recovery/recycling project
* Establishing operation/maintenance/inspection Procedures
* Training/certification of personnel

4. Inventory

The inventory of current uses of CFCs/halons is the first step and probably the most important part of this program because

it will serve as the base to initiate many subsequent actions. This inventory should involve the performing of a complete field survey to gather information/ data on all air conditioning (chillers, packaged or split systems, computer room units, window units, heat pumps, etc.), refrigeration (cold storage, walk-in or reach-in freezers, refrigerators, water coolers, etc.), food service (ice makers, ice cream makers, drink dispensers, refrigerated salad bars, etc.), fire suppression systems (fire extinguishers, halon systems, other mission related uses, etc.) and mobile applications (air conditioning systems on government vehicles) equipment/systems on Fort McClellan.

The information/data to be collected for each piece of equipment/system during the field survey should include: facility or building number, type of machine, manufacturer, model and serial numbers, capacity (tons); type and quantity (lbs) of refrigerant used, estimated remaining equipment life, leak risk (to be discussed in section 5 below), and any other noteworthy items.

The inventory should include all tenant activities; ie commissary, Burger King etc. Because of the potential HCFC restrictions in coming years, it is desirable to include and to identify HCFC applications for future reference. It is also desirable to perform an inventory of refrigerants/helons kept on hand for maintenance purposes. Additionally, historical use by refrigerant/helons type is also useful. Such data will help us to better manage our stockpile in the future as restrictions and shortage occur.

The equipment and refrigerant inventories should be maintained as living documents. A current use of all air conditioning refrigerants on Fort McClellan is summarized in Figure 1.

5. Leak Risk Assessment

As mentioned above, an assessment of the potential for leakage should be conducted while performing the field survey of the existing equipment/systems. Each equipment/system will be rated as either "Low", "Medium", or "High" risk. The criteria to be considered when making this assessment should include:

a. The age and general condition of the equipment /system - Generally, the older the age, the poorer the condition, the higher the probability of a leak. However, in some small refrigeration equipment where the compressor and the condenser are integral with the unit, the risk should be considered low, despite the age.

b. The extent of the piping - The more extensive the piping (and the more components in a system), the higher the potential for leakage.

c. The use of "old style" automatic purgers that produce excessive emissions should be rated as a higher risk. Newer, high efficiency purgers are likely to be at minimal risk.

d. Past experience of maintenance personnel with the

equipment/system - Ask: Has leakage been a problem in the past?

The results of leak risk assessment will be used to determine the priority for the replacement or conversion of our existing system. This assessment should identify these "worst leakers" for removal from service at the earliest date (if the technology for conversion or replacement is available).

6. Long Range Execution Plan

After the field inventory/leak risks assessment data and results have become available, the next step is to make decisions as to whether to convert existing units/systems to use alternate refrigerants or to replace them with completely new systems. As mentioned before, these decisions should be made on the consideration of 1) cost, and 2) is available technology; and the basic concept to be used is to convert large equipment and replace small units. Consultation and discussion with the equipment manufacturer concerning the specifics of a conversion may be needed before making any final decision.

Once the decisions are made, a long range plan to initiate needed projects/actions for the conversion or replacement of existing equipment/systems should be prepared. This plan should include following components:

a. Numbers of units/systems to be converted or replaced each year; how many and what kind of projects/ actions will be needed?

b. Scope and requirements of each project or action;

c. Cost estimate/budget for each project or action;

d. Work classification of each project or action - any equipment/system replacement project should be considered as a new work (.L account) unless the existing unit is in a failed or failing state. All conversion projects will probably be considered as new work too, unless specific components that need to be replaced as part of the conversion can be considered as failing; and

e. Execution schedule - The project execution should be scheduled to put the worst leakers up front if possible, to follow the TRADOC phase-out timetable as closely as possible; and to maintain a reasonable balance between the different types of CFC refrigerants that will be removed from service (This will help to ensure that sufficient stockpiles for each refrigerant will be available for maintenance long after the January 1, 1993, deadline for new CFC purchases).

The long range execution plan identifying specific conversion and replacement projects and their costs should be used as the basis for 1383 report development. All projects should be identified as a "3-H" requirement.

In addition, it is also important to ensure that all air conditioning and refrigeration systems installed in new constructions meet all current design criteria and regulatory requirements during the executing of conversion/replacement projects.

7. Management of Refrigerant Stockpiles

Proper management of the remaining CFC stockpile is needed and critical after January 1, 1993, the effective date to eliminate purchases of new CFCs. A specific management plan must be developed for each refrigerant, including HCFCs, using actual data collected during the inventory as well as estimates of future uses and replenishments from recycling efforts. The reclaimed CFCs should be used for older equipment because they will probably not meet warranty standards for new equipment. The remaining CFC stockpile must be managed in an efficient manner to ensue adequate supply of reclaimed CFCs to service our remaining CFC equipment for years to come.

8. Operation, Maintenance and Inspection Procedures

With containment, recovery, and recycling being mandated by law, significant changes must take place in the way we operate and maintain our CFC/halon equipment/systems. Following instructions are provided to ensure all operation, maintenance and inspection personnel are aware of and are practicing the proper procedures.

a. Containment

Operation and maintenance personnel should do the following to minimize refrigerant leakage:

1) Inspect all equipment for signs of leakage and promptly repair all leaks. On large systems, keep a log on refrigerant level or usage. Whenever an underchange is found, find and repair the leak before recharging the system. Leaking refrigerant oil usually indicates leaking refrigerant. Look for leaks at fittings, gskets and seals. Leak detection methods are described separately in Appendix 1.

2) Avoid compression fittings. Use brazed or welded joints wherever possible. Make sure flared joints are properly made up and that they are tight. Proper piping practices are also described separately in Appendix 2.

3) Low pressure chillers use an air purge system tend to lose some refrigerant with the expelled air. Purge systems need to be serviced regularly to make sure they do not lose excessive refrigerant. New purge systems that are much more effective at containing refrigerant are available from chiller manufactures.

b. Maintenance and Repair Practices

1) Do not use refrigerant for any purpose that will allow it to enter the atmosphere. For instance, do not use refrigerant to flush refrigerant systems or pneumatic lines or to

clean coils.

2) When purging air from pressure gauge set hoses or refrigeration system components, keep purge time to a minimum.

3) Do not vent refrigerant when replacing or repairing equipment. On systems having a liquid receiver and an operable compressor, pump the charge into the receiver and close the isolation valves before opening the system. If this is not possible, the charge must be pumped into an external cylinder using refrigerant recovery equipment. Refer to Appendix 3 for proper handling procedures for refillable cylinders and refer to recovery equipment manufacture's instructions for proper recovery procedures. If the recovered refrigerant is not heavily contaminated from a compressor burnout or similar event, it can be recycled with commercially available equipment and reused in the repaired system or in another system on the installation. Heavily contaminated refrigerant should be recovered and turned in for proper disposal or sent to a commercial reclaim facility.

4) Do not use the triple evacuation method for purging a system of water and other contaminants. This method consists of alternately filling the system with refrigerant, venting the charge, and evacuating the system to a relatively low vacuum. Purge air and water from a system using a onetime deep evacuation of less than 1000 microns (1 millimeter Hg, absolute pressure) and use an electronic vacuum gage to make sure this vacuum is achieved. After a compressor burnout, use the filter-drier method of system cleanup explained in the Appendix 4.

5) Do not charge a system with refrigerant until initial leak testing has been done. Initial leak testing consists of pressurizing the system with an inert gas, such as nitrogen, and checking for leaks with a soap solution. Evacuate the system and make sure the system will hold the vacuum. Pressurize the system with refrigerant and perform final leak testing with a halide torch or electronic leak detector.

c. Refrigerant Conversion

Substitute refrigerants are available to replace the most commonly used CFC refrigerants. R-123 is used to replace R-11 and R-134a is used to replace R-12 and R-500. Because R-123 is an aggressive solvent, seals, gaskets, motor insulation and other materials designed to withstand this refrigerant must be used. R-134a does not mix well with conventional mineral based refrigeration oils, but ester based oils have been used with good success.

Thermodynamic properties of the replacement refrigerants often vary somewhat from their predecessors; so, some system components, such as gears, impellers and flow control devices may need to be changed to maximize system performance. It is always helpful to consult the original equipment manufacturer before performing any refrigerant conversion.

9. CFC Recovery/Recycling/Reclamation

Intentional release of CFCs to the atmosphere while maintaining, servicing or disposing air conditioning or refrigeration equipment is prohibited after July 1, 1992. For this reason, it is essential that recovery and recycling equipment /devices are purchased and used in our daily operation. Following instructions are provided to ensure full compliance with the law.

a. Recovery

It is essential that recovery equipment be used in every cooling/refrigeration service work to comply with the law; and recovery system manufacturers procedures be followed for preventing different refrigerants from mixing together during the recovery process. This practice typically involves draining the compressor oil and purging remaining refrigerant from the recovery equipment before using it to recover a different refrigerant. Hence, using separate recovery units to recover each commonly used refrigerant should be considered; eg., one unit for R-12 and another unit for R-22.

b. Recycling

Each cooling/refrigeration service technician should apply recycling equipment to reuse refrigerant that has been recovered. However, it is warned that the major compressor manufacturers have stated that the warranty is only valid on their equipment if it is charged with refrigerant which meets ARI 700-88 purity standards (the standard that must be met by new refrigerant). Thus, it is essential that the recycled refrigerant be cleaned on the job site or in the shop and tested in-house or by an outside laboratory to check if it meets ARI 700-88 standards. Because these procedures are expensive and impractical, it is recommended that refrigerants recovered from systems not containing burned out compressors be recycled with a commercially available recycling unit and returned to the same system after repairs are made. On systems with compressor burnouts, the severity of burnout should be evaluated to determine system cleanup procedures (whether or not a suction filter is needed) and to see if the refrigerant can be properly recycled and reused. Heavily contaminated refrigerant should not be reused.

c. Reclamation

The cooling/refrigeration service contractor may sell some or all of the recovered refrigerant to a reclamation center. However, it should be noted that the seller will be charged for the cost of incineration if the recovered refrigerant can not be reclaimed economically. The refrigerant which is grossly contaminated or refrigerants that are mixed together are not suitable for reclamation and must be destroyed by incineration. Hence, it may be necessary, in some cases, to use a recycling unit on grossly contaminated refrigerant just to bring it to a condition that is suitable for reclamation. Efforts are also needed to avoid mixing refrigerants in the same storage container.

d. Recovery/Recycling/Reclamation Equipment and Service

There are certain basic features to look for in getting a recovery/recycling unit. The equipment should be Underwriter Laboratories (UL) listed and will handle the desired refrigerants. Recovery/recycling equipment is available in various size rangers, in terms of pounds per hour of refrigerant removal. Major characteristics of the recovery/recycle equipment can be found in Appendix 5 and Appendix 6. Companies providing reclamation services for recovered CFCs are given in Appendix 7.

10. Training and Certification

To comply with federal law, all maintenance personnel who service A/C and refrigeration systems must be properly trained and EPA certified by January 1, 1993. All cooling/refrigeration service activities should ensure that their service workers are so trained and certified. The EPA has endorsed the use of Refrigeration Service Engineers Society (RSES) as an excellent source for such training. The RSES point of contact for our region is Mr. Dan T. Benson and he can be contacted at (205) 887-6562.

11. CFC Disposal

Because of the prohibition on new purchases of CFCs after January 1, 1993, efforts should be emphasized to retain recovered and recycled refrigerants for maintenance purposes. If disposal is deemed necessary, the CFCs should be sent to the reclamation centers. These centers may be interested in purchasing or trading for our recovered CFCs. However, if our CFCs are contaminated or mixed together, we will likely have to pay a fee to get rid of them.

12. Elimination of Halon Applications

Halons fall under a separate category of ozone depleting substances and the rules are slightly different. The clean Air Act of 1990 does not prohibit the release of halons from fire extinguishing equipment at the federal level. However, it is Army policy to eliminate unnecessary release of halon to the atmosphere. Hence, it is recommended that no halon be purposely released, other than for actual fire suppression. Based on this position, following actions should be considered regarding phase-out of halon systems on Fort McClellan:

a. Fixed Halon Fire Extinguishing systems in Facilities.

1) Place, stand-alone systems not required by DOD MIL-HDBK 1008A out of service.

2) Where risks are dual protected, e.g., halon and sprinkler, place the halon system out of service.

3) Where a facility requires pre-action sprinkler protection for a risk, and the protection actually provided is a halon system, immediately program the pre-action sprinkler to replace the halon. Budget this action on a priority basis.

b. Fixed Halon Systems on Crash, Fire and Rescue (CFR) Vehicles.

1) Retain in service until further instruction is available concerning substitute or replacement agents.

c. Halon Extinguishing Systems or Fire Extinguishers in Combat Vehicles.

1) Retain in service until further instruction is available concerning substitute or replacement agents.

d. Halon Fire Extinguishers Installed in Facilities and Non-Combat Vehicles.

1) Replace these extinguishers with acceptable substitutes (IAW NFPA std #10 ASAP).

All excess or replaced halon fire extinguishing agents must be retained until recapture and disposition instructions are provided. It is Army policy that systems installed in tactical combat vehicles are the only ones deemed "mission essential or critical". Halons recaptured from non-mission-essential uses will be stockpiled for future support of mission critical requirements.

Halon 1211 recharge/recovery units can be available through the Naval Air Warfare Center (NAWC) in Lakehurst, NJ. Mr. Don Waling at the TRADOC Fire Protection Office (DSN 680-2026) may be contacted for further information regarding the procurement of these units.

13. Mobile Applications

All activities servicing motor vehicle air conditioners on Fort McClellan are required to comply following rules and regulations.

a. Beginning January 1, 1992, all shops servicing motor vehicle air conditioners must recover and recycle CFC refrigerant using Unederwriter Laboratory (UL) approved recovery equipment.

b. Effective November 15, 1992, only certified technicians are allowed to purchase small containers (less than 20 pounds) of refrigerant.

c. Beginning January 1, 1993, all shop technicians working on air conditioners must be properly trained and EPA certified and individual certification should be kept on file for inspection. To conform this requirement, the EPA will accept training and certification programs offered by the following organizations:

1) National Institute of Automotive Service Excellence (ASE), phone (703) 742-3200.

2) Mobile Air Conditioning Society (MACS), phone (215) 541-4500.

3) International Mobile Air Conditioning Association (IMACA), phone (215) 988- 6081.

4) Refrigerant Service Engineering Society (RSES), phone (708) 297-6464.

14. Discussion

a. Nature of the Program

This is a long-range, multi-activities, environmental compliance program. Planning, coordination, unit cooperation, effort integration and funding support are essential and required to the implementation and successful completion of this program. This action plan was developed by the DEH Environmental Office and would represent the first effort of Fort McClellan to fully comply with the newly established CFC/Halon regulations.

Because technical information and inventory data are not completely available at this time, this plan should be considered as a dynamic document capable of being readily modified to account for new information and needed changes.

b. Program Implementation

The DEH Environmental Office will oversee and monitor the overall implementation of this program. To initiate this program and to complete necessary information/data, a contract service project (scope of work is given in the Appendix 8) will be requested to perform following tasks:

1) Inventory of Currently Existed Equipment/Systems.

2) Leak Risk Assessment.

3) Development of Execution Guidance/Procedures.

Based on the Execution Guidance/Procedures, each necessary action will be taken according to the planned schedule by the assigned unit. Unit-action assignments are summarized in Table 1.

c. Program Management

The DEH Environmental office will be responsible for the overall management of this program. However, the responsibility for executing some required actions/tasks will be placed on the individual unit. This program will be managed according to the following concept:

Management Component	Responsible Office/Unit
Project Planning/Development	DEH Environmental Office
Budget/Resources Allocation	DEH Environmental Office

Execution of Required Actions/ Tasks (Complying of regulatory requirements)	Individual Unit
Elimination of Halon Application	DEH Fire Station
Coordination/Element Integration	DEH Environmental Office
Inspection/Monitoring	DEH Environmental Office
Data Keeping/Reporting	DEH Environmental Office

d. Program Costs

The costs to implement this program during the first three years (FY-93, FY-94, FY-95) are shown as follow:

	COST		
Proj/Action/Task	FY-93	FY-94	FY-95
Contract Service Project -1 (Inventory/Leak Risk Assessment/ Execution Guidance Develop)	10,000	0	0
Purchase Recovery/Recycling Equipment	15,000	0	0
Contract Service Project-2 (System Conversion/Replacement	0	300,000	350,000
CFC Disposal	5,000	4,000	4,000
Training/certification	5,000	3,000	3,000
Elimination of Halon	0	5,000	4,000

The major conversion/replacement projects and their costs are summarized in Table 2.

e. Program Schedule

	Year							
Proj/Action/Task	93	94	95	96	97	98	99	2000
Project-1 (Inventory/ Assessment)	------							
Purchase Equipment	------							
Complying of Reg Requirements	----------							
Project-2 (conversion/ Replacement)		----------						

Proj./Action/Task	93	94	95	96	97	98	99	2000
Ref. Stockpiles Management	----------							
CFC Disposal	----------							
Training/Certification	----------							
Elimination of Halon		----------						
Inspection/Monitoring	----------							
Data Keeping/Reporting	----------							

f. Expected Significance

Successful completion of this program will bring following results:

1) Achieving the goal of TRADOC CFC Reduction Plan.

2) Demonstrating Army's Environmental stewardship.

3) Complete phase-out of CFC by the end of 2000 to help overcome a major global environmental concern.

15. Point of contact for this action is Dr. Shih-chi Wang or Mr. Waymon L. Pence at (205) 848-3539 or DSN 865-3539.

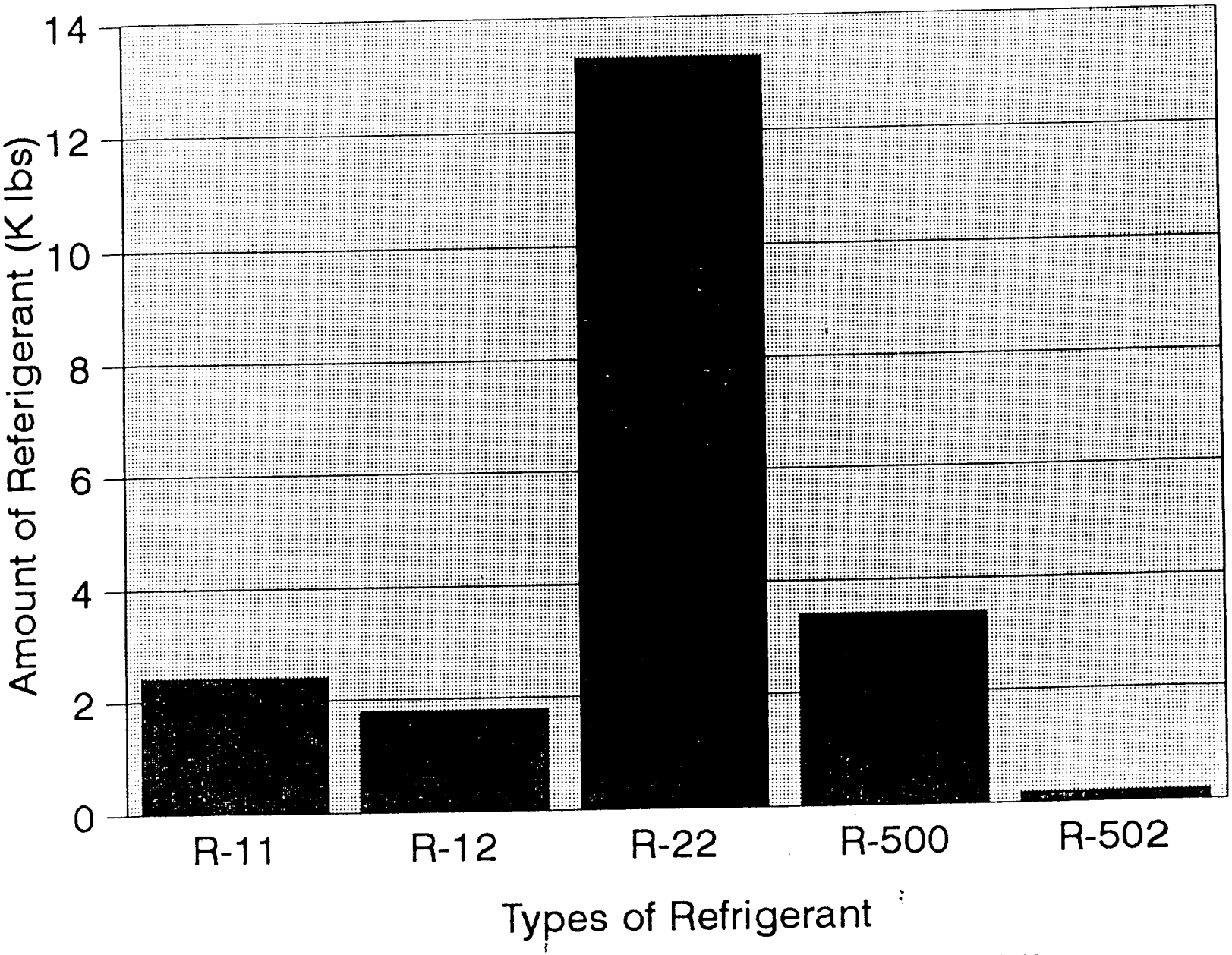


Figure 1. The type amd quantity of air conditioning refrigerants used on Fort McClellan.

Table 1 The Implementation Plan for CFC/Halon Reduction Program

Action/Task	Office/Unit: DEH Commer. Act.	DEH A C Maint	DEH Auto Shop	DS/GS Auto Shop	GSA Auto Shop	AAFES Auto Shop	Auto Craft Shop	AL Nat'l Guard	AAFES Serv. Act.	DEH Fire Sta.	DEH Envir. Off.
Purchase Recovery/ Recycling Equipment											X
AC Equipment/Systems Conversion or Replacement	X										X
Comply Recovery/ Recycling Requirement		X	X	X	X	X	X	X	X		
Comply Operation/ Maintenance Requirements		X	X	X	X	X	X	X	X		
Comply CFC Disposal Requirements		X	X	X	X	X	X	X	X		
Comply Training/ Certification Requirements		X	X	X	X	X	X	X	X		
Comply Halon Elimination Requirements										X	
Funding/Coordination											X

Table 2 The major conversion/replacement projects for the air conditioning systems on Fort McClellan and their costs.

Building Number (Listed by Priority)	Cost for Conversion/Replacement (Dollars) R11--- R123 R134A R500--- R134A
1. Conversion	
1876 (2 units)	85,000
1965 (1 unit)	85,000
2281 (1 unit)	85,000
503 (1 unit)	85,000
1081 (1 unit)	70,000
1081 (1 unit)	70,000
3176 (1 unit)	70,000
3176 (2 units)	70,000
1876 (1 unit)	105,000
2. Replacement	
2278 (1 unit)	100,000
294 (1 unit)	100,000
294 (2 units)	100,000

1. Total cost for the major conversion projects is $725,000.
2. Total cost for the major replacement project is $300,000.
3. Small systems and window type units are not included.
4. The implementation schedule is planned as follows:

   - FY-94 - convert buildings 1876/1965; replace building 2278.
   - FY-95 - convert buildings 2281/503/1081.
   - FY-96 - convert buildings 3176/1876.
   - FY-97 - replace building 294.

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Pat Shaw	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	CDTF
No. Units:	1
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	Lithium Bromide	
Capacity (tons)	NA	
Manufacturer	York	
Date of Manufacture	1985	
Model No.	ESC 3B2A	
Serial No.	PM20459	
Piping level	(low) medium high	low medium high
Configuration:	Roof (Forced) Other	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	51
No. Units:	1
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	York	
Date of Manufacture	NA	
Model No.	VWBC-7.5UL	
Serial No.	82251	
Piping level	(low) medium high	low medium high
Configuration:	Roof (Forced) Other	Roof Forced Other:

Comments: see comments #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	J. Wimbish	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	57
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	CGADC25GABA0GTWHR	
Serial No.	J89E80954	
Piping level	(low) medium high	low medium high
Configurati	Roof (Forced) Other	Roof Forced Other:

Comments: see comment #2

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	J. Wimbish	CU
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	63 (need 2 more units)
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Fedders	
Date of Manufactu	NA	
Model No.	CTC180F8B	
Serial No.	MH188048	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: ~~Bldg~~ see comment #3

#1 Other items in blg. 51:

1 refrig.
1 H_2O cooler
1 window AC

#2 blg. 57

1 ice machine
10 refrig.

#3 blg. 63

1 window AC
3 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	65
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Dunham Bush
Date of Manufacture	NA	NA
Model No.	RAUCC25GPA00DF	ARPC-015-T
Serial No.	J89A82732	74110382G
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: see comment #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	66
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA / 9lbs.	
Manufacturer	York	
Date of Manufacture	NA	
Model No.	NA	
Serial No.	NA	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	J. Wimbish	
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	128
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 48 lbs.	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Central Aire
Date of Manufactu	NA	NA
Model No.	CGABC506AF01FK	LQ613
Serial No.	J896G0414	8695H02
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other:)

Comments: see comment #2

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	J. Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	141
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	York	Trane
Date of Manufactu	NA	NA
Model No.	YCRX00-46	CGAA-G006-MA-LA
Serial No.	YCM143254	L36G78710
Piping level	(low) medium high	low (medium) high
Configurati	Roof Forced (Other)	Roof Forced (Other:)

Comments: none

#1 bldg. 65

2 H_2O coolers
2 refrigerators

#2 bldg. 128

1 window AC
1 ice chest / machine
1 2-door refrig.
(R-12, 100 oz.)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	143
No. Units:	2
Location:	(Rooftop) (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	McQuay	Carrier
Date of Manufacture	1977	NA
Model No.	6REI-3000TSK	38THO4852ODL
Serial No.	16696	4091E10219
Piping level	low (medium) high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: see comment #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	143 (cont'd.)
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Carrier	
Date of Manufacture	NA	
Model No.	50DD012400FA	
Serial No.	L694681	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	144
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufactu	NA	NA
Model No.	38AEO12500	306A025420
Serial No.	K990150	P096435
Piping level	low (medium) high	low (medium) high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	144 (cont'd.)
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Carrier	
Date of Manufactu	NA	
Model No.	28CW1828FB1089	
Serial No.	8006	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: ~~none~~ see #2

#1 bldg. 143

1 walk-in ref.
1 refrig.
2 H_2O coolers

#2 bldg. 144

1 refrig.
1 window AC

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	cw
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	161
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22 / 9 lbs.
Capacity (tons)	35	NA
Manufacturer	TSI	Air Temp
Date of Manufacture	NA	NA
Model No.	CA2C535	129400R111
Serial No.	5071-3	LM638113
Piping level	low (medium) high	low medium (high)
Configuration:	Roof Forced (Other)	Roof Forced (Other:)

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	162
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	TSI	
Date of Manufacture	NA	
Model No.	5071-1	
Serial No.	CA2CD61	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: see #2

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	cw
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	163
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Bohn	
Date of Manufactu	NA	
Model No.	RDDO2 235B	
Serial No.	BDH8048	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	200
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 14 lbs.	
Capacity (tons)	NA	
Manufacturer	~~AEA~~ York	
Date of Manufactu	NA	
Model No.	NA	
Serial No.	NH5H270270	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: model # unavailable

#1 blg. 161

1 window AC

piping in 2 units
rusted and fairly aged

#2 blg. 162

3 refrig.
3 H_2O coolers

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	Wimbish		cw
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	215
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22 /146 lbs.	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufacture	NA	NA
Model No.	CGAA-3006-MA	AS751B
Serial No.	LYL705089	00-43252
Piping level	(low) medium high	low (medium) high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments:	See #1

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	Wimbish		
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	215
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Heil
Date of Manufacture	NA	NA
Model No.	Type L-6	NRCR90HL01A
Serial No.	KSA282074	B4055BTRAC60690
Piping level	(low) medium high	(low) medium high
Configuration:	(Roof) Forced Other	(Roof) Forced Other:

Comments:	none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	Wimbish		
Source Type:	CH SP CU PU RE FR WU		

Spatial Data	
Building:	241
No. Units:	see comments
Location:	Rooftop Ground Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	100	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	RAUA-D126AC012	
Serial No.	NA	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments:	see #2

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	Al Reisz		
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	267
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	carrier	Chrysler
Date of Manufactu	NA	1976
Model No.	50QH008530	HAW 75-1
Serial No.	3185G51952	GJ120571
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments:	

#1 - Bldg. 215

6 window AC
5 H_2O coolers
7 refrig.
1 ice machine (R-12, 2 lbs.)

#2 Bldg. 241

5 refrig.
3 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Al Reisz	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	267
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 3 lbs.	
Capacity (tons)	NA	
Manufacturer	Heil	
Date of Manufacture	1985	
Model No.	NCABA24VB02	
Serial No.	H507539 22	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: See #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	ca
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	274
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	RAUC - C106 - B	
Serial No.	C84A - 01188	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: blg. looks vacant + decrepit

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	276
No. Units:	NA
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type		
Capacity (tons)	NA	
Manufacturer		
Date of Manufactu		
Model No.		
Serial No.		
Piping level	low medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments: this blg. is being torn down

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	294
No. Units:	2
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-12 / 720 lbs.	R-12 / 720 lbs.
Capacity (tons)	200	200
Manufacturer	Wstng. hse.	Wstnghse.
Date of Manufactu	1976	1976
Model No.	TC191A	TC191A
Serial No.	JU47	JU25
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: Units should be high-risk

#1 – Bldg. 267

4 refrig.
1 Window AC
2 H_2O coolers

large refrig. = R-12 (2lbs.)
small refrig. = R-12 (6 oz.)

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	Wimbish		
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	295
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	RAUBC306BEOIB	
Serial No.	J87E60591	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	Al Reisz		Cu
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	328
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Bohn	
Date of Manufactu	NA	
Model No.	RVB0655B	
Serial No.	BHF 8118	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: see #2

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	C. Horan		
Source Type:	CH SP CU PU RE FR WU		

Spatial Data	
Building:	303-A
No. Units:	no AC units - see back
Location:	Rooftop Ground Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type		
Capacity (tons)	NA	
Manufacturer		
Date of Manufacture		
Model No.		
Serial No.		
Piping level	low medium high	low medium high
Configuration:	Roof Forced Other	Roof Forced Other:

Comments: see #1

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	R. Shaw		
Source Type:	(CH) SP CU PU RE FR WU		

Spatial Data	
Building:	503
No. Units:	2
Location:	Rooftop Ground (Inside Building)

Unit Data	Unit #1	Unit #2
Refrigerant type	R-11	R-11
Capacity (tons)	200	>100
Manufacturer	Carrier	Trane
Date of Manufactu	1966	NA
Model No.	19DG6153CM	CVHE-014F-AC...
Serial No.	7618 24800	L83B10041
Piping level	low (medium) high	low (medium) high
Configurati	Roof (Forced) Other	Roof (Forced) Other:

Comments: these are true low-pressure chillers

#1 - bldg. 303-A

1 window AC
1 H_2O cooler
1 refrig.

#2 - bldg. 328

1 Halon portable
1 H_2O cooler
1 refrig.

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	P. Shaw		
Source Type:	CH (SP) CU PU RE FR WU		CU

Spatial Data	
Building:	614 (DOE)
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	GE	
Date of Manufacture	NA	
Model No.	BGTA120C3C	
Serial No.	218180328	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments:	See #1

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	P. Shaw		CU
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	793
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Carrier	
Date of Manufacture	NA	
Model No.	38AE012300	
Serial No.	N394993	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments:	none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	J. Wimbish		CU
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	801
No. Units:	1
Location:	Rooftop Ground Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	6	
Manufacturer	Carrier	
Date of Manufactu	NA	
Model No.	386060B1D	
Serial No.	N312790	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments:	none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	10-21-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	J. Wimbish		CU (all)
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	802 - 806
No. Units:	5
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Mueller Climatrol	
Date of Manufactu	NA	
Model No.	UDH140000 70-BH	
Serial No.	248825	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments:	total of 5 units (all Mueller)

#1 - bldg. 614

1 H_2O cooler

2 refrig.

1 Halon portable

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	809
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Lennox	
Date of Manufacture	1985	
Model No.	AS171353-LY	
Serial No.	5185E17108	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	J. Wimbish	CU (all)
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	810 - 812
No. Units:	3
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 /10lbs.	
Capacity (tons)	NA	
Manufacturer	Lennox	
Date of Manufacture	NA	
Model No.	14518-653-44	
Serial No.	5185F12848	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: 3 total units (all R-22)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	893
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Climatrol	
Date of Manufactu	NA	
Model No.	UDH-15000-2U	
Serial No.	8B69H-1903	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-21-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

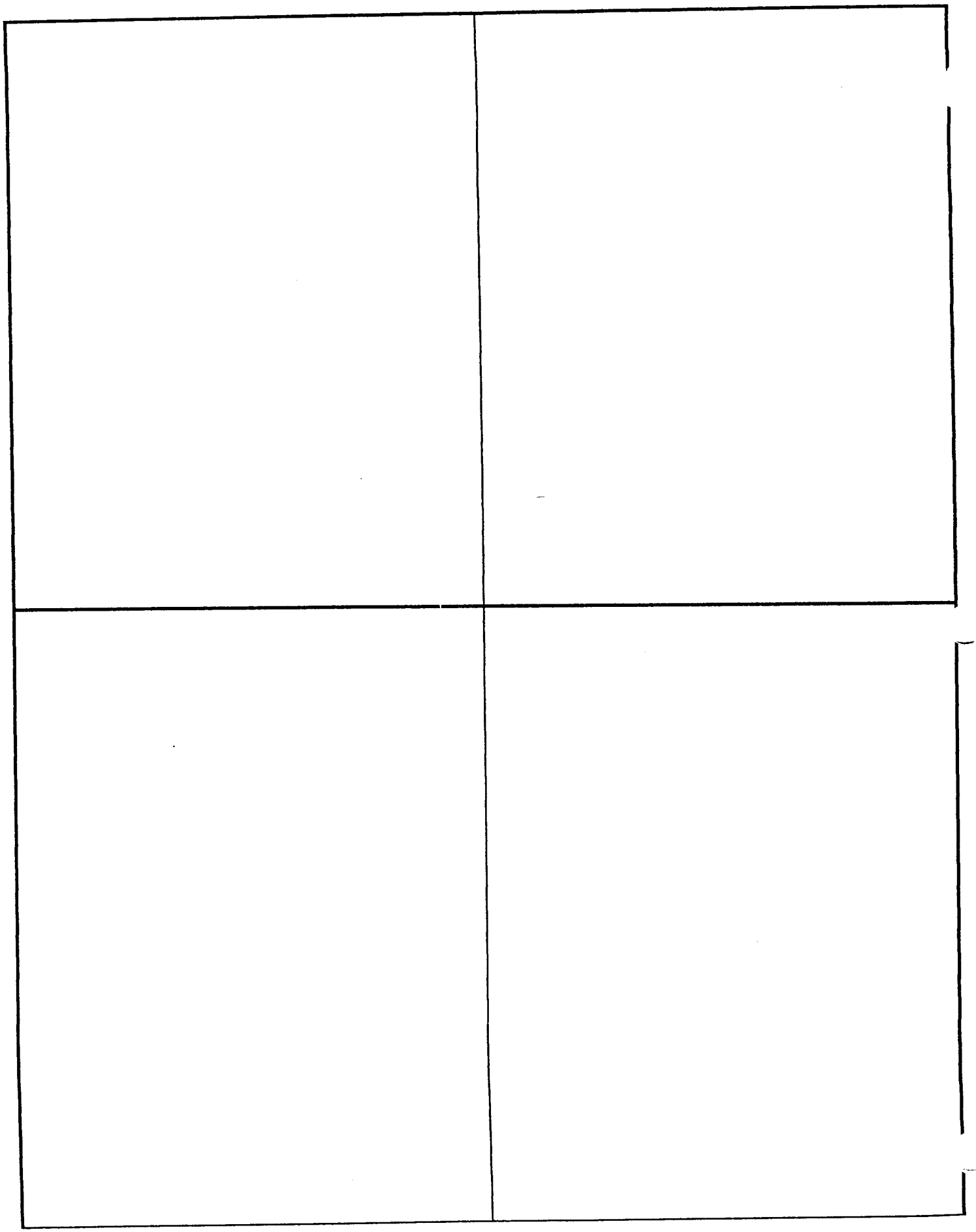
Spatial Data

Building:	900
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	
Capacity (tons)	3	
Manufacturer	Carrier	
Date of Manufactu	NA	
Model No.	38EH036330DL	
Serial No.	0606271	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: piping brand new



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	930
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-12	
Capacity (tons)	NA	
Manufacturer	Day + Night	
Date of Manufacture	NA	
Model No.	NA	
Serial No.	NA	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: very little info is discernible

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	C. Horan	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	934
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	McQuay	
Date of Manufacture	NA	
Model No.	4110-00-879	
Serial No.	AV547293	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	C. Horan	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	936
No. Units:	2
Location:	Rooftop (Ground) (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	McQuay	McQuay
Date of Manufactu	NA	NA
Model No.	~~NA~~ ALR075C	LSL103CV
Serial No.	NA	35F00007-06
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other:)

Comments: See # 2

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	C. Horan	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	939
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	McQuay	
Date of Manufactu	NA	
Model No.	NA	
Serial No.	NA	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: See # 3

#1 - bldg. 934

1 H_2O cooler

many refrig.

#2 bldg. 936

1 H_2O cooler

#3 - bldg. 937

6 H_2O coolers

1 ice machine

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	C. Horan	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	942
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	McQuay	
Date of Manufacture	1988	
Model No.	ALR07C	
Serial No.	5TB085300	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: See #1

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	C. Horan	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	947
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	McQuay	McQuay
Date of Manufacture	~~NA~~ 1988	NA
Model No.	ALR075C	LSL103CU
Serial No.	5TB018 5600	35F00008-06
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: 1 H_2O-cooler

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Al Reisz	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	952
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Carrier	
Date of Manufactu	NA	
Model No.	E593555	
Serial No.	3§AC016430	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: Asbestos hazard

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	954
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufactu	NA	NA
Model No.	OAUA-402-D	OAUA-402-D
Serial No.	C82E-08740	C82E-08739
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: pipes in good condition

#1 - bldg. 942

1 refrig.

1 water cooler

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish	cu
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	959
No. Units:	2
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 13 lbs.	R-22 / 13 lbs.
Capacity (tons)	NA	NA
Manufacturer	RUUD	RUUD
Date of Manufacture	NA	NA
Model No.	NA	NA
Serial No.	NA	NA
Piping level	low (medium) high	low (medium) high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Horan	cu
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1001
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 50 lbs.	
Capacity (tons)	NA	
Manufacturer	~~ESA~~ TSI	
Date of Manufacture	NA	
Model No.	5021525	
Serial No.	10999	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1020
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 130 lbs.	R-22 / 130 lbs.
Capacity (tons)	NA	NA
Manufacturer	Dunham Bush	Dunham Bush
Date of Manufactu	NA	NA
Model No.	ARPC-042-SQ	ARPC-042-SQ
Serial No.	731009351	731009353
Piping level	low (medium) high	low (medium) high
Configurati	Roof Forced (Other)	Roof Forced (Other)

see #1

Comments: of all R-22 units, these are largest and worst risk of leakage CFC

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1021
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 130 lbs.	R-22 / 130 lbs.
Capacity (tons)	NA	NA
Manufacturer	Dunham Bush	Dunham Bush
Date of Manufactu	NA	NA
Model No.	ARPC-040-SHQ	ARPC-040-SHQ
Serial No.	7309940 6	7308183 2
Piping level	low (medium) high	low (medium) high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: see #2

#1 – bldg. 1020

1 window AC

8 refrig.

5 H_2O coolers

#2 – bldg. 1021

0 window AC

9 refrig.

5 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1022
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 130 lb.	R-22 / 130 lbs.
Capacity (tons)	NA	NA
Manufacturer	Dunham Bush	Dunham Bush
Date of Manufacture	NA	NA
Model No.	ARPC-040-SHQ	ARPC-040-SHQ
Serial No.	73099408	73099407
Piping level	low (medium) high	low (medium) high
Configuration:	(Roof) Forced Other	(Roof) Forced Other:

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1022
No. Units:	1
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 6 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	SFHO-B506-HA	
Serial No.	C82A-13159	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: 1 of 3 total units @ 1022

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1023
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 130 lbs	R-22 / 130 lbs.
Capacity (tons)	NA	NA
Manufacturer	Dunham Bush	Dunham Bush
Date of Manufactu	NA	NA
Model No.	ARPC-040-SQ	ARPC-040-SQ
Serial No.	731009352	731009350
Piping level	low (medium) high	low (medium) high
Configurati	(Roof) Forced Other	(Roof) Forced Other:

Comments: see #2

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1060
No. Units:	2
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	40	40
Manufacturer	Trane	Trane
Date of Manufactu	1967	1983
Model No.	NA	RAUBC 406 BB01B
Serial No.	VES83062	J83D60121
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: Fairly old unit; see #3

#1 – Bldg. 1022

8 refrig.

6 H_2O coolers

#2 – Bldg. 1023

49 refrig. (small)

6 H_2O coolers

#3 – Bldg. 1060

2 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1077
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	(2 more small
Capacity (tons)	NA	units out back)
Manufacturer	Carrier	
Date of Manufacture	NA	
Model No.	30HJ025400	
Serial No.	BG41 531	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: WAC museum

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	1081
No. Units:	2
Location:	Rooftop Ground (Inside Building) #1031

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-11	R-11
Capacity (tons)	200	200
Manufacturer	York	York
Date of Manufacture	1988	1988
Model No.	YT-A2-B2-B1-CHD	YT-A2-B2-B1-CHD
Serial No.	YHTM-240895	YHTM-240896
Piping level	low medium (high)	low medium (high)
Configuration:	Roof Forced (Other)	Roof Forced (Other:

Comments: Should be high risk units

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	10-28-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	heat p.
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	1120
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-12 / 70 lbs.	R-502 / 65 lbs.
Capacity (tons)	NA	NA
Manufacturer	Hussmann	Hussmann
Date of Manufactu	NA	NA
Model No.	4550FSKU / 21106	H600RLKU / 2110992
Serial No.	8217-0066	8218-0040
Piping level	(low) medium high	(low) medium high
Configurati	Roof (Forced) Other	Roof (Forced) Other:

Comments: See AAFES list for small equip.

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP (CU) PU RE FR WU	

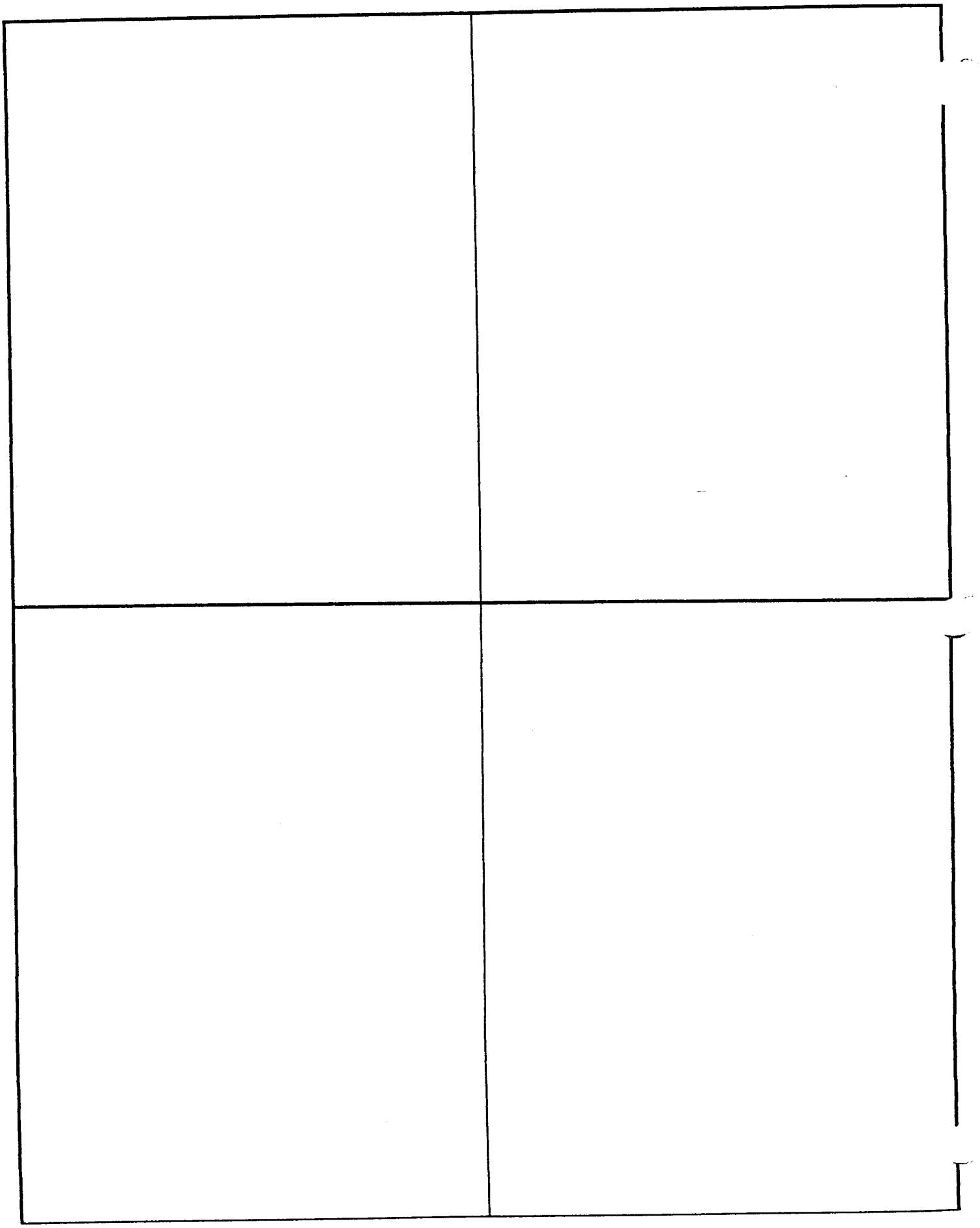
Spatial Data

Building:	1120
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	RAUA-2003-B	
Serial No.	621-0172-2A	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: See AAFES list for small equip.



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	1122
No. Units:	2
Location:	Rooftop (Ground) (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 18lbs.	R-22
Capacity (tons)	NA	NA
Manufacturer	Heil	Heil
Date of Manufacture	1993	1993
Model No.	PGAA606IK1	NP6AA606IK1
Serial No.	1932310233	PGAA606IK
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other:

Comments: new units

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1122
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 9lbs.	
Capacity (tons)	NA	
Manufacturer	GE	
Date of Manufacture	NA	
Model No.	BGTA860R1A	
Serial No.	219495202	
Piping level	(low) medium high	low medium high
Configuration:	Roof (Forced) Other	Roof Forced Other:

Comments: good condition

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1220
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	Lux Aire	Singer
Date of Manufactu	NA	1983
Model No.	HGES-T0908B	NA
Serial No.	RRTN452126	NA
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other	Roof Forced (Other:

Comments: new units

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

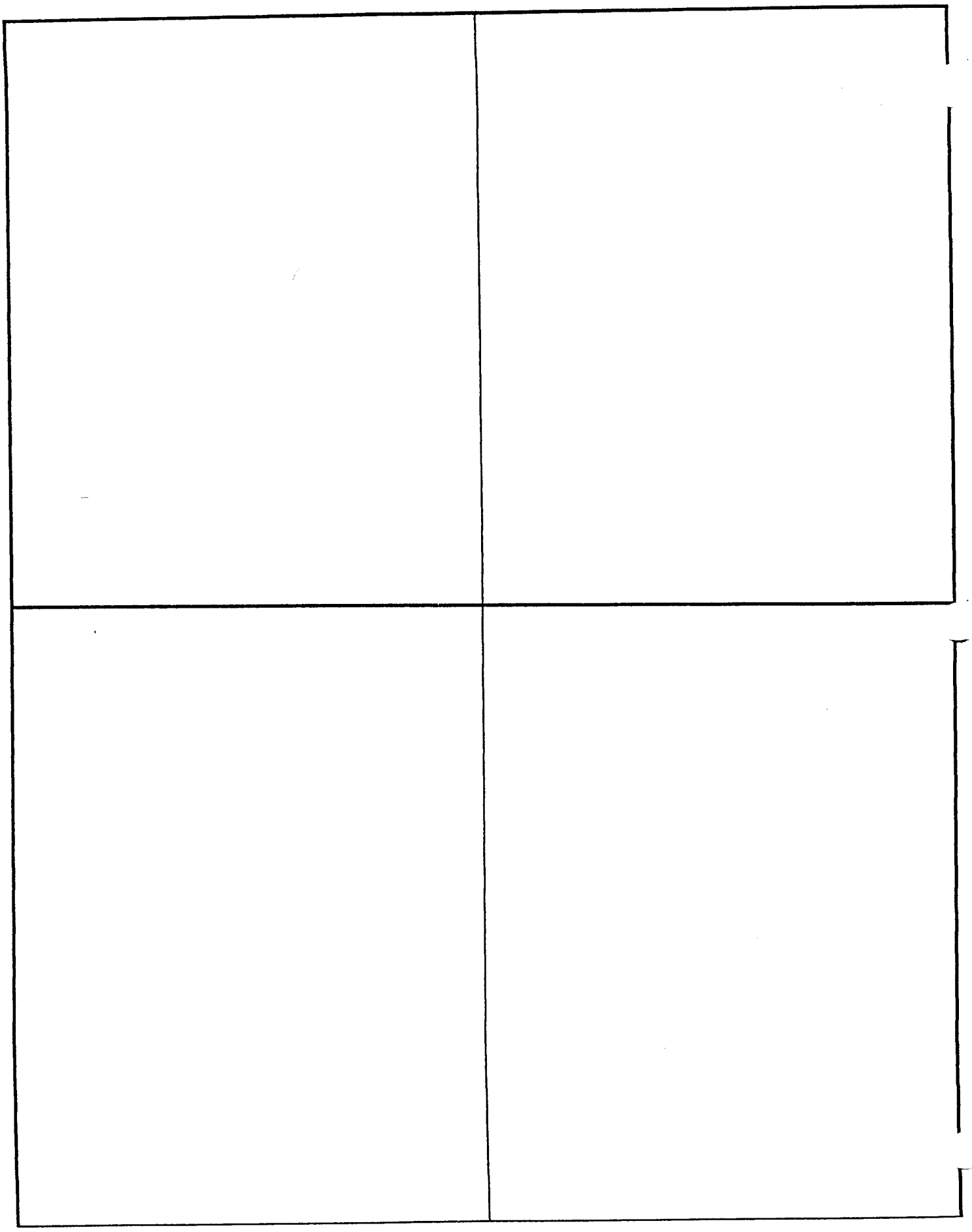
Spatial Data

Building:	1333
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 25lbs	R-22.
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufactu	1987	1994
Model No.	TA180D300AB	TTA180C300CA
Serial No.	5143744D	J411985 60
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other	Roof Forced (Other)

Comments: new-looking



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1392
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 125 oz.	R-22 / 125 oz.
Capacity (tons)	NA	NA
Manufacturer	Heil	Heil
Date of Manufacture	1989	1989
Model No.	CA1060VKA2/667	→ same
Serial No.	L893962167	L893962119
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments:

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	1510.01
No. Units:	2
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22 / 48 lbs.
Capacity (tons)	45	NA
Manufacturer	Trane	Trane
Date of Manufacture	~~NA~~ 1985	CGABC506AF01
Model No.	NA	U86GB1865
Serial No.	NA	
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1740
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	30	
Manufacturer	Trane	
Date of Manufactu	1987	
Model No.	CGACC306KAN0D30	
Serial No.	J87N83345	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: pipes good condition

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	1789
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 62 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	~~NA~~ 1986	
Model No.	CGABC306AE0OF2	
Serial No.	J86A80264	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments:

#1 - bldg. 1510.01

4 H_2O coolers
1 refrig.
1 ice machine

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Al Reisz	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	1876
No. Units:	2
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-500	R-500
Capacity (tons)	750	900
Manufacturer	York	York
Date of Manufacture	1976	1977
Model No.	HTN261-GAA	OTR361-ZAB
Serial No.	51406	52618
Piping level	low (medium) high	low (medium) high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: should be high-risk; 1 H_2O cooler

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1928
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	McQuay	
Date of Manufacture	NA	
Model No.	NA	
Serial No.	NA	
Piping level	low (medium) high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	C. Heran	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1929
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	2ES ES8N	
Serial No.	18435	
Piping level	low medium (high)	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	1966
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 42 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	~~NA~~ 1990	
Model No.	C6ADC25ACA19	
Serial No.	J90F63148	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

#1 — bldg. 1928

2 H_2O coolers
5 refrig.
1 walk-in
1 ice mach.

} R-12
5-12oz.

#2 — bldg. 1929

4 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	1967
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 7 lbs.	R-22 / 10 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufacture	1985	1985
Model No.	NA	48LD008500
Serial No.	3585G59781	3485G58986
Piping level	low (medium) high	low (medium) high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: Burger King

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	1967
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 10 lbs.	R-22 / 7 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufacture	1985	1985
Model No.	48LD008500	NA
Serial No.	2985648736	3585G59779
Piping level	low (medium) high	low (medium) high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: All in good condition

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	2041
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	NA	
Capacity (tons)	NA	
Manufacturer	Baltimore Aircoil (cool tower)	
Date of Manufactu	NA	
Model No.	E1443-0	
Serial No.	916001 80-P	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: chiller could not be accessed

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

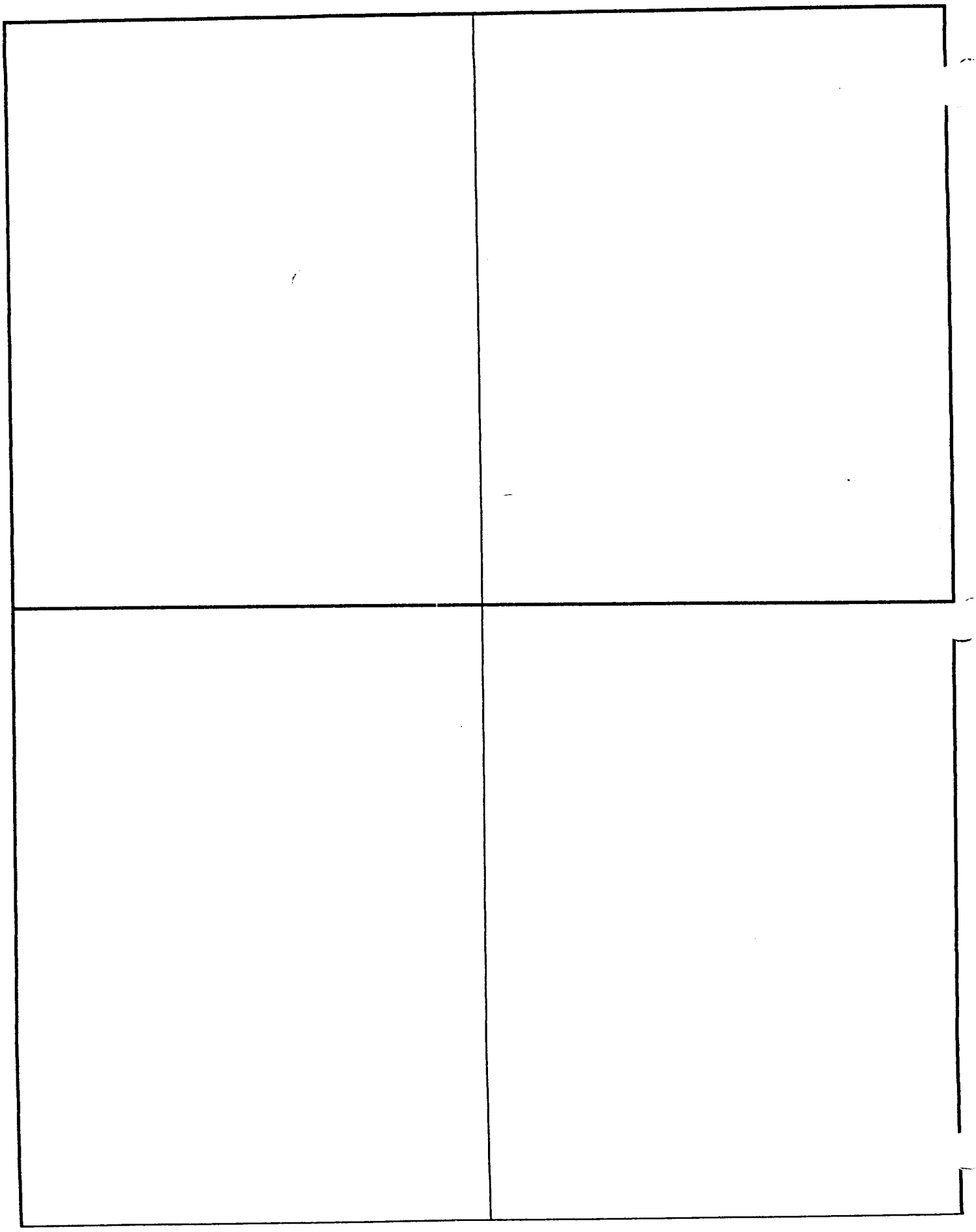
Spatial Data

Building:	2041
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-502	R-502
Capacity (tons)	NA	NA
Manufacturer	Bangor	Bangor
Date of Manufactu	NA	NA
Model No.	W5070L5	W508L5
Serial No.	2881	1428672E91
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments:



General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	2041
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22 / 10 lbs.	R-22 / 10 lbs.
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufacture	1987	1986
Model No.	BTA060D400AO	BTA048D400AO
Serial No.	B22287971	S40208228
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments:	none

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	2042
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	York	York
Date of Manufactu	NA	NA
Model No.	NA	H2CA090A46B
Serial No.	NA	NCTM077178
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments:	all class 6 units are in good shape; see AAFES list for small equip.

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data	
Building:	2041
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22 / 11 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	1986	
Model No.	BTA048D400AO	
Serial No.	S40208230	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments:	none

General		
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data	
Building:	2042
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	NA
Manufacturer	York	
Date of Manufactu	NA	
Model No.	H2CA120A46C	
Serial No.	NDTM120964	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments:	class 6 has 3 units that contain no nameplate info

see #1

#1 – b/g. 2042

3 walk-ins

2 refrig.

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-4-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	~~B~~ 2051
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Airtemp	
Date of Manufacture	NA	
Model No.	HAR67-1	
Serial No.	5611 5861	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	2101
No. Units:	1
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	~~NA~~ 50	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	RA-5003A	
Serial No.	C21-635C-30016	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: unit fairly old-looking

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	CU
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	2102
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	RA-2003A	
Serial No.	~~RA~~ 621-631C	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH SP CU PU RE FR WU	

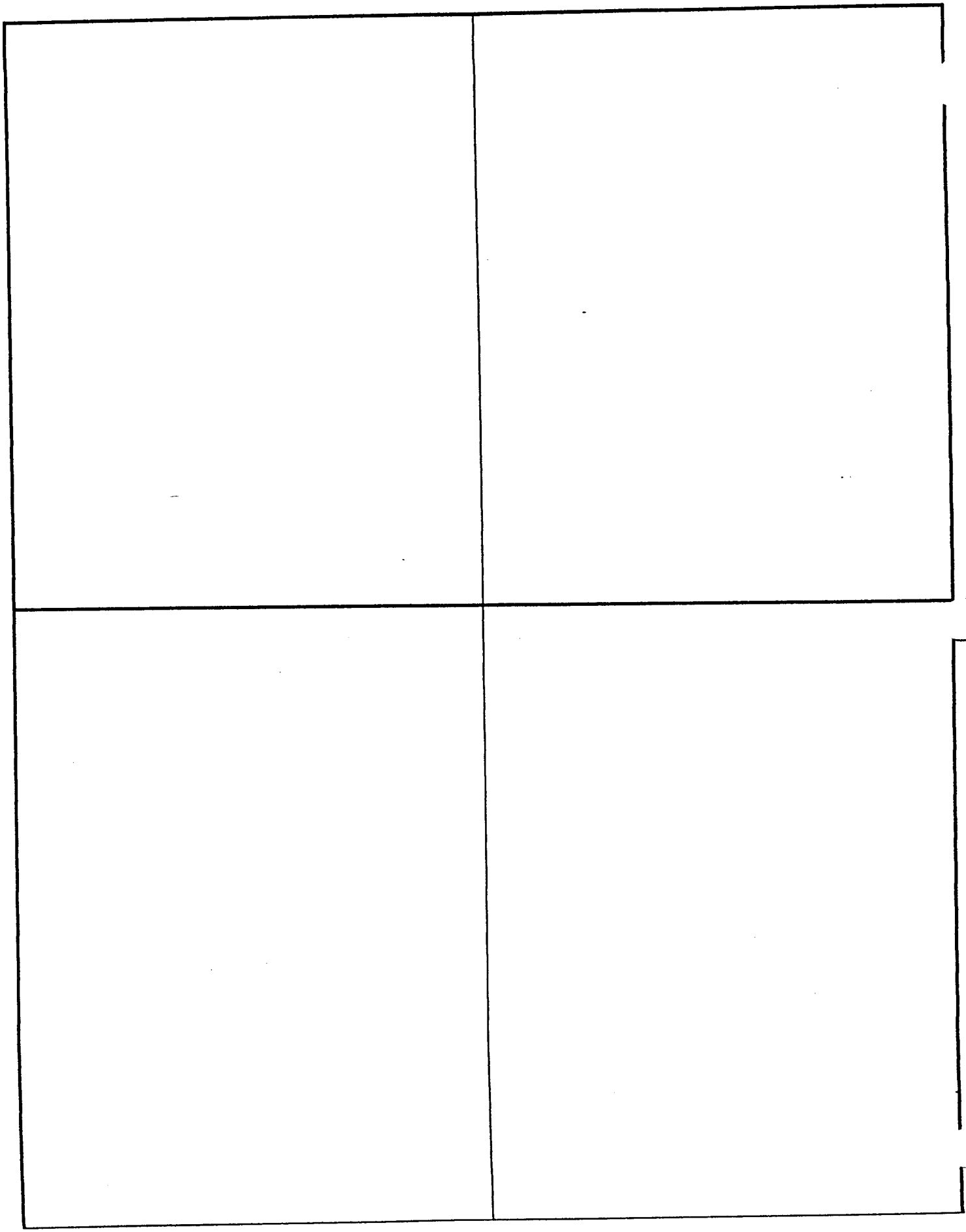
Spatial Data

Building:	2202
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	York	
Date of Manufactu	NA	
Model No.	CA603-26A	
Serial No.	YBKM047454	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: unit seems inactive



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) (CU) PU RE FR WU	

Spatial Data

Building:	2213
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	100	
Manufacturer	AirTemp	
Date of Manufacture	1976	
Model No.	HAW100	
Serial No.	6K120918	
Piping level	low (medium) high	low medium high
Configuration:	Roof (Forced) Other	Roof Forced Other:

Comments: See #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish #1	CU (#1)
Source Type:	CH (SP) CU (PU) RE FR WU	

Spatial Data

Building:	2262
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 5 lbs.	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Lennox
Date of Manufacture	NA	NA
Model No.	SFHC-B252-LB	168-464-1-A
Serial No.	C836-10595	GCS3-1353-350A
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	CU
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	2263
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 18 lbs	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	SFCA-1253-LA	
Serial No.	58-05374	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	2276
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 56 lbs.	
Capacity (tons)	NA	
Manufacturer	York	
Date of Manufactu	NA	
Model No.	YCAZ 77LE3/17	
Serial No.	YBBM-027142	
Piping level	low medium (high)	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: couldn't access basement

#1 – condensing unit
on top of blg. 2213
unaccessible

blg. 2213 other equip.:

11 refrig.
11 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	2277
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	~~NA~~ 50	
Manufacturer	Carrier	
Date of Manufacture	NA	
Model No.	38AE064510	
Serial No.	X197847	
Piping level	low medium (high)	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: could'nt access basement

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	2278
No. Units:	1
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-12	
Capacity (tons)	250	
Manufacturer	Wstnghse.	
Date of Manufacture	1975	
Model No.	TC330W2CEAC	
Serial No.	HT39	
Piping level	low medium (high)	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: should be high-risk system see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Al Reisz	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	2281
No. Units:	1
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-11	
Capacity (tons)	~~NA~~ 200	
Manufacturer	~~Wstng. hse.~~ →	Carrier
Date of Manufactu	1975 (?)	
Model No.	19DH574 3C8	
Serial No.	8147 32820	
Piping level	low medium (high)	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: Low pressure chiller; has old-style purge unit; high risk

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	2290
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 43 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	~~NA~~ 1987	
Model No.	CGABC406AF11FB	
Serial No.	J87B80591	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: possible condenser on roof

#1 2278 - B.P. #2

1 H_2O cooler

1 window AC

1 refrig.

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	2291
No. Units:	2
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 30 lbs.	R-22 / 21 lbs.
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufacture	1986	1986
Model No.	BYC 20063H0CA	YCD180A3L0AA
Serial No.	5471435520	E3214 22830
Piping level	(low) medium high	(low) medium high
Configuration:	Roof (Forced) Other	Roof Forced (Other:

Comments: one more unit on roof (can't read info)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	2293
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufacture	1977	1977
Model No.	RAUA-3006mc	RAUA-1003-B
Serial No.	77B-18403	77B-13936
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	3127
No. Units:	NA - see comment #1
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type		
Capacity (tons)		
Manufacturer	NA	
Date of Manufactu		
Model No.		
Serial No.		
Piping level	low medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3133
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 86 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	1988	
Model No.	CGACC406K BNEE	
Serial No.	J88H51851	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: new-looking unit

#1 3127 – small items

4 R-12 ice makers

1 H_2O cooler

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3134
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 60 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	1988	
Model No.	CGACC306KBN	
Serial No.	J88H81852	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: new-looking unit

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3135
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 70 lbs.	
Capacity (tons)	35	
Manufacturer	Dunham - Bush	
Date of Manufacture	NA	
Model No.	ACDR35A	
Serial No.	3116301A946	
Piping level	low (medium) high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: b/g. being totally renovated

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	3137
No. Units:	1
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 170 lbs	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	1987	
Model No.	CGAD101RANKKG	
Serial No.	J87C70819	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: 2nd unit couldn't be found (roof?)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

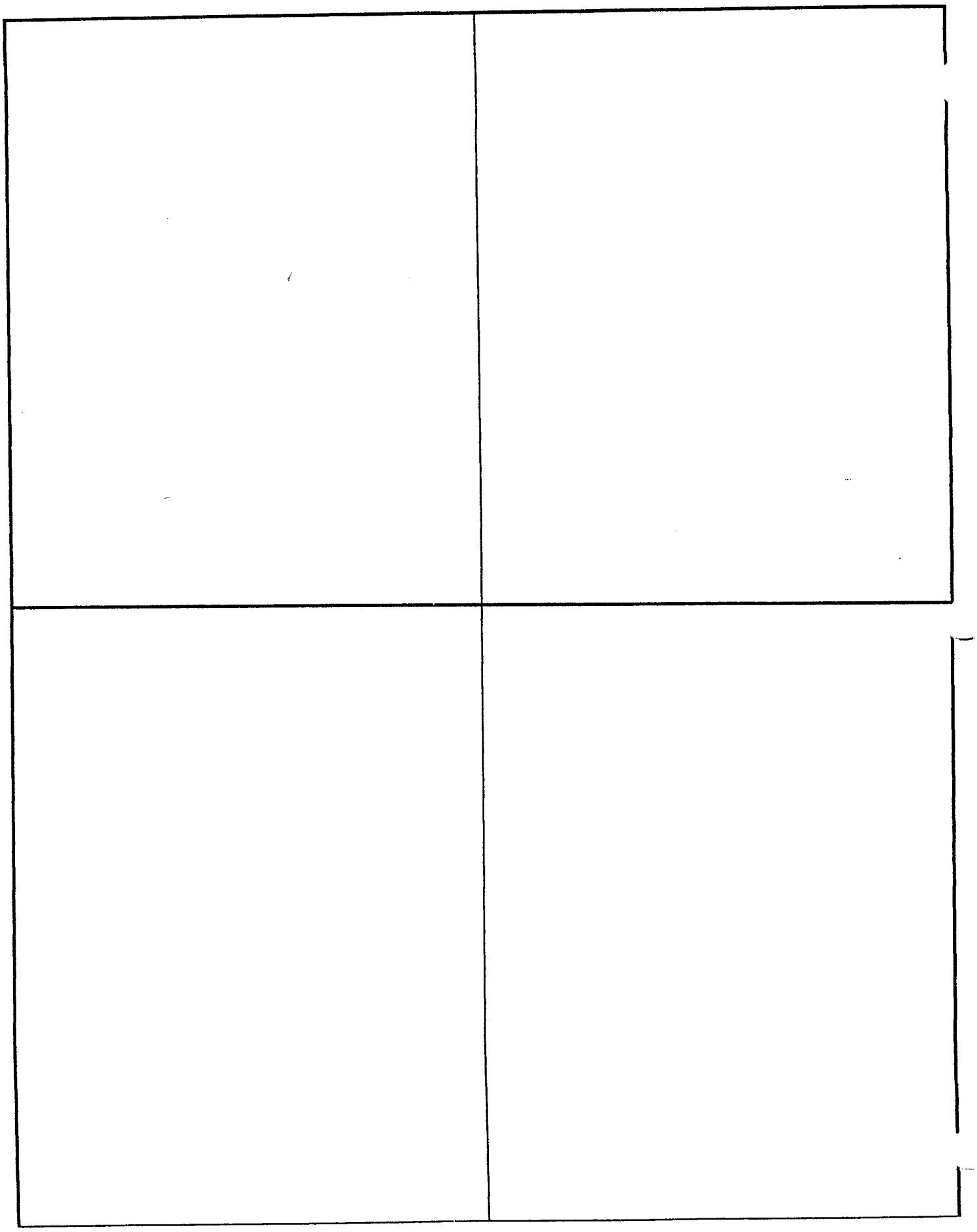
Spatial Data

Building:	3165
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 9 lbs.	R-22 / 9 lbs.
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufactu	1993	1993
Model No.	TTR06DC100A1	TTR06DC100A1
Serial No.	H21262059	H21262057
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other:)

Comments: brand new units (all 4)



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3165
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 9lbs.	R-22 / 7 lbs.
Capacity (tons)	NA	NA
Manufacturer	Trane	Trane
Date of Manufacture	1993	1993
Model No.	TTR060C100A1	TTR042C10UA1
Serial No.	H21262055	H22293615
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: brand new

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU (#1)
Source Type:	CH (SP) CU (PU) RE FR WU	

Spatial Data

Building:	3169
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 5 lbs.	R-22 / 2 lbs.
Capacity (tons)	NA	NA
Manufacturer	APCO	Rheem
Date of Manufacture	NA	NA
Model No.	3112-16-15K	RAND-200C1V
Serial No.	28107225963	162964080-0202
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: low risk units

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	3181
No. Units:	NA - MP Coffee shop items
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type		
Capacity (tons)		
Manufacturer	NA	
Date of Manufactu		
Model No.		
Serial No.		
Piping level	low medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Al Reisz	
Source Type:	(CH) SP CU PU RE FR WU	

Spatial Data

Building:	3176
No. Units:	2
Location:	Rooftop Ground (Inside Building)

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-11	R-11
Capacity (tons)	NA	NA
Manufacturer	York	York
Date of Manufactu	NA	NA
Model No.	OT-C3-C3B2-0J	OT-C3-C3B2 0J -
Serial No.	BTM	BTM
Piping level	low medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments: high risk R-11 units (purge) see #2

#1 bldg. 3181

5 refrig.
6 H_2O coolers
8 window AC
2 ice makers

#2 bldg. 3176

2 window AC
1 refrig.
1 H_2O cooler

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3182
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 80 lbs.	R-22 / 80 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufacture	1986	1986
Model No.	306B040	306B040-630
Serial No.	5692491	5692502
Piping level	low medium (high)	low medium (high)
Configuration:	Roof Forced (Other)	Roof Forced (Other:)

Comments: POC - Van Roberts (specialist)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3183
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 60 lbs.	R-22
Capacity (tons)	NA	NA
Manufacturer	Trane	Carrier
Date of Manufacture	~~NA~~ 1986	~~NA~~ 1987
Model No.	CGABC306AE01	38AE016500
Serial No.	J86H60471	T792581
Piping level	low (medium) high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other:)

Comments: pipes in good condition

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3185
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Carrier	
Date of Manufactu	1984	
Model No.	38ADO24520	
Serial No.	1497401	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	
Source Type:	CH SP CU PU RE FR WU	

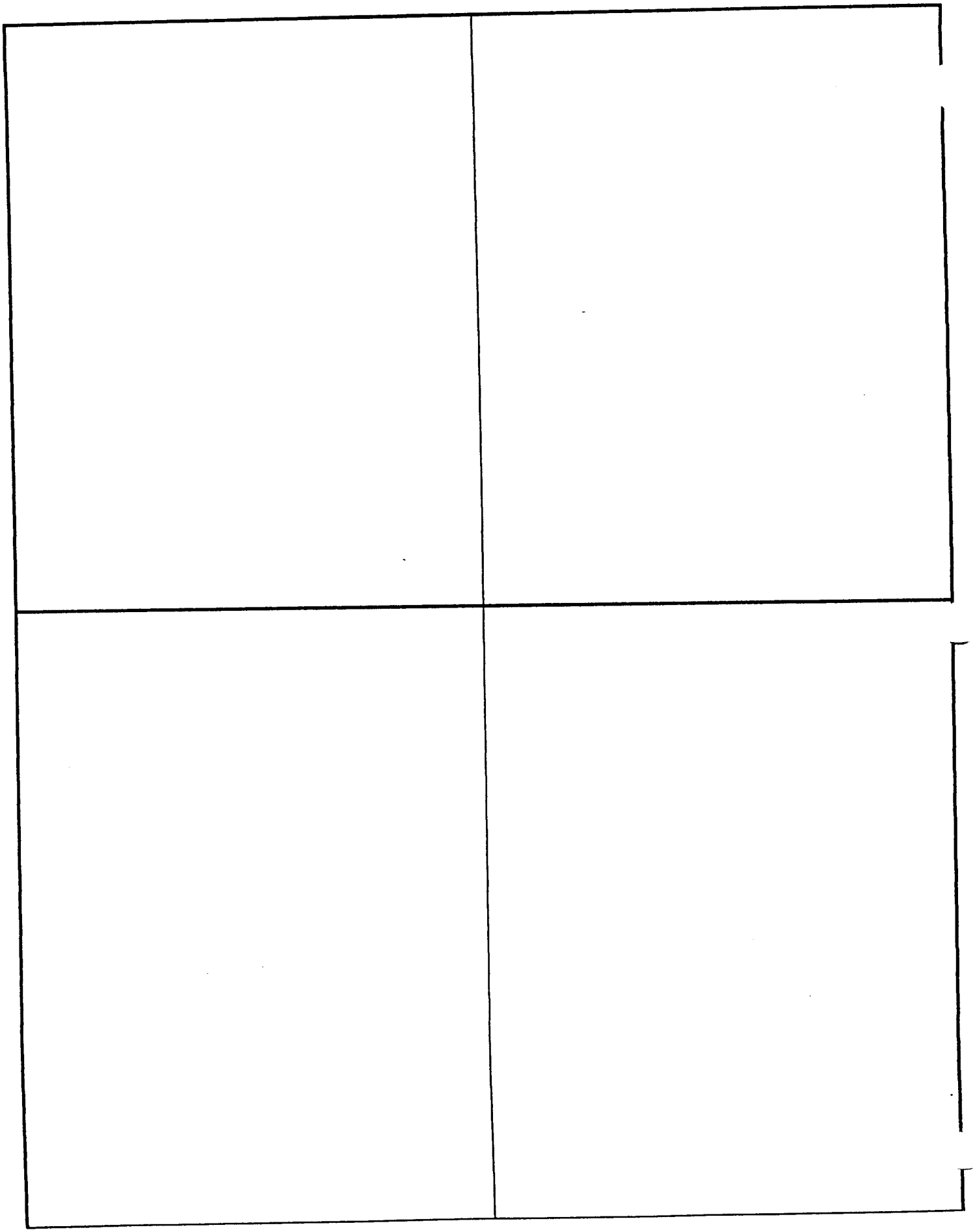
Spatial Data

Building:	3191
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	NA	R-22
Capacity (tons)	NA	80
Manufacturer	TACO	Trane
Date of Manufactu	1976	1976
Model No.	HTM-337	RAUA-8006EA
Serial No.	NA	NA
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: Heat exchanger - no CFC's



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3195
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 114 lbs	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	1988	
Model No.	CGACC604KBNGG	
Serial No.	J88H81895	
Piping level	low (medium) high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3201
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Mueller	
Date of Manufacture	NA	
Model No.	UDH080047UD6	
Serial No.	98891	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: b/g. locked ; no access

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Al Reisz	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3202
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	RA-2003-A	
Serial No.	G21-631-A7D	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: POC - Sgt. Agee (-3844)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH SP CU (PU) RE FR WU	

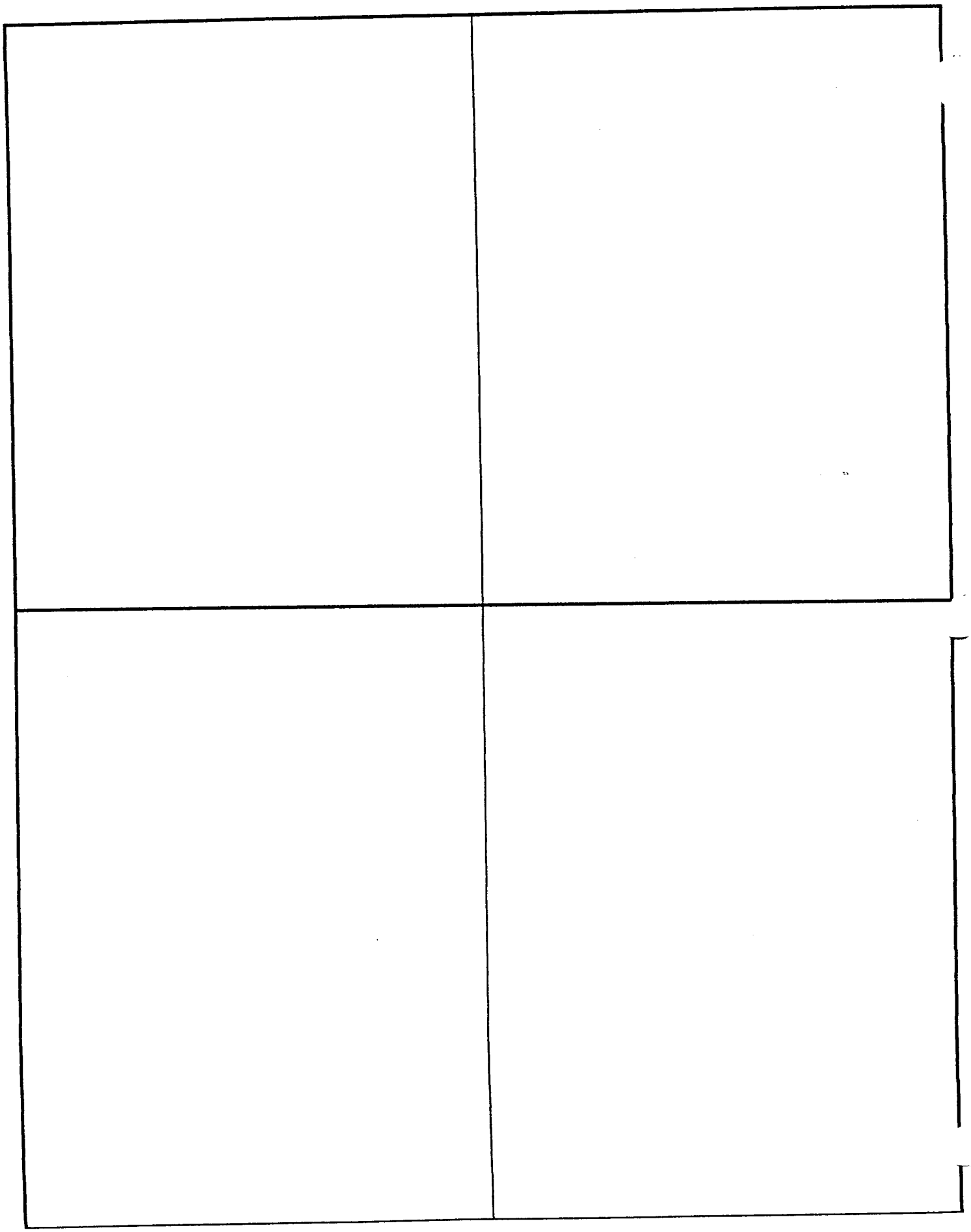
Spatial Data

Building:	3203
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 11 lbs	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	5AHE-B756-AA	
Serial No.	C83J-04622	
Piping level	(low) medium high	low medium high
Configurati	Roof (Forced) Other	Roof Forced Other:

Comments: good condition



General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	11-11-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	P. Shaw		CU
Source Type:	CH SP CU (PU) RE FR WU		

Spatial Data	
Building:	3204
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22 / 11 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	SAHE-B756-AA	
Serial No.	C83J-04659	
Piping level	(low) medium high	low medium high
Configuration:	Roof (Forced) Other	Roof Forced Other:

Comments:	none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	11-11-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	P. Shaw		CU
Source Type:	CH SP CU (PU) RE FR WU		

Spatial Data	
Building:	3210
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22 / 15 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	NA	
Model No.	SAHE-C106-AA	
Serial No.	C83J-04666	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments:	none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	11-11-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window u	
Preparer:	3208		CU
Source Type:	CH SP CU (PU) RE FR WU		

Spatial Data	
Building:	3208
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R22 / 16 lbs.	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	SAHE-C106-AA	
Serial No.	C83J-04670	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments:	none

General			
Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,	
Date:	11-11-94	FR - Freezer, RE - Refrigerator	
Calender Yr of Data:	1994	SP - Split package, WU - window unit	
Preparer:	P. Shaw		
Source Type:	CH (SP) CU PU RE FR WU		

Spatial Data	
Building:	3211
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	~~NA~~ 25	
Manufacturer	TSI	
Date of Manufactu	NA	
Model No.	CA2C524	
Serial No.	3200	
Piping level	low (medium) high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments:	none ; see comment #1

#1 – bldg. 3211

2 refrig.

1 H_2O cooler

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	3212 ; POC : Bob Ketch (mgr.)
No. Units:	NA
Location:	(Rooftop) Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	60	
Manufacturer	See #1 (Trane)	
Date of Manufacture	1987	
Model No.	CGACC606KANGG62	
Serial No.	J87GC0737	
Piping level	low medium high	low medium high
Configuration:	Roof Forced Other	Roof Forced Other:

Comments: could not access rooftop unit see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Wimbish	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	3213
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 5 7 lbs.	
Capacity (tons)	NA	
Manufacturer	Dunham Bush	
Date of Manufacture	1987	
Model No.	CGACCC606KAN	
Serial No.	J87E60534	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: see #2

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	Wimbish	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3217
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufactu	1988	
Model No.	CGACC506KBNEF603	
Serial No.	J88B0417	
Piping level	(low) medium high	low medium high
Configurati	Roof Forced (Other)	Roof Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	CU
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3251
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	R-22 / 8 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufactu	NA	NA
Model No.	565AJ048	565AJ048
Serial No.	0284A 58887	0284A 58916
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: none

#1 – b/g. 3212

3 Ice machines
18 Refrig.

#2 – b/g. 3213

6 H_2O coolers

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	cu
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3251
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	R-22 / 8 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufacture	NA	NA
Model No.	565AJ048	565AJ048
Serial No.	5183A 51080	5183A 51091
Piping level	(low) medium high	(low) medium high
Configuration:	Roof Forced (Other)	Roof Forced (Other)

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	cu
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3252
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	R-22 / 8 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufacture	NA	NA
Model No.	565AJ048	565AJ048
Serial No.	4883A 45729	0284A 58742
Piping level	low medium high	(low) medium high
Configuration:	Roof Forced Other	Roof Forced (Other)

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	cu
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3252
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	R-22 / 8 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufactu	NA	NA
Model No.	565AJ048	565AJ048
Serial No.	0284A 59054	0284A 59034
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other:)

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	cu
Source Type:	CH (SP) CU PU RE FR WU	

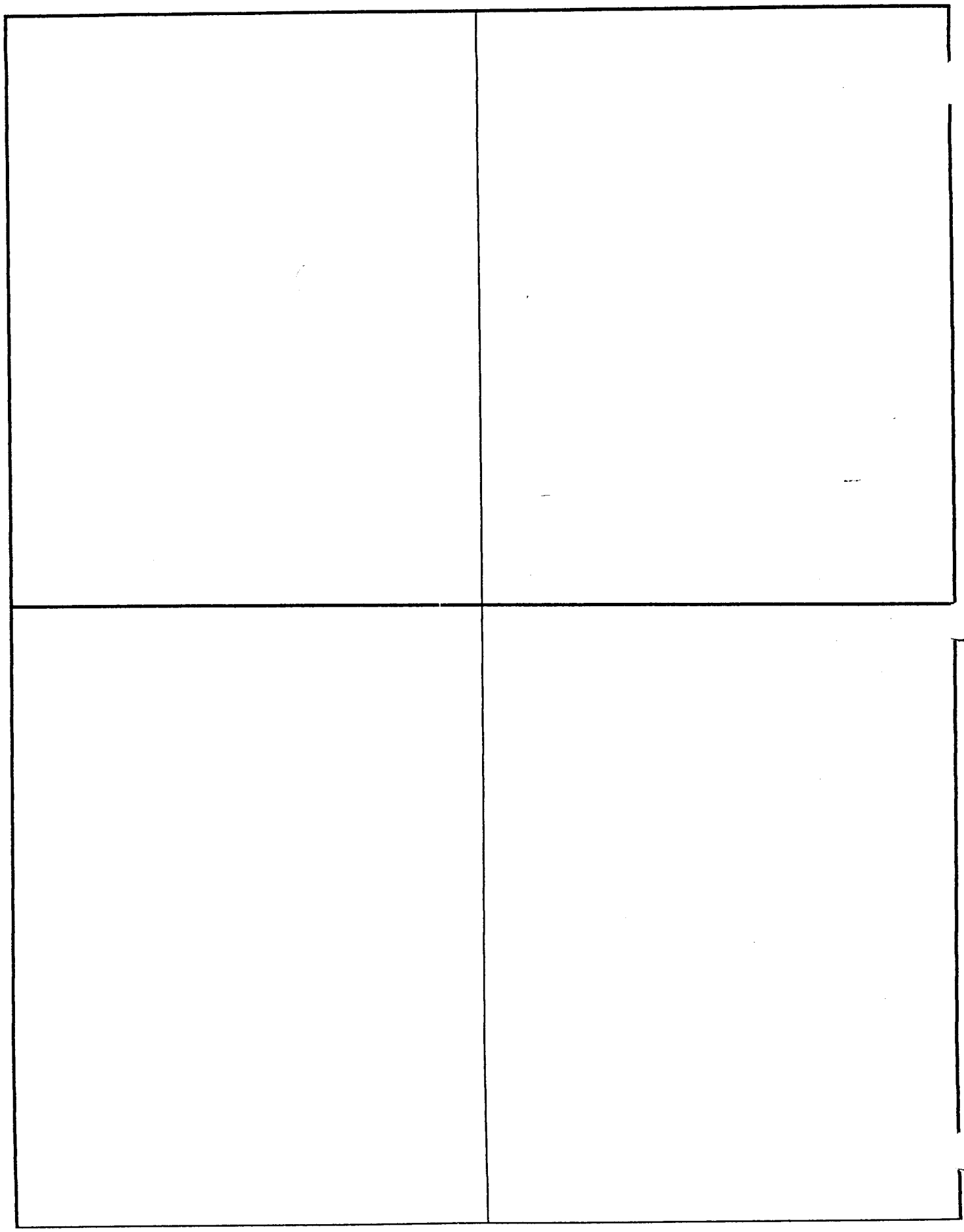
Spatial Data

Building:	3253
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	R-22 / 8 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Carrier
Date of Manufactu	NA	NA
Model No.	565AJ048	565AJ048
Serial No.	4883A 45840	5183A 51115
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: none



General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3253
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 5165.	R-22 / 9165.
Capacity (tons)	NA	NA
Manufacturer	Whirlpool	Heil
Date of Manufacture	NA	NA
Model No.	NCABA47VB03	CA5542VKA1 867.83
Serial No.	4720 69065	4931716387
Piping level	(low) medium high	(low) medium high
Configuration:	Roof (Forced) Other	Roof Forced (Other):

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH SP CU (PU) RE FR WU	

Spatial Data

Building:	3293
No. Units:	1
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	
Capacity (tons)	NA	
Manufacturer	Trane	
Date of Manufacture	NA	
Model No.	RAVA-4006-FB	
Serial No.	77C-21932	
Piping level	low medium (high)	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: none ; unit in fair/poor cond.

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	3600
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	~~NA~~ 40	~~NA~~ 40
Manufacturer	Bohn	Bohn
Date of Manufactu	NA	NA
Model No.	ADD0415B	ADD0415B
Serial No.	BJJ 8166	BJJ 8165
Piping level	low (medium) high	low (medium) high
Configurati	Roof Forced (Other)	Roof Forced (Other)

Comments: see #1

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-1-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:	P. Shaw	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	3681
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22	R-22
Capacity (tons)	~~NA~~ 110	~~NA~~ 110
Manufacturer	Carrier	Carrier
Date of Manufactu	NA	NA
Model No.	30HS110-D500	38AE-014-500
Serial No.	5999381	239-459-9913
Piping level	(low) medium high	(low) medium high
Configurati	Roof Forced (Other)	Roof Forced (Other):

Comments: none

#1 - bldg. 3600

2 H_2O coolers

3 refrig.

2 ice machines (don't work)

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	P. Shaw	
Source Type:	CH SP (CU) PU RE FR WU	

Spatial Data

Building:	3681
No. Units:	1
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-502	
Capacity (tons)	NA	
Manufacturer	Carrier	
Date of Manufacture	NA	
Model No.	09DE-069-510	
Serial No.	T981971	
Piping level	(low) medium high	low medium high
Configuration:	Roof Forced (Other)	Roof Forced Other:

Comments: in yard ; condenser for entire school

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:		FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:		
Source Type:	CH SP CU PU RE FR WU	

Spatial Data

Building:	
No. Units:	
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type		
Capacity (tons)		
Manufacturer		
Date of Manufactu		
Model No.		
Serial No.		
Piping level	low medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments:

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:	11-11-94	FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window u
Preparer:	Al Reisz	
Source Type:	CH (SP) CU PU RE FR WU	

Spatial Data

Building:	8403
No. Units:	2
Location:	Rooftop (Ground) Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type	R-22 / 8 lbs.	R-22 / 7 lbs.
Capacity (tons)	NA	NA
Manufacturer	Carrier	Lennox
Date of Manufacture	1992	1989
Model No.	38TH048520D	GCS16R-651-75P
Serial No.	1690E31201	natural gas
Piping level	(low) medium high	low (medium) high
Configuration:	Roof Forced (Other)	(Roof) Forced Other:

Comments: none

General

Installation:	Fort McClellan	CH - Chiller, CU - Condensing Unit,
Date:		FR - Freezer, RE - Refrigerator
Calender Yr of Data:	1994	SP - Split package, WU - window unit
Preparer:		
Source Type:	CH SP CU PU RE FR WU	

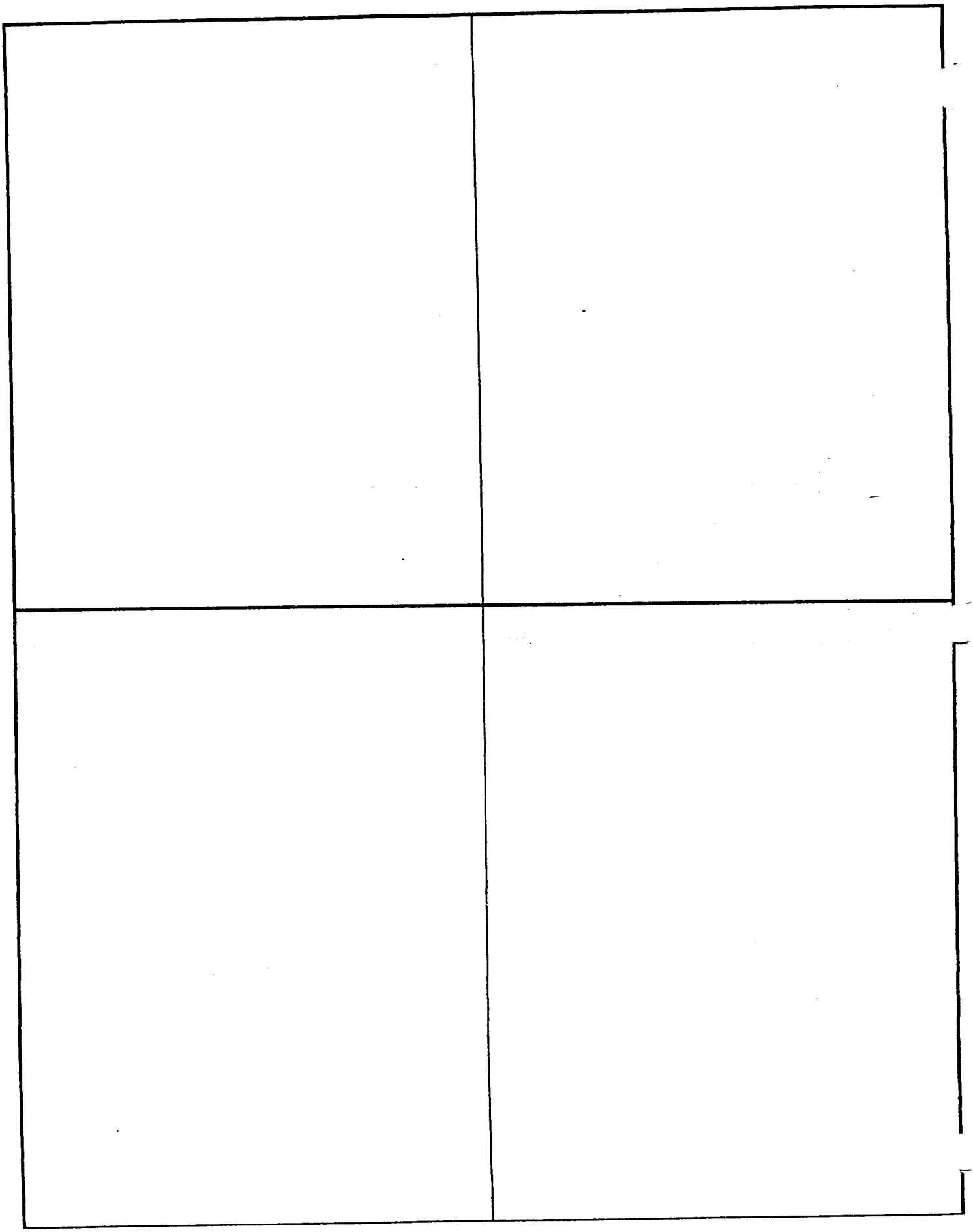
Spatial Data

Building:	
No. Units:	
Location:	Rooftop Ground Inside Building

Unit Data

	Unit #1	Unit #2
Refrigerant type		
Capacity (tons)		
Manufacturer		
Date of Manufactu		
Model No.		
Serial No.		
Piping level	low medium high	low medium high
Configurati	Roof Forced Other	Roof Forced Other:

Comments:



Appendix D
Summary Data of 140 Buildings Surveyed

Bldg. No.	Type I	Type II				Type III					Halon
		Air Cool Chill	Air Cool Cond.	Cond Unit	Pack Unit	HP/ Cond. Unit	Window	Refrig./Freezer	Water Cooler	Ice Mach.	
51	0	1	0	0	0	1	1	1	1	0	0
57	0	1	0	0	0	0	0	10	0	1	0
61	0	0	0	0	0	0	0	1	2	0	0
63	0	2	0	0	0	3	1	0	3	0	0
65	0	1	0	1	0	2	0	2	2	0	0
66	0	0	0	0	0	1	0	0	1	0	0
128	0	1	0	0	0	0	1	1	1	0	0
141	0	1	0	0	0	2	0	0	8	0	0
143	0	2	0	0	0	3	8	1	6	0	0
144	0	2	0	0	0	0	2	1	1	0	3
161	0	1	0	0	0	1	1	0	0	0	0
162	0	1	0	0	0	0	0	3	3	0	0
163	0	0	1	0	0	1	2	1	1	0	0
200	0	0	0	0	0	1	0	1	1	0	0
215	0	0	0	1	1	4	6	7	6	1	0
241	0	1	0	0	0	0	12	5	3	0	0
267	0	0	0	1	0	1	1	4	3	0	0
273	DEMOLISHED										
274	TO BE DEMOLIHED										
275	TO BE DEMOLIHED										
276	DEMOLISHED										
292	0	0	0	0	0	0	0	93	29	8	6
294	2	0	0	0	0	0	0	0	0	0	0
295	0	1	0	0	0	0	0	0	2	0	0
303-A	0	0	0	0	0	0	3	0	0	0	0
328	0	0	1	0	0	1	0	1	2	0	2
503	1	0	0	0	0	0	0	2	2	0	0
614	0	0	0	0	0	1	0	1	1	0	1
686	DEMOLISHED										
692	0	0	0	0	0	0	0	0	0	0	0
793	0	0	0	0	0	1	0	0	0	0	0
801	0	0	0	0	0	1	0	0	0	0	0
802	0	0	0	0	0	1	0	0	0	0	0
803	0	0	0	0	0	1	0	0	0	0	0
804	0	0	0	0	0	1	0	0	0	0	0
805	0	0	0	0	0	1	0	0	0	0	0
806	0	0	0	0	0	1	0	0	0	0	0

Appendix D
Summary Data of 140 Buildings Surveyed

Bldg. No.	Type I	Type II				Type III					Halon
		Air Cool Chill	Air Cool Cond.	Cond Unit	Pack Unit	HP/ Cond. Unit	Window	Refrig./Freezer	Water Cooler	Ice Mach.	
809	0	0	0	0	0	1	0	0	0	0	0
810	0	0	0	0	0	1	0	0	0	0	0
811	0	0	0	0	0	1	0	0	0	0	0
812	0	0	0	0	0	1	0	0	0	0	0
815	DEMOLISHED										
875	0	0	0	0	0	0	0	0	0	0	0
891	0	0	0	0	0	0	0	0	0	0	0
893	0	0	0	0	0	1	0	0	1	0	0
900	0	0	0	0	0	1	0	0	0	0	0
930	0	0	0	0	0	1	1	1	0	0	0
934	0	1	0	0	0	0	0	6	2	0	0
936	0	1	0	0	0	0	0	6	1	1	0
939	0	1	0	0	0	0	0	0	1	1	0
942	0	1	0	0	0	0	0	0	1	1	0
947	0	1	0	0	0	0	0	0	1	1	0
952	0	0	0	0	0	0	0	0	0	0	0
954	0	0	0	0	0	2	0	1	1	0	0
959	0	0	0	0	0	2	0	0	0	0	0
1001	VACANT			1							
1012	0	0	0	0	0	0	0	0	8	0	0
1020	0	2	0	0	0	0	1	8	5	0	0
1021	0	2	0	0	0	0	0	9	6	0	0
1022	0	2	0	0	0	1	0	8	6	0	0
1023	0	2	0	0	0	0	0	49	6	0	0
1060	0	1	0	0	0	0	0	2	2	0	0
1077	0	1	0	0	0	2	0	1	2	0	0
1081	2	1	0	0	0	0	0	4	20	1	0
1120	0	0	0	1	0	1	0	4	0	2	0
1122	0	0	0	0	0	3	0	0	1	0	0
1125	DEMOLISHED										
1162	DEMOLISHED										
1220	0	0	0	0	0	2	0	1	1	1	0
1333	0	0	0	0	0	2	0	0	2	0	0
1391	0	0	0	0	0	0	4	1	1	0	0
1392	0	0	0	0	0	2	0	1	1	0	0
1393	0	0	0	0	0	0	3	0	1	0	0
1395	0	0	0	0	0	0	3	0	1	0	0

Appendix D
Summary Data of 140 Buildings Surveyed

Bldg. No.	Type I	Type II				Type III					Halon
		Air Cool Chill	Air Cool Cond.	Cond Unit	Pack Unit	HP/ Cond. Unit	Window	Refrig./Freezer	Water Cooler	Ice Mach.	
1396	0	0	0	0	0	0	3	0	1	0	0
1510.01	0	2	0	0	0	0	0	1	4	1	0
1740	0	1	0	0	0	0	0	0	1	0	0
1742	DEMOLISHED										
1762	DEMOLISHED										
1789	0	1	0	0	0	0	0	3	3	0	0
1876	2	0	0	0	0	0	0	0	1	0	0
1892	DEMOLISHED										
1928	0	1	0	0	0	0	0	6	2	1	0
1929	0	0	1	0	0	0	0	3	4	0	1
1965	1	0	0	0	0	0	0	11	3	1	0
1966	0	1	0	0	0	0	0	1	2	0	0
1967	0	0	0	0	0	4	0	5	0	1	0
2041*	0	0	0	0	0	3	0	61	5	1	0
2042	0	0	0	0	0	4	0	5	0	3	0
2051	0	0	0	0	0	0	2	1	2	0	0
2101	0	0	1	0	0	0	0	0	1	1	0
2102	0	0	0	0	0	1	0	1	0	0	0
2202	0	0	0	0	0	1	0	7	0	2	0
2203	0	0	0	0	0	0	0	2	1	0	0
2213	0	0	0	1	0	0	0	11	11	0	0
2262	0	0	0	0	0	1	0	1	1	0	0
2263	0	0	0	0	0	1	0	0	1	0	0
2275	0	0	0	0	0	0	62	60	6	0	0
2276	0	1	0	0	0	0	0	0	6	0	0
2277	0	0	0	1	0	0	0	0	6	0	0
2278	1	0	0	0	0	0	1	1	1	0	0
2281	1	0	0	0	0	0	0	1	2	0	0
2290	0	1	0	0	0	0	0	5	2	0	0
2291	0	0	0	0	0	1	0	0	1	0	0
2293	0	0	0	0	0	0	0	1	1	0	0
2299	0	0	0	0	0	0	0	2	3	0	0
3127	0	1	0	0	0	0	0	0	1	4	0
3130	DEACTIV	2									
3131	DEACTIV	2									
3133	0	1	0	0	0	0	0	0	0	1	0
3134	0	1	0	0	0	0	0	0	2	0	0

Appendix D
Summary Data of 140 Buildings Surveyed

Bldg. No.	Type I	Type II				Type III					Halon
		Air Cool Chill	Air Cool Cond.	Cond Unit	Pack Unit	HP/ Cond. Unit	Window	Refrig./Freezer	Water Cooler	Ice Mach.	
3135	0	1	0	0	0	0	0	0	0	1	0
3137	0	1	0	0	0	0	0	0	1	2	0
3160	0	0	0	0	0	0	0	2	1	0	0
3165	0	0	0	0	0	4	0	1	2	0	0
3169	0	0	0	0	0	2	1	1	1	0	0
3176	2	0	0	0	0	0	2	1	2	0	0
3181	0	0	0	0	0	0	7	5	6	3	0
3182	0	2	0	0	0	0	0	1	2	0	0
3183	0	1	0	0	0	0	0	0	1	0	0
3184	0	0	0	0	0	0	0	1	1	0	0
3185	0	0	0	1	0	0	0	1	2	0	0
3191	0	0	1		0	0	0	5	2	0	0
3192	ACCESS DENIED-HAZARDOUS WASTE STORAGE FACILITY										
3195	0	1	0	0	0	0	0	1	2	0	0
3201	DEACTIVATED										
3202	0	0	0	0	0	0	0	0	1	0	0
3203	DEACTIVATED					1					
3204	DEACTIVATED					1					
3208	DEACTIVATED					1					
3210	DEACTIVATED					1					
3211	0	1	0	0	0	0	0	2	1	0	0
3212	0	1	0	0	0	0	0	18	1	3	0
3213	0	1	0	0	0	0	0	0	1	0	0
3217	0	1	0	0	0	0	0	0	0	0	0
3251	0	0	0	0	0	4	0	1	3	0	0
3252	0	0	0	0	0	0	0	1	2	0	0
3253	0	0	0	0	0	4	0	0	2	0	0
3293	0	0	0	1	0	0	0	0	1	0	0
3600	0	2	0	0	0	0	0	3	2	2	0
3681	0	0	0	2	0	0	0	10	4	1	0
CDTF	0	0	0	0	0	0	0	0	0	0	0
8403	0	0	0	0	0	2	0	2	3	0	0
8418	0	0	0	0	0	0	0	1	1	0	0
Totals	12	58	5	11	1	89	128	483	268	46	13
	Type I				Type II					Type III	Type V
Totals	12				75					1014	13

Appendix E
Type I Summary Data

Bldg. No.	Capacity (tons)	R-type	Manufact.	Model No.	Serial No.	Pressure	Year	Capacity Charge (lb)	Current Charge (lb)	Status
1876A	750	500	York	HT-N2G1-GAA	51406	Medium	1976	2000	1775	Motor and compressor recently rebuilt; leak test done; no leaks at present
1876B	900	500	York	OT-R3-C-1-ZAB	52618	Medium	1976	2450	1875	May have leaks; 650 lbs. added at start of '94 season; no leak test done yet
3176A	350	11	York	OT C3 C3 B2 OJ		Low	*	850	850	No comments
3176B	350	11	York	OT C3 C3 B2 OJ		Low	*	850	850	No comments
503	200	11	Carrier	19DG6153CM	761824800	Low	1976	775	775	No major leaks at present
294A	190	12	Westnghse	TC191A	JU47	High	1976	760	700	Impellers changed resulting in new capacity of 145 tons
294B	190	12	Westnghse	TC191A	JU25	High	1976	760	700	Impellers changed resulting in new capacity of 145 tons
1081A	200	11	York	YTA2B2B1-CHD	YHTM-240895	Low	1984	600	600	No major leaks at present
1081A	200	11	York	YTA2B2B1-CHD	YGTM-240896	Low	1984	600	600	No major leaks at present
2281	200	11	Carrier	19DH5743CB	8147 32820	Low	1981	625	625	No major leaks at present
2278	175	12	Westnghse	TC 330 W2 CEAL	HT39	High	1975	625	600	No noticeable leaks over the past year
1965	200	11	Carrier	19DG5032CR	771025700	Low	1977	575	575	No major leaks at present

Appendix E
Type II Summary Data

Building	Manufacturer	Model #	Serial #	Capacity (tons)	Lbs. Refrig.	Manu. Date	*Config.
1001	NA	502LS25	10999	25	50	NA	C
144	Carrier	30GAO25420	P096435	25	50	NA	A
144	Carrier	30GAO25420	M991326SP	25	50	NA	A
163	Bohn	RDD0235B	BDH8048	25	50	NA	B
1077	Carrier	30HJ025400	B641531	25	50	NA	A
3211	TSI	CA2CS24	3200	25	50	NA	A
1966	Trane	CGADC25GACA19	J90F63148	25	50	1990	A
215	Heil	NA	NA	25	50	NA	C
1928	McQuay	NA	NA	30	60	1977	A
1120	Trane	NA	NA	30	60	NA	C
162	TSI	CA2CD61	5071-1	30	60	NA	A
63	TSI	SE2CS15	NA	30	60	NA	A
1740	Trane	CGACC306KANDD303EGW	J87M83345	30	60	1987	A
1789	Trane	CGABC306AE00F23S	J86A80264	30	60	1986	A
3134	Trane	CGACC306KBNDD303EG	J88H81852	30	60	1988	A
3183	Trane	CGABC306AE01FK	J86H60471	30	60	1986	A
65	Dunham-Bush	ARPC-015-T	741103826	35	70	NA	A
161	TSI	CA2CS35	5071-3	35	70	NA	A
3135	DunhamBush	ACDR35A	3116301A94G	35	70	NA	A
3293	Trane	RAUA-4006-FB	77C-21932	40	80	1977	C
328	Bohn	SPR540	BHF8118	40	80	NA	B
215	Trane	CGAA-3006-MA	L4L705089	40	80	NA	D
295	Trane	RAUBC306BE01B	J87E60591	40	80	1987	A
2290	Trane	CGABC406AF11F3	J87B80591	40	80	1987	A
3600	Bohn	RDD0415B	BJJ 8166	40	80	NA	A
3600	Bohn	RDD0415B	BJJ8165	40	80	NA	A
3133	Trane	CGACC406K BNEE403EG	J88H81851	40	80	1988	A
3182	Carrier	30GB040	S692491	40	80	NA	A
3182	Carrier	30GB040	S692502	40	80	NA	A
2277	Carrier	38AE064510	X197847	50	100	NA	C
3185	Carrier	38AD024520	Y497401	50	100	NA	C
2101	Trane	RA-5003A	621-635C 9L-30016	50	100	NA	B
128	Trane	CGABC506AF01FK	J86G60414	50	100	1987	A
1510.01	Trane	CGABC506AF01	J86G81865	50	100	1985	A
1510.01	Trane	NA	NA	50	100	NA	A
65	Trane	RAUCC25GPAOODFT2J	J89A82732	50	100	1988	C
57	Trane	CGADC25GABAOGTWHR	J89E80954	50	100	1989	A
2276	York	YCAZ77LE3-17PC	YBBM 027142	50	100	NA	A
3127	Trane	CGACC506KBNFF603GFWS	J88B80417	50	100	1988	A
3217	Trane	CGACC506KBNEF603GFWS	J88B80417	50	100	1988	A
1929	Trane	CGWA-6004-EA	L77B02701	60	120	1977	B
3195	Trane	CGACC604KBNGG623F	J88H81895	60	120	1988	A
3212	Trane	CGACC606KANGG623G	J87G60737	60	120	1987	A
3213	Trane	CGACC606KANGG623G	J87E60534	60	120	1987	A
934	McQuay	ALR075C	5TB0184500	75	150	1988	A
936	McQuay	ALR075C	5TB0184600	75	150	1988	A
939	McQuay	ALR075C	5TB0184100	75	150	1988	A
942	McQuay	ALR075C	5TB10185300	75	150	1988	A
947	McQuay	ALR075C	5TB0185600	75	150	1988	A
1021	DunhamBush	NA	73081832	80	160	NA	A
3130	DunhamBush	ARPC-080-TQ	250302383	80	160	NA	A
3191	Trane	RAUA-8006EA	NA	80	160	1976	B
1060	Trane	RAUBC406BB01B	J83D60121	80	160	1967	A
3130	Trane	CGACC806RANJJ423MGK	J87D60400	80	160	1987	A
3131	DunhamBush	AC80A	81072801A88C	80	160	NA	A
1020	DunhamBush	NA	731009351	100	200	NA	A
1020	DunhamBush	NA	731009353	100	200	NA	A
1021	DunhamBush	NA	73099406	100	200	NA	A

Appendix E
Type II Summary Data

Building	Manufacturer	Model #	Serial #	Capacity (tons)	Lbs. Refrig.	Manu. Date	*Config.
267	Chrysler	HAW75-1	6J120571	100	200	NA	C
2213	Chrysler	HAW100	6K120918	100	200	1976	C
141	York	YCRXOO-46	YCVM143254	100	200	1978	A
143	York	YCAZ88MR646P	NA	100	200	1977	A
143	York	YCAZ88MR646P	NA	100	200	NA	A
1022	DunhamBush	NA	73099408	100	200	NA	A
1022	DunhamBush	NA	73099407	100	200	NA	A
1023	DunhamBush	NA	731009352	100	200	NA	A
1023	DunhamBush	NA	731009350	100	200	NA	A
3131	DunhamBush	ARPC-100-SQ	731008898	100	200	NA	A
3137	Trane	CGACD101RANKK603AG	J87C70819	100	200	1987	A
63	Trane	RAUBC306FE00F3	NA	100	200	NA	A
241	Trane	RAUAD126AC012	NA	100	200	NA	A
3681	Carrier	30HS110-D500	S999381	110	220	NA	C
3681	Carrier	38AE-014-500	239-459-9913	110	220	NA	C
1081	TSI	CA2CDT140	NA	140	280	1988	A
51	York	YCAK-14-17-CS	NA	200	400	NA	A
			Totals	4750	9500		

***Configurations Include:**

A-Air Cooled Chiller

B-Air Cooled Condenser

C-Condensing Unit

D-Package Unit

Appendix F
Type I Semi-Quantitative Risk Analysis

Type I Semi-Quantitative Risk Analysis Ranking Factors*

Capacity (tons)	Value	Age (yrs)	Value	Refrigerant Type	Value	Status of Chiller	Value
175 - 300	1	0-5	1	134a	1	No leaks at present	1
300 - 600	2	6-10	2	500/502	2	Recent rebuild/retrofit	2
600 - 1000	3	11-15	3	11/12	3	Frequent repairs	3
		16-20	4			No leak test/potentially leaky	4
		21-25+	5				

*1 lowest risk

Risk was based on the summation of risk factors shown in the Table above. A numerical value was assigned to various levels within an category. The logic used in the semi-quantitative analysis is as follows:

a) The lower the capacity systems pose a lower risk due to the quantity of refrigerant and cost to retrofit or replace, therefore, smaller systems received a lower rating. Loss from these systems would have a lower impact on the environment.

b) The age of the system implies risk from both an overall mechanical and component position. Typically, systems older than 15 years are recommended to be replaced, therefore, systems 16+ years recieved the higher ranking.

c) Class I refrigerants received a higher rating than Class II. R-11/12 are considered highest risk since they are associated with low pressure systems that purge periodically and medium systems. Their zone depleting potential is highest also.

d) Based on input from the chiller service organization, input was provided regarding recent maintenance activities and issues associated with each Type I unit. Systems recently leak checked that showed no leakage were considered lower risk. Where leak tests have not been performed recently or there were more frequent repairs, the rating was highest.

Appendix F
Type I Semi-Quantitative Risk Analysis

Building/ Chiller Size	Risk due to:Size (tons)	Age (yrs)	Ref. Type	PM Status	Total Risk
2281/200-ton	1	3	2	1	7
1876/750-ton	3	4	2	1.5	10.5
1876/900-ton	3	4	2	4	13
3176/350-ton	2	3	2	1	8
3176/350-ton	2	2	2	1	7
503/200-ton	1	4	2	1	8
294/190-ton	1	4	2	1.5	8.5
291/190-ton	1	4	2	1.5	8.5
1081/200-ton	1	2	2	1	6
1081/200-ton	1	2	2	1	6
2278/175-ton	1	4	2	1	8
1965/200-ton	1	4	2	1	8

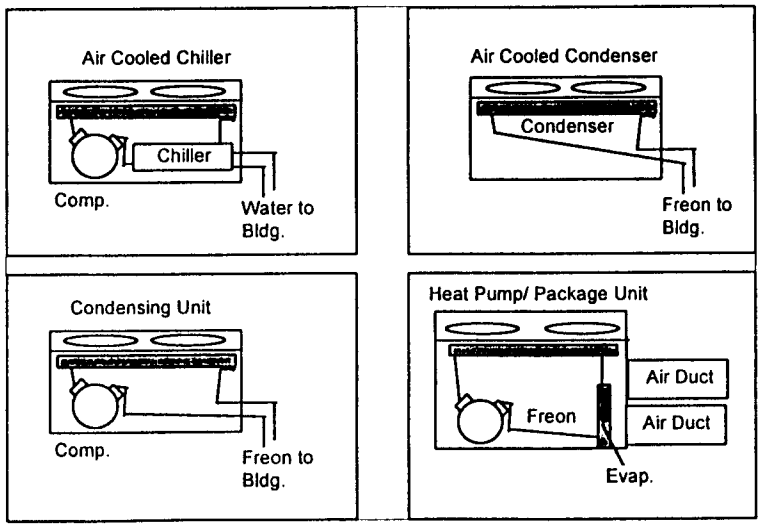
Appendix G
Type II Risk Detail Analysis

Type II Risk Factors

Configuration	Value	Condition	Value
Air Cooled Chiller	1	Good	1
Air Cooled Codenser	2	Fair	2
Condensing Unit	2.3	Poor	3
Package Unit	1	Very Poor	4

Configurations are shown below in Figure G.1. Systems with a known manufacturing date prior to 1980 were considered to be at highest risk due to age. Systems with a known manufacturing date later than 1985 were considered to be at lowest risk due to age. Total risk was defined as the weighted sums of configuration and condition. Configuration was weighted as 40% and Condition was weighted as 60%. Configuration accounted for the extent of piping, but visual condition was considered a more significant factor with regard to line and equipment condition in the overal risk.

Figure G1. Type II Configurations



Appendix G
Type II Risk Detail Analysis

Building #	Manufacturer	Model #	Serial #	Capacity (Tons)	R-type	Lbs. Refrig.	Manu. Date	Air Cool. Chiller R=1	Air Cool Cond. R=2	Cond./ IIP R=2.3	Pack. Unit R=1	Config. Risk	Cond. Risk	Total Risk	Low Risk	Mod. Risk
1001	NA	502LS25	10999	25	22	50	NA			1		2.3	4	3.32	0	1
144	Carrier	30GAO25420	P096435	25	22	50	NA	1				1	4	2.8	0	1
144	Carrier	30GAO25420	M991326SP	25	22	50	NA	1				1	4	2.8	0	1
1928	McQuay	NA	NA	30	22	60	1977	1				1	4	2.8	0	1
1021	DunhamBush	NA	73081832	80	22	160	NA	1				1	4	2.8	0	1
3130	DunhamBush	ARPC-080-TQ	250302383	80	22	160	NA	1				1	4	2.8	0	1
1020	DunhamBush	NA	731009351	100	22	200	NA	1				1	4	2.8	0	1
1020	DunhamBush	NA	731009353	100	22	200	NA	1				1	4	2.8	0	1
1021	DunhamBush	NA	73099406	100	22	200	NA	1				1	4	2.8	0	1
1120	Trane	NA	NA	30	22	60	NA			1		2.3	3	2.72	0	1
3293	Trane	RAUA-4006-FB	77C-21932	40	22	80	1977			1		2.3	3	2.72	0	1
2277	Carrier	38AE064510	X197847	50	22	100	NA			1		2.3	3	2.72	0	1
267	Chrysler	HAW75-1	6J120571	100	22	200	NA			1		2.3	3	2.72	0	1
2213	Chrysler	HAW100	6K120918	100	22	200	1976			1		2.3	3	2.72	0	1
163	Bohn	RDD0235B	BDH8048	25	22	50	NA		1			2	3	2.6	0	1
3191	Trane	RAUA-8006EA	NA	80	22	160	1976		1			2	3	2.6	0	1
162	TSI	CA2CD61	5071-1	30	22	60	NA	1				1	3	2.2	0	1
65	Dunham-Bush	ARPC-015-T	741103826	35	22	70	NA	1				1	3	2.2	0	1
1060	Trane	RAUBC406BB01B	J83D60121	80	22	160	1967	1				1	3	2.2	0	1
141	York	YCRXOO-46	YCVM143254	100	22	200	1978	1				1	3	2.2	0	1
143	York	YCAZ88MR646P	NA	100	22	200	1977	1				1	3	2.2	0	1
143	York	YCAZ88MR646P	NA	100	22	200	NA	1				1	3	2.2	0	1
1022	DunhamBush	NA	73099408	100	22	200	NA	1				1	3	2.2	0	1
1022	DunhamBush	NA	73099407	100	22	200	NA	1				1	3	2.2	0	1
1023	DunhamBush	NA	731009352	100	22	200	NA	1				1	3	2.2	0	1
1023	DunhamBush	NA	731009350	100	22	200	NA	1				1	3	2.2	0	1
3185	Carrier	38AD024520	Y497401	50	22	100	NA			1		2.3	2	2.12	0	1
328	Bohn	SPR540	BHF8118	40	22	80	NA		1			2	2	2	0	1
2101	Trane	RA-5003A	21-635C 9L-3001	50	22	100	NA		1			2	2	2	0	1
1929	Trane	CGWA-6004-EA	L77B02701	60	22	120	1977		1			2	2	2	0	1
1077	Carrier	30HJ025400	B641531	25	22	50	NA	1				1	2	1.6	1	0
3211	TSI	CA2CS24	3200	25	22	50	NA	1				1	2	1.6	1	0
63	TSI	SE2CS15	NA	30	22	60	NA	1				1	2	1.6	1	0
161	TSI	CA2CS35	5071-3	35	22	70	NA	1				1	2	1.6	1	0
215	Trane	CGAA-3006-MA	L4L705089	40	22	80	NA				1	1	2	1.6	1	0
295	Trane	RAUBC306BE01B	J87E60591	40	22	80	1987	1				1	2	1.6	1	0
2290	Trane	CGABC406AF11F3	J87B80591	40	22	80	1987	1				1	2	1.6	1	0
3600	Bohn	RDD0415B	BJJ 8166	40	22	80	NA	1				1	2	1.6	1	0
3600	Bohn	RDD0415B	BJJ8165	40	22	80	NA	1				1	2	1.6	1	0
128	Trane	CGABC506AF01FK	J86G60414	50	22	100	1987	1				1	2	1.6	1	0
1510.01	Trane	CGABC506AF01	J86G81865	50	22	100	1985	1				1	2	1.6	1	0
1510.01	Trane	NA	NA	50	22	100	NA	1				1	2	1.6	1	0
3130	Trane	CGACC806RANJJ423MGK	J87D60400	80	22	160	1987	1				1	2	1.6	1	0

Appendix G
Type II Risk Detail Analysis

Building #	Manufacturer	Model #	Serial #	Capacity (Tons)	R-type	Lbs. Refrig.	Manu. Date	Air Cool. Chiller R=1	Air Cool Cond. R=2	Cond./ HP R=2.3	Pack. Unit R=1	Config. Risk	Cond. Risk	Total Risk	Low Risk	Mod. Risk
3131	DunhamBush	AC80A	81072801A88C	80	22	160	NA	1				1	2	1.6	1	0
3131	DunhamBush	ARPC-100-SQ	731008898	100	22	200	NA	1				1	2	1.6	1	0
3137	Trane	CGACD101RANKK603AG	J87C70819	100	22	200	1987	1				1	2	1.6	1	0
65	Trane	RAUCC25GPAOODFT2J	J89A82732	50	22	100	1988			1		2.3	1	1.52	1	0
3681	Carrier	30HS110-D500	S999381	110	22	220	NA			1		2.3	1	1.52	1	0
3681	Carrier	38AE-014-500	239-459-9913	110	22	220	NA			1		2.3	1	1.52	1	0
1966	Trane	CGADC25GACA19	J90F63148	25	22	50	1990	1				1	1	1	1	0
1740	Trane	CGACC306KANDD303EGW	J87M83345	30	22	60	1987	1				1	1	1	1	0
1789	Trane	CGABC306AE00F23S	J86A80264	30	22	60	1986	1				1	1	1	1	0
3134	Trane	CGACC306KBNDD303EG	J88H81852	30	22	60	1988	1				1	1	1	1	0
3183	Trane	CGABC306AE01FK	J86H60471	30	22	60	1986	1				1	1	1	1	0
3135	DunhamBush	ACDR35A	3116301A94G	35	22	70	NA	1				1	1	1	1	0
3133	Trane	CGACC406K BNEE403EG	J88H81851	40	22	80	1988	1				1	1	1	1	0
3182	Carrier	30GB040	S692491	40	22	80	NA	1				1	1	1	1	0
3182	Carrier	30GB040	S692502	40	22	80	NA	1				1	1	1	1	0
57	Trane	CGADC25GABAOGTWHR	J89E80954	50	22	100	1989	1				1	1	1	1	0
2276	York	YCAZ77LE3-17PC	YBBM 027142	50	22	100	NA	1				1	1	1	1	0
3127	Trane	CGACC506KBNFF603GFWS	J88B80417	50	22	100	1988	1				1	1	1	1	0
3217	Trane	CGACC506KBNEF603GFWS	J88B80417	50	22	100	1988	1				1	1	1	1	0
3195	Trane	CGACC604KBNGG623F	J88H81895	60	22	120	1988	1				1	1	1	1	0
3212	Trane	CGACC606KANGG623G	J87G60737	60	22	120	1987	1				1	1	1	1	0
3213	Trane	CGACC606KANGG623G	J87E60534	60	22	120	1987	1				1	1	1	1	0
934	McQuay	ALR075C	5TB0184500	75	22	150	1988	1				1	1	1	1	0
936	McQuay	ALR075C	5TB0184600	75	22	150	1988	1				1	1	1	1	0
939	McQuay	ALR075C	5TB0184100	75	22	150	1988	1				1	1	1	1	0
942	McQuay	ALR075C	5TB10185300	75	22	150	1988	1				1	1	1	1	0
947	McQuay	ALR075C	5TB0185600	75	22	150	1988	1				1	1	1	1	0
63	Trane	RAUBC306FE00F3	NA	100	22	200	NA	1				1	1	1	1	0
241	Trane	RAUAD126AC012	NA	100	22	200	NA	1				1	1	1	1	0
1081	TSI	CA2CDT140	NA	140	22	280	1988	1				1	1	1	1	0
51	York	YCAK-14-17-CS	NA	200	22	400	NA	1				1	1	1	1	0
215	Heil	NA	NA	25	22	50	NA			1		2.3		0.92	1	0
Totals				4750		9500		58	5	11	1					

Appendix H
Type I Costs / Schedule Detailed Analysis

LEAK RISK ASSESSMENT/CONVERSION/REPLACEMENT

To comply with caa-90 there are many items that each facility that uses refrigerants must take into consideration if the facility is to have an economical continued life. A study to meet the requirements of caa-90 for leak risk assessment and conversion/replacement are so intertwined that they have been combined into one report.

Table (1) titled "low risk units" lists the refrigeration/air conditioning equipment that uses refrigerant r-22. This equipment is rated as low risk and it is recommended that replacement be accomplished only as required by routine maintenance. The refrigerant captured and recycled with the conversion of the chillers being replaced in 1999 that use r-22 should provide an adequate supply of r-22 until all chillers using r-22 have been replaced if diligent maintenance is performed on these chillers.

Table (2) titled "high risk units lists the refrigeration/air conditioning equipment that uses refrigerants other than r-22. This equipment is rated as high risk and a detailed analysis was used to determine the recommended replacement.

An economic analysis was used on each piece of equipment. In addition to the economic analysis the capacity, type refrigerant, age of equipment, repair history, requirements of caa-90, amount of refrigerant, energy efficiency of exiting vs new, hours of operation, ease of replacement, and cost to replace vs cost to convert was considered in establishing the recommendations.

The nist "building life-cycle cost" program was used in the economic analysis as recommended by the department of energy along with the recommended factors for cost of money and acceleration rates for inflation. (this data is included in the appendix) this economic analysis shows that all units would be replaced in 1996. The factor that primarily influenced this was the efficiency of the new units greatly exceeded the efficiency of the existing units.

Table (3) titled "replace" provides funding requirements where all chillers are replaced in 1996 with the energy usage of the existing and new chillers. Table (4) titled "convert" is used as a comparison and provides funding requirements where all chillers are converted to other than cfc referents in 1996 and replaced when they are 28 years old.

It is realized that local funding may be required and that local funding may not be available to replace all chillers in 1994. Table (5) titled replace/convert provides a scenario where funding has been staggered over several years by converting the newer chillers now and replacing the remaining chillers as shown. This provides a means of having each of the refrigerants used at the facility available after these refrigerants are no longer available at a reasonable cost from outside suppliers.

The refrigerant captured and recycled with the conversion of the three chillers in 1977 and the chiller being replaced in 1999 that use r-11 should provide an adequate supply of r-11 until all chillers using r-11 have been replaced. The refrigerant captured and recycled when the r-500 the chiller being replaced in 1999 that use r-11 should provide an adequate supply of r-11 until all chillers using r-11 have been replaced.

The caa-90 requires that equipment rooms housing equipment that uses refrigerants must comply with the standards of ansi/ashrae 15-1992, (revised 1994). The cost to make the required modifications to the equipment rooms to comply with the standards is included with each proposal but was not used as a cost factor in the economic analysis because this modification is required in all cases. Standard 15-1992 requires the following:

1. Refrigerate sensors be installed in each room.
2. Alarms be installed in each room.
3. Mechanical ventilation be installed in each room.
4. Purge and relief be installed to vent outside the room.
5. Self-contained breathing apparatus be installed adjacent to each equipment room door.

Computer print-out sheets on the recommended replacement chillers are included in the appendix.

REPLACE/CONVERT

BLDG. NO	MANUF	RECOMMENDATION	YEAR 1996 COST	YEAR 1997 COST	YEAR 1998 COST	YEAR 1999 COST	YEAR 2000 COST	YEAR 2001 COST	YEAR 2002 COST	YEAR 2003 COST	YEAR 2004 COST	YEAR 2005 COST	YEAR 2007 COST	YEAR 2010 COST	CHILLER TOTAL COST
1876	YORK	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$24,720								$248,920				$24,720 $248,920
1876	YORK	HIGH EFF PURGE REPLACE CHILLER			$287,760										$287,760
3176	YORK	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $9,270					$159,300							$19,570 $9,270 $159,300
3176	YORK	HIGH EFF PURGE REPLACE CHILLER	$9,270				$155,250								$9,270 $155,250
503	CARRIER	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $9,270			$124,320									$19,570 $9,270 $124,320
294	CARRIER	HIGH EFF PURGE REPLACE CHILLER	$9,270									$141,700			$9,270 $141,700
294	WEST	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $9,270							$137,640					$19,570 $9,270 $137,640
294	WEST	HIGH EFF PURGE REPLACE CHILLER	$9,270						$134,310						$9,270 $134,310
1081	YORK	MOD TO EQ.ROOM HIGH EFF PURGE RETROFIT	$19,570 $9,270	$53,000										$159,840	$19,570 $9,270 $212,840
1081	YORK	HIGH EFF PURGE RETROFIT	$9,270	$53,000										$159,840	$9,270 $212,840
2281	CARRIER	MOD TO EQ.ROOM HIGH EFF PURGE RETROFIT	$19,570 $9,270	$53,000									$150,960		$19,570 $9,270 $203,960
2287	WEST	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $9,270			$122,080									$19,570 $9,270 $122,080
1965	CARRIER	MOD TO EQ.ROOM REPLACE	$19,570						$118,580						$19,570 $118,580
		TOTAL	$254,410	$159,000	$287,760	$246,400	$155,250	$159,300	$252,890	$137,640	$248,920	$141,700	$150,960	$319,680	$2,513,910

REPLACE

BLDG. NO	MANUF	RECOMMENDATION	YEAR 1996 COST	TONS	EXIST KWH/YR	NEW KWH/YR
1876	YORK	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$24,720 $201,880	750	861,300	569,250
1876	YORK	HIGH EFF PURGE REPLACE CHILLER	$271,920	900	1,033,560	689,040
3176	YORK	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $139,050	350	401,940	267,960
3176	YORK	HIGH EFF PURGE REPLACE CHILLER	$139,050	350	401,940	267,960
503	CARRIER	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $114,330	200	229,680	157,080
294	TRAIN	HIGH EFF PURGE REPLACE CHILLER	$112,270	140	160,776	106,260
294	WEST	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $114,330	190	218,196	144,210
294	WEST	HIGH EFF PURGE REPLACE CHILLER	$114,330	190	218,196	144,210
1081	YORK	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $114,330	200	190,080	151,800
1081	YORK	HIGH EFF PURGE REPLACE CHILLER	$114,330	200	190,080	151,800
2281	CARRIER	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $114,330	200	190,080	151,800
2287	WEST	MOD TO EQ.ROOM HIGH EFF PURGE REPLACE CHILLER	$19,570 $112,270	175	200,970	137,445
1965	CARRIER	MOD TO EQ.ROOM REPLACE CHILLER	$19,570 $100,940	125	143,550	107,250
TOTAL		REPLACE ALL CHILLERS	$1,925,070			

Replacement of All Type I Units in 1996

Bldg. No.	Manu.	Recommendation	Year 1996 Cost
1876	York	Mod to Eq. Room High EFF Purge Replace Chiller	$24,720 $201,880
1876	York	High EFF Purge Replace Chiller	 $271,920
3176	York	Mod to Eqpt. Room High EFF Purge Replace Chiller	$19,570 $139,050
3176	York	High EFF Purge Replace Chiller	 $139,050
503	Carrier	Mod to Eqpt. Room High EFF Purge Replace Chiller	$19,570 $114,330
294	Trane	High EFF Purge Replace Chiller	 $112,270
294	West	Mod to Eqpt. Room High EF Purge Replace Chiller	$19,570 $114,330
294	West	High EFF Purge Replace Chiller	 $114,330
1081	York	Mod to Eqpt. Room High EFF Purge Replace Chiller	$19,570 $114,330
1081	York	High EFF Purge Replace Chiller	 $114,330
2281	Carrier	Mod to Eqpt. Room High EFF Purge Replace Chiller	$19,570 $114,330
2287	West	Mod to Eqpt. Room High EFF Purge Replace Chiller	$19,570 $112,270
1965	Carrier	Mod to Eqpt. Room Replace Chiller	$19,570 $100,940
TOTAL		**Replace All Chillers**	**$1,925,070**

BLCC SUMMARY FOR 294ACON

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$48,373	$2,809
.NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$85,634	$4,973
ENERGY COSTS	$133,511	$7,753
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$279,647	$16,239

BLCC SUMMARY FOR 294ANEW

	PRESENT VALUE	ANNUAL VALUE
NITIAL COST (AS OF SERVICE DATE)	$109,324	$6,348
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$109,275	$6,346
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$226,684	$13,163

BLCC SUMMARY FOR 294BCON

	PRESENT VALUE	ANNUAL VALUE
'ITIAL COST (AS OF SERVICE DATE)	$48,373	$2,809
NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$96,756	$5,619
ENERGY COSTS	$133,511	$7,753
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$290,770	$16,885

BLCC SUMMARY FOR 294BNEW

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$109,324	$6,348
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$109,275	$6,346
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$226,684	$13,163

BLCC SUMMARY FOR 294CCON

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$8,707	$506
NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$84,118	$4,885
ENERGY COSTS	$98,377	$5,713
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$203,331	$11,807

BLCC SUMMARY FOR 294CNEW

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$107,389	$6,236
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$83,319	$4,838
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$198,794	$11,544

BLCC SUMMARY FOR 503BCON

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$57,081	$3,315
NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$85,634	$4,973
ENERGY COSTS	$140,538	$8,161
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$295,381	$17,153

BLCC SUMMARY FOR 503BNEW

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$109,324	$6,348
NNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$115,026	$6,680
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$232,436	$13,497

BLCC SUMMARY FOR 1081ACON

	PRESENT VALUE	ANNUAL VALUE
TIAL COST (AS OF SERVICE DATE)	$57,081	$3,315
NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$67,077	$3,895
ENERGY COSTS	$138,793	$8,060
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$275,080	$15,974

BLCC SUMMARY FOR 1081ANEW

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$109,324	$6,348
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$115,026	$6,680
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$232,436	$13,497

BLCC SUMMARY FOR 1876anew

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$192,526	$11,180
NUALLY RECURRING OM&R COSTS	$16,172	$939
ENERGY COSTS	$431,348	$25,048
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$640,045	$37,167

BLCC SUMMARY FOR 1876BCONV

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$96,747	$5,618
ANNUALLY RECURRING OM&R COSTS	$24,258	$1,409
NON-AN. RECURRING OM&R COSTS	$192,486	$11,178
ENERGY COSTS	$632,420	$36,724
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$945,911	$54,929

BLCC SUMMARY FOR 1876BNEW

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$245,736	$14,270
NUALLY RECURRING OM&R COSTS	$16,172	$939
ENERGY COSTS	$522,118	$30,319
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$784,027	$45,528

BLCC SUMMARY FOR 1965CON

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$726	$42
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
NON-AN. RECURRING OM&R COSTS	$72,033	$4,183
ENERGY COSTS	$101,190	$5,876
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$182,035	$10,571

BLCC SUMMARY FOR 2281CON

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$57,081	$3,315
.NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$67,077	$3,895
ENERGY COSTS	$138,793	$8,060
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$275,080	$15,974

BLCC SUMMARY FOR 2281NEW

	PRESENT VALUE	ANNUAL VALUE
VITIAL COST (AS OF SERVICE DATE)	$109,324	$6,348
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$115,026	$6,680
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$232,436	$13,497

BLCC SUMMARY FOR 2287CON

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$48,373	$2,809
NUALLY RECURRING OM&R COSTS	$12,129	$704
NON-AN. RECURRING OM&R COSTS	$72,210	$4,193
ENERGY COSTS	$144,030	$8,364
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$276,742	$16,070

BLCC SUMMARY FOR 2287NEW

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$107,389	$6,236
ANNUALLY RECURRING OM&R COSTS	$8,086	$470
ENERGY COSTS	$104,149	$6,048
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$219,623	$12,753

BLCC SUMMARY FOR 3176ACON

	PRESENT VALUE	ANNUAL VALUE
'ITIAL COST (AS OF SERVICE DATE)	$76,430	$4,438
.NUALLY RECURRING OM&R COSTS	$19,406	$1,127
NON-AN. RECURRING OM&R COSTS	$98,517	$5,721
ENERGY COSTS	$304,569	$17,686
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$498,922	$28,972

BLCC SUMMARY FOR 3176ACON

	PRESENT VALUE	ANNUAL VALUE
VITIAL COST (AS OF SERVICE DATE)	$76,430	$4,438
ANNUALLY RECURRING OM&R COSTS	$19,406	$1,127
NON-AN. RECURRING OM&R COSTS	$98,517	$5,721
ENERGY COSTS	$245,941	$14,282
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$440,294	$25,568

BLCC SUMMARY FOR 3176ANEW

	PRESENT VALUE	ANNUAL VALUE
ITIAL COST (AS OF SERVICE DATE)	$125,771	$7,303
.NUALLY RECURRING OM&R COSTS	$12,937	$751
ENERGY COSTS	$203,046	$11,791
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$341,754	$19,846

BLCC SUMMARY FOR 3176BNEW

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$125,771	$7,303
ANNUALLY RECURRING OM&R COSTS	$12,937	$751
ENERGY COSTS	$203,046	$11,791
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$341,754	$19,846

modl-CVHE	nton-250	volt-460	hrtz-60	type-SNGL	cpkw-142	cpim-220
evtm-TECU	evth-28	evsz-032S	evbs-200	evwp-2	orsz-200	refg-123
cdtm-TECU	cdth-28	cdsz-032L	cdbs-250	cdwp-2	cdty-STD	typo-STD

PERCENT	TONS	EX EVAP ENT	EVAP ENT	COND	EX COND	KW	KW/TON
100	175	44.0	54.0	85.0	94.4	104	0.594
90	158	44.0	53.0	82.5	90.9	92	0.584
80	140	44.0	52.0	80.0	87.5	82	0.586
70	123	44.0	51.0	77.5	84.1	72	0.588
60	105	44.0	50.0	75.0	80.6	63	0.600
50	88	44.0	49.0	72.5	77.2	54	0.613
40	70	44.0	48.0	70.0	73.8	45	0.643
30	53	44.0	47.0	67.5	70.4	37	0.705
20	35	44.0	46.0	65.0	67.0	27	0.771
15	26	44.0	45.5	63.8	65.3	22	0.838

IPLV VALUE = 0.611

PERFORMANCE TESTS AT PART LOAD MAY ONLY BE QUOTED FROM THE SELECTION PROGRAM.
25% LOAD IS THE MINIMUM ARI 550 TEST POINT.
Esc-quit

DESIGN TONS :	175	ARI 550-92	Selection : 23 of 27
KW :	104	Version 14.08	
KW / TON :	0.594	REVL 55017	

EVAPORATOR		CONDENSER			
EXIT TEMP :	44.00	ENTERING TEMP :	85.00	SHIP WEIGHT :	1198
FLOW RATE :	420	FLOW RATE :	525	OPERATING WT :	1306
ENTERING TEMP :	54.00	EXIT TEMP :	94.41	REFRIG CHARGE :	37
PRESSURE DROP :	17.08	PRESSURE DROP :	21.84	LIST PRICE :	17163
FLUID VELOCITY :	6.87	FLUID VELOCITY :	6.74	SOUND dBA :	
FOULING FACTOR :	0.00025	FOULING FACTOR :	0.00025	LRA :	139
REFRIG TEMP :	39.23	REFRIG TEMP :	95.47	MOTOR RLA :	1
FLUID TYPE & % :	W 0	FLUID TYPE & % :	W 0	SELECTION RLA :	14
INLET VANE DEG :	62				

modl-CVHE	nton-250	volt-460	hrtz-60	type-SNGL	cpkw-142	cpim-220
evtm-TECU	evth-28	evsz-032S	evbs-200	evwp-2	orsz-200	refg-123
cdtm-TECU	cdth-28	cdsz-032L	cdbs-250	cdwp-2	cdty-STD	typo-STD

X-aux cond P-part load H-heat recovery $-eps Esc-quit
PgUp PgDn-page by ten O-optimize F9-report

modl-CVHE	nton-280	volt-460	hrtz-60	type-SNGL	cpkw-142	cpim-220
evtm-IECU	evth-28	evsz-032L	evbs-350	evwp-2	orsz-230	refg-123
cdtm-IECU	cdth-28	cdsz-032L	cdbs-280	cdwp-2	cdty-STD	typo-STD

PERCENT	TONS	EX EVAP ENT	EVAP ENT	COND	EX COND	KW	KW/TON
100	200	44.0	54.0	85.0	94.4	116	0.580
90	180	44.0	53.0	82.5	90.9	103	0.572
80	160	44.0	52.0	80.0	87.5	91	0.569
70	140	44.0	51.0	77.5	84.1	81	0.579
60	120	44.0	50.0	75.0	80.6	70	0.583
50	100	44.0	49.0	72.5	77.2	60	0.600
40	80	44.0	48.0	70.0	73.8	50	0.625
30	60	44.0	47.0	67.5	70.4	40	0.667
20	40	44.0	46.0	65.0	67.0	31	0.775
15	30	44.0	45.5	63.8	65.3	26	0.867

IPLV VALUE = 0.595

PERFORMANCE TESTS AT PART LOAD MAY ONLY BE QUOTED FROM THE SELECTION PROGRAM.
25% LOAD IS THE MINIMUM ARI 550 TEST POINT.
Esc-quit

DESIGN TONS : 200
KW : 116
KW / TON : 0.580

ARI 550-92
Version 14.08
REVL 55017

Selection : 10 of

EVAPORATOR

EXIT TEMP :	44.00
FLOW RATE :	480
ENTERING TEMP :	54.00
PRESSURE DROP :	9.71
FLUID VELOCITY :	5.28
FOULING FACTOR :	0.00025
REFRIG TEMP :	40.42
FLUID TYPE & % :	W 0
INLET VANE DEG :	60

CONDENSER

ENTERING TEMP :	85.00
FLOW RATE :	600
EXIT TEMP :	94.38
PRESSURE DROP :	12.56
FLUID VELOCITY :	6.60
FOULING FACTOR :	0.00025
REFRIG TEMP :	97.18
FLUID TYPE & % :	W 0

SHIP WEIGHT :	12607
OPERATING WT :	14163
REFRIG CHARGE :	600
LIST PRICE :	175816
SOUND dBA :	79
LRA :	1392
MOTOR RLA :	196
SELECTION RLA :	160

modl-CVHE	nton-280	volt-460	hrtz-60	type-SNGL	cpkw-142	cpim-220
evtm-IECU	evth-28	evsz-032L	evbs-350	evwp-2	orsz-230	refg-123
cdtm-IECU	cdth-28	cdsz-032L	cdbs-280	cdwp-2	cdty-STD	typo-STD

X-aux cond P-part load H-heat recovery $-eps Esc-quit
PgUp PgDn-page by ten O-optimize F9-report

modl-CVHE	nton-500	volt-460	hrtz-60	type-SNGL	cpkw-231	cpim-220
evtm-IECU	evth-28	evsz-050L	evbs-550	evwp-2	orsz-400	refg-123
cdtm-IECU	cdth-28	cdsz-050L	cdbs-500	cdwp-2	cdty-STD	typo-STD

PERCENT	TONS	EX EVAP ENT	EVAP ENT	COND	EX COND	KW	KW/TON
100	350	44.0	54.0	85.0	94.3	194	0.554
90	315	44.0	53.0	82.5	90.8	167	0.530
80	280	44.0	52.0	80.0	87.4	146	0.521
70	245	44.0	51.0	77.5	84.0	128	0.522
60	210	44.0	50.0	75.0	80.6	111	0.529
50	175	44.0	49.0	72.5	77.2	94	0.537
40	140	44.0	48.0	70.0	73.8	79	0.564
30	105	44.0	47.0	67.5	70.3	64	0.610
20	70	44.0	46.0	65.0	66.9	48	0.686
15	53	44.0	45.5	63.8	65.2	40	0.762

IPLV: .543

PERFORMANCE TESTS AT PART LOAD MAY ONLY BE QUOTED FROM THE SELECTION PROGRAM.
25% LOAD IS THE MINIMUM ARI 550 TEST POINT.

Run Time : 00:01:30

DESIGN TONS :	350	ARI 550-92	Selection : 48 of 50
KW :	194	Version 14.08	
KW / TON :	0.554	REVL 55017	

EVAPORATOR		CONDENSER			
EXIT TEMP :	44.00	ENTERING TEMP :	85.00	SHIP WEIGHT :	1654
FLOW RATE :	840	FLOW RATE :	1050	OPERATING WT :	1917
ENTERING TEMP :	54.00	EXIT TEMP :	94.32	REFRIG CHARGE :	99
PRESSURE DROP :	11.64	PRESSURE DROP :	11.99	LIST PRICE :	20538
FLUID VELOCITY :	5.87	FLUID VELOCITY :	6.43	SOUND dBA :	7
FOULING FACTOR :	0.00025	FOULING FACTOR :	0.00025	LRA :	236
REFRIG TEMP :	40.11	REFRIG TEMP :	96.99	MOTOR RLA :	33
FLUID TYPE & % :	W 0	FLUID TYPE & % :	W 0	SELECTION RLA :	27
INLET VANE DEG :	87				

modl-CVHE	nton-500	volt-460	hrtz-60	type-SNGL	cpkw-231	cpim-220
evtm-IECU	evth-28	evsz-050L	evbs-550	evwp-2	orsz-400	refg-123
cdtm-IECU	cdth-28	cdsz-050L	cdbs-500	cdwp-2	cdty-STD	typo-STD

modl-CVHF	nton-770	volt-460	hrtz-60	type-SNGL	cpkw-453	cpim-276
evtm-TECU	evth-28	evsz-080L	evbs-800	evwp-2	orsz-880	refg-123
cdtm-IECU	cdth-28	cdsz-080L	cdbs-710	cdwp-2	cdty-STD	typo-STD

PERCENT	TONS	EX EVAP ENT	EVAP ENT	COND	EX COND	KW	KW/TON
100	750	44.0	54.0	85.0	94.3	412	0.549
90	675	44.0	53.0	82.5	90.8	350	0.519
80	600	44.0	52.0	80.0	87.3	299	0.498
70	525	44.0	51.0	77.5	83.9	254	0.484
60	450	44.0	50.0	75.0	80.5	213	0.473
50	375	44.0	49.0	72.5	77.1	176	0.469
40	300	44.0	48.0	70.0	73.7	143	0.477
30	225	44.0	47.0	67.5	70.3	114	0.507
20	150	44.0	46.0	65.0	66.9	86	0.573
10	75	44.0	45.0	62.5	63.5	58	0.773

IPLV VALUE = 0.497

PERFORMANCE TESTS AT PART LOAD MAY ONLY BE QUOTED FROM THE SELECTION PROGRAM.
25% LOAD IS THE MINIMUM ARI 550 TEST POINT.
Esc-quit

DESIGN TONS : 750
" KW : 412
KW / TON : 0.549

ARI 550-92
Version 14.08
REVL 55017

Selection : 22 o 5

EVAPORATOR

EXIT TEMP : 44.00
FLOW RATE : 1800
ENTERING TEMP : 54.00
PRESSURE DROP : 25.92
FLUID VELOCITY : 7.41
FOULING FACTOR : 0.00025
REFRIG TEMP : 40.85
FLUID TYPE & % : W 0
INLET VANE DEG : 85

CONDENSER

ENTERING TEMP : 85.00
FLOW RATE : 2250
EXIT TEMP : 94.32
PRESSURE DROP : 25.23
FLUID VELOCITY : 9.80
FOULING FACTOR : 0.00025
REFRIG TEMP : 99.13
FLUID TYPE & % : W 0

SHIP WEIGHT : 2374
OPERATING WT : 2768
REFRIG CHARGE : 140
LIST PRICE : 301566

LRA : 442
MOTOR RLA : 62
SELECTION RLA : 56

modl-CVHF	nton-770	volt-460	hrtz-60	type-SNGL	cpkw-453	cpim-276
evtm-TECU	evth-28	evsz-080L	evbs-800	evwp-2	orsz-880	refg-123
cdtm-IECU	cdth-28	cdsz-080L	cdbs-710	cdwp-2	cdty-STD	typo-STD

X-aux cond P-part load H-heat recovery $-eps Esc-quit
PgUp PgDn-page by ten O-optimize F9-report

Appendix I
Type II Cost/Schedule Detailed Analysis

Type	Size (Tons)	Unit Replacement Cost ($)	Retrofit Cost
Air Cooled Chillers	25-30	16200	NA
	50-60	24900	NA
	100	33700	NA
Air Cooled Condensers	25-30	4200	NA
	50-60	7700	NA
	100	12900	NA
Condensing Units	25-30	8300	NA
(air cooled)	50-60	16300	NA
	100	29500	NA
Condensing Units	25-30	10900	NA
(water cooled)	50-60	17500	NA
	100	Do not manu.	NA

Appendix J

Planning Guidelines for CFC and Halon Equipment

As a result of the CFC/Halon survey, it was possible to formulate some planning guidelines for Fort McClellan regarding the phase out of ozone-depleting chemicals.

Equipment Using R-22 Refrigerant

- 224 items identified with less than 20 lbs. refrigerant
- 75 items identified with more than 20 lbs. refrigerant

Comments

- R-22 has a relatively low ozone depletion potential
- There is no currently available replacement refrigerant for R-22
- Production of R-22 will likely continue until year 2010 or beyond

Plan

- Continue to use this equipment as-is for the foreseeable future

Equipment Using R-500 and R-502 Refrigerants

- 7 items identified that are less than 20 lbs. in capacity
- 10 items identified that are more than 20 lbs. in capacity

Comments

- R-500 and R-502 will ultimately be phased out of existence
- Many alternatives already exist for R-500 and R-502 (see Appendix K)

Plan

- Continue maintaining small equipment containing R-500 and R-502
- See replacement/retrofitting schedule for 2 large chiller units using R-500

Equipment Using R-12 Refrigerant

- 784 items identified that are less than 20 lbs. in capacity
- 12 items identified that are more than 20 lbs. in capacity

- Recycle, store, and reuse all existing CFC refrigerants recovered as the result of retrofit and replacement activities
- See replacement/retrofitting schedule for cost analysis

Halon Units on Fort McClellan

- 6 buildings identified as containing Halon units
- 84 vehicles identified as containing Halon units
- 3 permanent Halon fire suppression systems identified
- 252 portable Halon fire suppression units identified
- A total of 2,266 lbs. of Halon 1211 and 1301 identified

Comments

- Halon-1211 and Halon-1301 have higher ozone depleting potentials than CFCs
- The Clean Air Act of 1990 does not prohibit the release of Halon to the atmosphere
- It is recommended that Halon systems be used for actual fire suppression only

Plan

- Place stand-alone portable Halon units out of service
- Where risks are dual protected, e.g., Halon and sprinkler systems, place the Halon system out of service
- Where a facility requires pre-action sprinkler protection for a risk, and the protection actually provided is a Halon system, immediately program the pre-action sprinkler to replace the Halon; budget on a priority basis
- For fixed or portable units in CFR and tactical vehicles, consider the Halon essential or "mission critical" and retain in service until further instruction is available concerning alternative fire suppression agents
- For Halon units installed in facilities or non-combat vehicles, replace with acceptable alternatives (see alternatives section)
- Stockpile recaptured Halon units for future support of mission critical uses

APPENDIX K

SNAP ALTERNATIVES

ALTERNATIVES DETAIL INFORMATION

This appendix provides a general discussion of the alternatives recommended under the EPA SNAP program. Refer to Table 4.1 for additional comments and information.

CFC-11, CFC-12, and R-502 Industrial Process Refrigeration, Retrofit

HCFC-123

HCFC-123 is acceptable as a substitutes for CFC-11, CFC-12, and R-502 in retrofitted industrial process refrigeration. Because HCFC-123 contributes to ozone depletion, it is considered a transitional alternative. Since it poses much lower ozone-depleting risk than continued use of CFCs, EPA has determined that its use is acceptable for certain end-uses. In addition, HCFC-123's GWP and atmospheric lifetime are significantly lower than almost all other alternatives. HCFC-123 is not flammable. EPA strongly recommends that users of HCFC-123 adhere to any requirements provided in ASHRAE Standards 15 and 34. Worker-monitoring studies conducted by EPA demonstrate that in office building equipment rooms, HCFC-123's 8-hour time-weighted average concentration can be maintained at or under 1 ppm (less than the industry-established AEL of 30 ppm), provided that such standards are followed. HCFC-123 is acceptable for use in commercial building chillers and should pose no hazard in industrial uses.

R-406A

R-406A, which consists of HCFC-22, HCFC-142b, and isobutane, is acceptable as a substitute for CFC-11, CFC-12, and R-502 in retrofitted industrial process refrigeration. See the discussion on R-406A under retrofitted R-500 centrifugal chillers.

R-407A and R-407B

R-407A and R-407B, which consist of HFC-134a, HFC-32, and HFC-125, are acceptable as substitutes for CFC-11, CFC-12, and R-502 in retrofitted industrial process refrigeration. None of the components contribute to ozone depletion. However, HFC-125 has a very high GWP and HFC-134a has a moderate GWP. EPA strongly encourages recycling and reclamation of this blend in order to reduce its direct global warming impact. Although HFC-143a is flammable, the blend is not. Leak testing has demonstrated that its composition never becomes flammable.

HCFC Blend Epsilon

HCFC Blend Epsilon, which consists of HCFC-22, HFC-143a, and HFC-125, is acceptable as a substitute for CFC-11, CFC-12, and R-502 in retrofitted industrial process refrigeration. Because HCFC-22 contributes to ozone depletion, this blend is considered a transitional alternative. Regulations regarding recycling and reclamation issued under section 608 of the Clean Air Act apply to this blend. HFC-125 and HFC-143a have very high GWPs, and the GWP of HFC-22 is somewhat high. Although HFC-143a is flammable, the blend is not. Leak testing has demonstrated that its composition never becomes flammable.

CFC-12 and R-502 Commercial Ice Machines, Retrofit

R-406A

R-406A, which consists of HCFC-22, HCFC-142b, and isobutane, is acceptable as a substitute for CFC-12 and R-502 in retrofitted commercial ice machines. See the discussion on R-406A under retrofitted R-500 centrifugal chillers,

R-407A and R-407B

R-407A and R-407B, which consist of HFC-134a, HFC-32, and HFC-125, are acceptable as substitutes for CFC-12 and R-502 in retrofitted commercial ice machines. See the discussion on these blends under retrofitted CFC-11, CFC-12, and R-502 industrial process refrigeration.

HCFC Blend Gamma

HCFC Blend Gamma, which consists of HCFC-22, HCFC-142b, and HCFC-124, is acceptable as a substitute for CFC-12 and R-502 in retrofitted commercial ice machines. See the discussion on HCFC Blend Gamma under retrofitted CFC-12, R-500, and CFC-502 refrigerated transport.

HCFC Blend Epsilon

HCFC Blend Epsilon, which consists of HCFC-22, HFC-143a, and HFC-125, is acceptable as a substitute for CFC-12 and R-502 in retrofitted commercial ice machines. See the discussion on HCFC Blend Epsilon under retrofitted CFC-11, CFC-12, and R-502 industrial process refrigeration.

CFC-12 and R-502 Commercial Ice Machines, New

R-407A and R-407B

R-407A and R-407B, which consist of HFC-134a, HFC-32, and HFC-125, are acceptable as substitutes for CFC-12 and R-502 in new commercial ice machines. See the discussion on these blends under retrofitted CFC-11, CFC-12, and R-502 industrial process refrigeration.

CFC-12 and R-502 Vending Machines, Retrofit

R-404A

R-404A, which consists of HFC-125, HFC-143a, and HFC-134a, is acceptable as a substitute for CFC-12 and R-502 in retrofitted vending machines. None of this blend's constituents contains chlorine, and thus this blend poses no threat to stratospheric ozone. However, HFC-125 and HFC-143a have very high GWPs, and the GWP of HFC-134a is somewhat high. EPA strongly encourages recycling and reclamation of this blend to reduce its direct global warming impact. Although HFC-143a is flammable, the blend is not. Leak testing has demonstrated that its composition never becomes flammable.

R-406A

R-406A, which consists of HCFC-22, HCFC-142b, and isobutane, is acceptable as a substitute for CFC-12 and R-502 in retrofitted vending machines. See the discussion on R-406A under retrofitted R-500 centrifugal chillers.

HCFC Blend Gamma

HCFC Blend Gamma, which consists of HCFC-22, HCFC-142b, and HCFC-124, is acceptable as a substitute for CFC-12 in retrofitted household refrigerators. See the discussion on HCFC Blend Gamma under retrofitted CFC-12, R-500, and CFC-502 refrigerated transport.

CFC-12 and R-502 Household Freezers, Retrofit

R-402A and R-402B

R-402A and R-402B, which consist of HCFC-22, propane, and HFC-125, are acceptable as substitutes for CFC-11, CFC-12, and R-502 in retrofitted household freezers. HCFC-22 contributes to ozone depletion, and will be phased out according to the accelerated schedule (published 12/10/93, 58 FR 65018), although it has a lower ODP than CFC-12. The GWP of HFC-125 is very high and that of HCFC-22 is somewhat high. Although these blends contain one flammable constituent, propane, the blends themselves are not flammable. In addition, while testing demonstrated that the vapor and liquid compositions changed during leaks, neither phase became flammable.

R-404A

R-404A, which consists of HFC-125, HFC-143a, and HFC-134a, is acceptable as a substitute for CFC-12 and R-502 in retrofitted household freezers. See the discussion on this blend under retrofitted CFC-12 and R-502 vending machines.

R-406A

R-406A, which consists of HCFC-22, HCFC-142b, and isobutane, is acceptable as a substitute for CFC-12 in retrofitted household freezers. See the discussion on R-406A under retrofitted R-500 centrifugal chillers.

R-507

R-507, which consists of HFC-125 and HFC-143a, is acceptable as a substitute for CFC-12 and R-502 in retrofitted household freezers. See the discussion on this blend under retrofitted CFC-12 and R-502 vending machines.

HCFC Blend Gamma

HCFC Blend Gamma, which consists of HCFC-22, HCFC-142b, and HCFC-124, is acceptable as a substitute for CFC-12 in retrofitted household freezers. See the discussion on HCFC Blend Gamma under retrofitted CFC-12, R-500, and CFC-502 refrigerated transport.

CFC-12 and R-502 Household Freezers, New

R-402A and R-402B

R-402A and R-402B, which consist of HCFC-22, propane, and HFC-125, are acceptable as substitutes for CFC-11, CFC-12, and R-502 in retrofitted household freezers. See the discussion on R-402A and R-402B under retrofitted household freezers.

R-404A

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)
REFRIGERANT RECOVERY OR RECYCLING DEVICE
ACQUISITION CERTIFICATION FORM

EPA regulations require establishments that service or dispose of refrigeration or air conditioning equipment to certify by August 12, 1993 that they have acquired recovery or recycling devices that meet EPA standards for such devices. To certify that you have acquired equipment, please complete this form according to the instructions and **mail it to the appropriate EPA Regional Office. BOTH THE INSTRUCTIONS AND MAILING ADDRESSES CAN BE FOUND ON THE REVERSE SIDE OF THIS FORM.**

PART 1: ESTABLISHMENT INFORMATION

Name of Establishment

Street

(Area Code) Telephone Number

City State Zip Code

Number of Service Vehicles Based at Establishment

County

PART 2: REGULATORY CLASSIFICATION

Identify the type of work performed by the establishment. **Check all boxes that apply.**

- ☐ Type A -Service small appliances
- ☐ Type B -Service refrigeration or air conditioning equipment other than small appliances
- ☐ Type C -Dispose of small appliances
- ☐ Type D -Dispose of refrigeration or air conditioning equipment other than small appliances

PART 3: DEVICE IDENTIFICATION

	Name of Device(s) Manufacturer	Model Number	Year	Serial Number (if any)	Check Box if Self-Contained
1.					☐
2.					☐
3.					☐
4.					☐
5.					☐
6.					☐
7.					☐

PART 4: CERTIFICATION SIGNATURE

I certify that the establishment in Part 1 has acquired the refrigerant recovery or recycling device(s) listed in Part 2, that the establishment is complying with Section 608 regulations, and that the information given is true and correct.

Signature of Owner/Responsible Officer Date Name (Please Print) Title

Public reporting burden for this collection of information is estimated to vary from 20 minutes to 60 minutes per response with an average of 40 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the collection of information. Send comments regarding ONLY the burden estimates or any other aspects of this collection of information, including suggestions for reducing this burden to Chief, Information Policy Branch, EPA, 401 M St., S.W. (PM-223Y); Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer of EPA." DO NOT SEND THIS FORM TO THE ABOVE ADDRESSES. ONLY SEND COMMENTS TO THESE ADDRESSES.

Appendix K
SNAP Alternatives

REFRIGERANTS
ACCEPTABLE SUBSTITUTES

End-Use	Substitute	Decision	Comments
CFC-11 Centrifugal Chillers (Retrofit)	HCFC-123	Acceptable	EPA worker-monitoring studies of 123 show that 8-hour TWA can be kept within 1 ppm (well under the AEL of 30 ppm) when recycling and ASHRAE standards are followed. This substitute is subject to containment and recovery regulations concerning HCFCs.
CFC-12 Centrifugal Chillers (Retrofit)	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
CFC-113 Centrifugal Chillers (Retrofit)	None	Acceptable	
CFC-114 Centrifugal Chillers (Retrofit)	HCFC-124	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
R-500 Centrifugal Chillers (Retrofit)	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
CFC-11, CFC-12, CFC-113, CFC-114, R-500 Centrifugal Chillers (New Equipment/NIKs)	HCFC-123	Acceptable	EPA worker-monitoring studies of 123 show that 8-hour TWA can be kept within 1 ppm (well under the AEL of 30 ppm) when recycling and ASHRAE standards are followed. This substitute is subject to containment and recovery regulations concerning HCFCs.
	HCFC-124	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	HFC-227ea	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	Ammonia Vapor Compression	Acceptable	Users should check local building codes related to the use of ammonia.
	Evaporative Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Desiccant Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Ammonia/water Absorption	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Water/lithium bromide absorption	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Stirling Cycle	Acceptable	Alternative technology.

End-Use	Substitute	Decision	Comments
	Hydrocarbon Blend A	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use hydrocarbons in the process stream.
	Chlorine	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use chlorine in the process stream.
CFC-11, CFC-12, R-502 Industrial Process Refrigeration (New Equipment/NIKs)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	HFC-227ea	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-402A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-404A	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-507	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	Ammonia Vapor Compression	Acceptable	Users should check local building codes related to the use of ammonia.
	Propane	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use hydrocarbons in the process stream.
	Propylene	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use hydrocarbons in the process stream.
	Butane	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use hydrocarbons in the process stream.
	Hydrocarbon Blend A	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use hydrocarbons in the process stream.
	Chlorine	Acceptable	EPA recommends that this substitute be used only at industrial facilities that manufacture or use chlorine in the process stream.
	Evaporative Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Desiccant Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Stirling Cycle	Acceptable	Alternative technology.

End-Use	Substitute	Decision	Comments
	R-404A	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-507	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
CFC-12, R-502 Cold Storage Warehouses (New Equipment/NIKs)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	HFC-227ea	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-402A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-404A	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-507	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	Ammonia Vapor Compression	Acceptable	Users should check local building codes related to the use of ammonia.
	Evaporative Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	Desiccant Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	High to Low Pressure Stepdown	Acceptable	Alternative technology.
	Stirling Cycle	Acceptable	Alternative technology.
CFC-12, R-500, R-502 Refrigerated Transport (Retrofit)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-401A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-401B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-404A	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-507	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.

End-Use	Substitute	Decision	Comments
	Ammonia Vapor Compression	Acceptable	Users should check local building codes related to the use of ammonia.
	Stirling Cycle	Acceptable	Alternative technology.
CFC-12, R-502 Commercial Ice Machines (Retrofit)	R-401A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-401B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-404A	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-507	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
CFC-12, R-502 Commercial Ice Machines (New Equipment/NIKs)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-402A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-402B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-404A	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-507	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	Ammonia Vapor Compression	Acceptable	Users should check local building codes related to the use of ammonia.
	Stirling Cycle	Acceptable	Alternative technology.
CFC-12 Vending Machines (Retrofit)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-401A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-401B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
CFC-12 Vending Machines (New Equipment/NIKs)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.

End-Use	Substitute	Decision	Comments
CFC-12, R-502 Household Freezers (New Equipment/NIKs)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	HFC-152a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	Stirling Cycle	Acceptable	Alternative technology.
CFC-12, R-500 Residential Dehumidifiers (Retrofit)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-401A	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	R-401B	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
CFC-12, R-500 Residential Dehumidifiers (New Equipment/NIKs)	HCFC-22	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
CFC-12 Motor Vehicle Air Conditioners (Retrofit)	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-401C	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
CFC-12 Motor Vehicle Air Conditioners (New Equipment/NIKs)	HFC-134a	Acceptable	EPA strongly recommends the containment and reclamation of this substitute.
	R-401C	Acceptable	This substitute is subject to containment and recovery regulations covering HCFCs.
	Evaporative Cooling	Acceptable	Alternative technology that is currently commercially available; new developments have greatly expanded applicability.
	CO_2	Acceptable	Alternative technology.
	Stirling Cycle	Acceptable	Alternative technology currently under development for this end-use.

END-USE	SUBSTITUTE	DECISION	COMMENTS
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Cold Storage Warehouses (Retrofit)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Cold Storage Warehouses (New Equipment/NIKs)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500, R-502 Refrigerated Transport (Retrofit)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500, R-502 Refrigerated Transport (New Equipment/NIKs)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Retail Food Refrigeration (Retrofit)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Retail Food Refrigeration (New Equipment/NIKs)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Commercial Ice Machines (Retrofit)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-502 Commercial Ice Machines (New Equipment/NIKs)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.

END-USE	SUBSTITUTE	DECISION	COMMENTS
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500 Residential Dehumidifiers (Retrofit)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12, R-500 Residential Dehumidifiers (New Equipment/NIKs)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Motor Vehicle Air Conditioners (Retrofit)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.
CFC-12 Motor Vehicle Air Conditioners (New Equipment/NIKs)	HCFC-22/HFC-142b/CFC-12	Unacceptable	As a blend of both Class I and Class II substances, it has a higher ODP than use of Class II substances.
	Hydrocarbon Blend A	Unacceptable	Flammability is a serious concern. Data have not been submitted to demonstrate it can be used safely in this end-use.

FIRE SUPPRESSION AND EXPLOSION PROTECTION
STREAMING AGENTS
SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

END-USE	SUBSTITUTE	DECISION	CONDITIONS	COMMENTS
Halon 1211 Streaming Agents	[CFC Blend]	Acceptable in nonresidential uses only.		Use of CFCs are controlled under CAA section 610 which bans use of CFCs in pressurized dispensers, and therefore are not permitted for use in portable fire extinguishers. EPA will list this agent as proposed unacceptable in the next SNAP proposed rulemaking. Because CFCs are a Class I substance, production will be phased out by January 1, 1996. See additional comments 1, 2
	HBFC-22B1	Acceptable in nonresidential uses only		Proper procedures regarding the operation of the extinguisher and ventilation following dispensing the extinguishant is recommended. Worker exposure may be a concern in small office areas. HBFC-22B1 is considered an interim substitute for Halon 1211. Because the HBFC-22B1 has an ODP of .74, production will be phased out (except for essential uses) on January 1, 1996. This agent was submitted to the Agency as a Premanufacture Notice (PMN) and is presently subject to requirements contained in a Toxic Substance Control Act (TSCA) Consent Order. See additional comments 1, 2
	C_6F_{14}	Acceptable for nonresidential uses where other		Users must observe the limitations on PFC acceptability by making reasonable effort to undertake

FIRE SUPPRESSION AND EXPLOSION PROTECTION
TOTAL FLOODING AGENTS

ACCEPTABLE SUBSTITUTES

END-USE	SUBSTITUTE	DECISION	COMMENTS
Halon 1301 Total Flooding Agents	[Inert Gas Blend] B	Acceptable in unoccupied areas	Agency review for occupied areas is incomplete.
	[Powdered Aerosol] A	Acceptable in unoccupied areas	For use in occupied areas, additional decomposition product and health effect data is required.
	[Powdered Aerosol] B	Acceptable in unoccupied areas	Agency review for occupied areas is incomplete.
	Carbon Dioxide	Acceptable	System design must adhere to OSHA 1910.162(b)5 and NFPA Standard 12.
	Water	Acceptable	

END-USE	SUBSTITUTE	DECISION	CONDITIONS	COMMENTS
			than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 5.0%. HCFC-22 concentrations greater than 5.0% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	
	HCFC-124	Acceptable	Until OSHA establishes applicable workplace requirements: Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 1.0%. Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 2.5%. HCFC-123 concentrations greater than 2.5% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	The comparative design concentration based on cup burner values is approximately 8.4% while its cardiotoxic LOAEL is 2.5%. Thus, it is unlikely that this agent will be used in normally occupied areas. See additional comments 1, 2, 3, 4

END-USE	SUBSTITUTE	DECISION	CONDITIONS	COMMENTS
			greater than 50.0%. HFC-23 concentrations greater than 50 percent are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge. The design concentration must result in an oxygen level of at least 16%.	
	HFC-125	Acceptable	Until OSHA establishes applicable workplace requirements: Where egress from an area cannot be accomplished within one minute, the employer shall not use this agent in concentrations exceeding its cardiotoxic NOAEL of 7.5%. Where egress takes longer than 30 seconds but less than one minute, the employer shall not use the agent in a concentration greater than its cardiotoxic LOAEL of 10.0%. HFC-125 concentrations greater than 10.0% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	The comparative design concentration based on cup burner values is approximately 11.3% while its cardiotoxic LOAEL is 10.0%. Thus, it is unlikely that this agent will be used in normally occupied areas. See additional comments 1, 2, 3, 4

END-USE	SUBSTITUTE	DECISION	CONDITIONS	COMMENTS
			LOAEL of 10.5%. HFC-227ea concentrations greater than 10.5% are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.	(SNUR). See additional comments 1, 2, 3, 4
	C_4F_{10}	Acceptable where other alternatives are not technically feasible due to performance or safety requirements: a. due to their physical or chemical properties, or b. where human exposure to the extinguishing agents may approach cardiosensitization levels or result in other unacceptable health effects under normal operating conditions.	Until OSHA establishes applicable workplace requirements: For occupied areas from which personnel cannot be evacuated in one minute, use is permitted only up to concentrations not exceeding the cardiotoxicity NOAEL of 40%. Although no LOAEL has been established for this product, standard OSHA requirements apply, i.e. for occupied areas from which personnel can be evacuated or egress can occur between 30 and 60 seconds, use is permitted up to a concentration not exceeding the LOAEL. All personnel must be evacuated before concentration of C_4F_{10} exceeds 40%. Design concentration must result in oxygen levels of at least 16%.	The comparative design concentration based on cup burner values is approximately 6.6%. Users must observe the limitations on PFC acceptability by making reasonable efforts to undertake the following measures: (i) conduct an evaluation of foreseeable conditions of end use; (ii) determine that human exposure to the other alternative extinguishing agents may approach or result in cardiosensitization or other unacceptable toxicity effects under normal operating conditions; and (iii) determine that the physical or chemical properties or other technical constraints of the other available agents preclude their use; Documentation of such measures must be available for review upon request.

END-USE	SUBSTITUTE	DECISION	CONDITIONS	COMMENTS

Additional Comments

1 - Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code.
2 - Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must reenter the area.
3 - Discharge testing should be strictly limited only to that which is essential to meet safety or performance requirements.
4 - The agent should be recovered from the fire protection system in conjunction with testing or servicing, and recycled for later use or destroyed

END-USE	SUBSTI-TUTE	DECISION	CONDITIONS	COMMENTS
				appropriate, users should consult the description of potential uses which is included in the preamble to this rulemaking. See additional comments 1, 2, 3, 4

Additional Comments

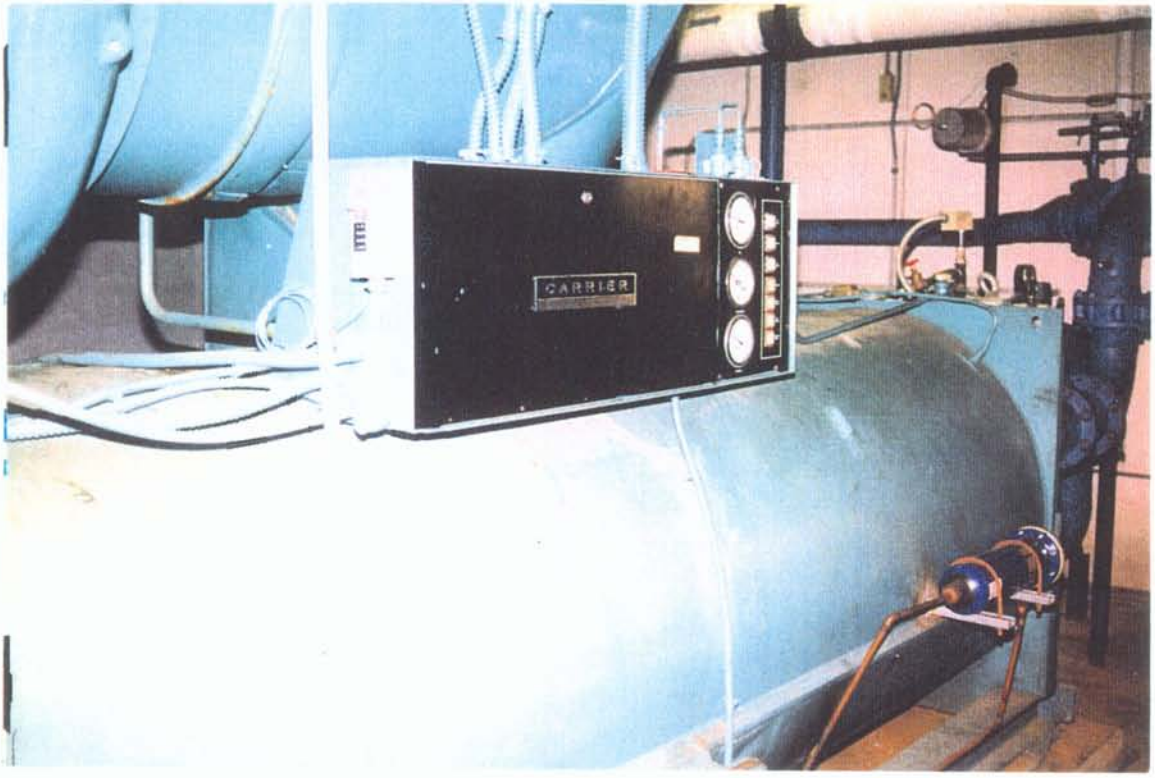
1 - Must conform with OSHA 29 CFR 1910 Subpart L Section 1910.160 of the U.S. Code.
2 - Per OSHA requirements, protective gear (SCBA) must be available in the event personnel must reenter the area.
3 - Discharge testing should be strictly limited only to that which is essential to meet safety or performance requirements.
4 - The agent should be recovered from the fire protection

APPENDIX L

Personnel Contacted (CFC/Halon Survey)

Name of Contact	Organization	Location	Information provided
Thom Rahe	Johnson Controls	Building 215	List of chillers/condensing units
Charlie Phillips	Johnson Controls	Building 215	Mechanical Equipment Supervisor
Charlotte Stevens	Johnson Controls	Building 215	Quantity of freon purchased
Susan Thibodeaux	Johnson Controls	Building 215	Quantity of freon purchased
Roger Grimes	Johnson Controls	Building 215	Building access/chiller information
Tim Owens	Johnson Controls	Building 215	Building access
Todd Siple	Johnson Controls	Building 215	Project Manager
Walley Greg	Johnson Controls	Birmingham, AL	Large chiller service records/information
Mike Isbell	AAFES Maintenance	Building 2042	Building access/AC information
Cathy Aleschire	AAFES Administrative	Building 2042	Building access
John Foster	NACH	Building 292	Building access
Dennis Borden	NACH	Building 292	Building access
Mary Ann Reeves	NACH	Bilding 292	List of hospital refrigeration equip.
Susie Prater	DEH	Building 215	Building location and status
Ron Burke	DEH	Building 215	Building location and status
Lois Wise	DOL	Building 241	List of small equipment on post
Monica Adams	DOL	Building 241	List of small equipment on post
Ron Moody	Org. Maintenance	Building 350	FOX vehicle halon and CFC info
Maj. David McPherson	National Guard		Building access, list of CFC equip.
Clayton Maddox	National Guard		MSDS sheets, materials info
M.C. Jones	National Guard		Building access, materials info

Appendix M
Equipment Photographs



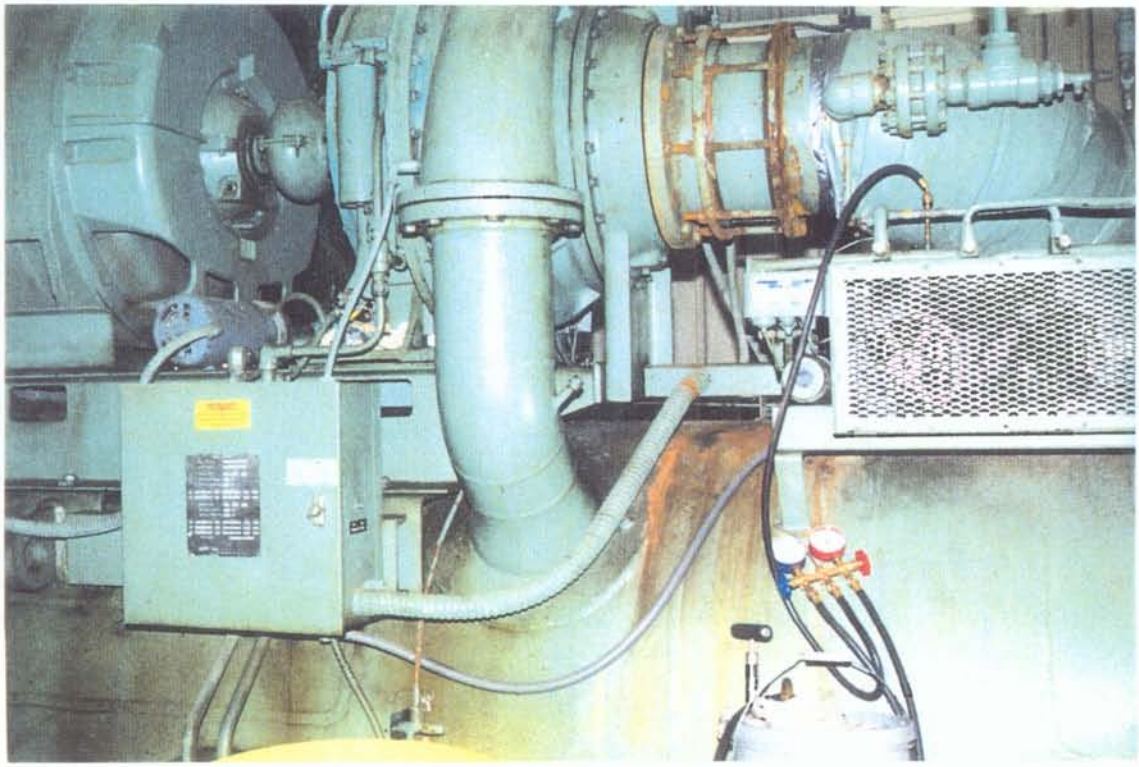
200-Ton R-11 Centrifugal Carrier Chiller - Building 503

125-Ton Centrifugal Trane Chiller
Moved From Building 503 to Building 294 and Retrofitted with HFC-123A.

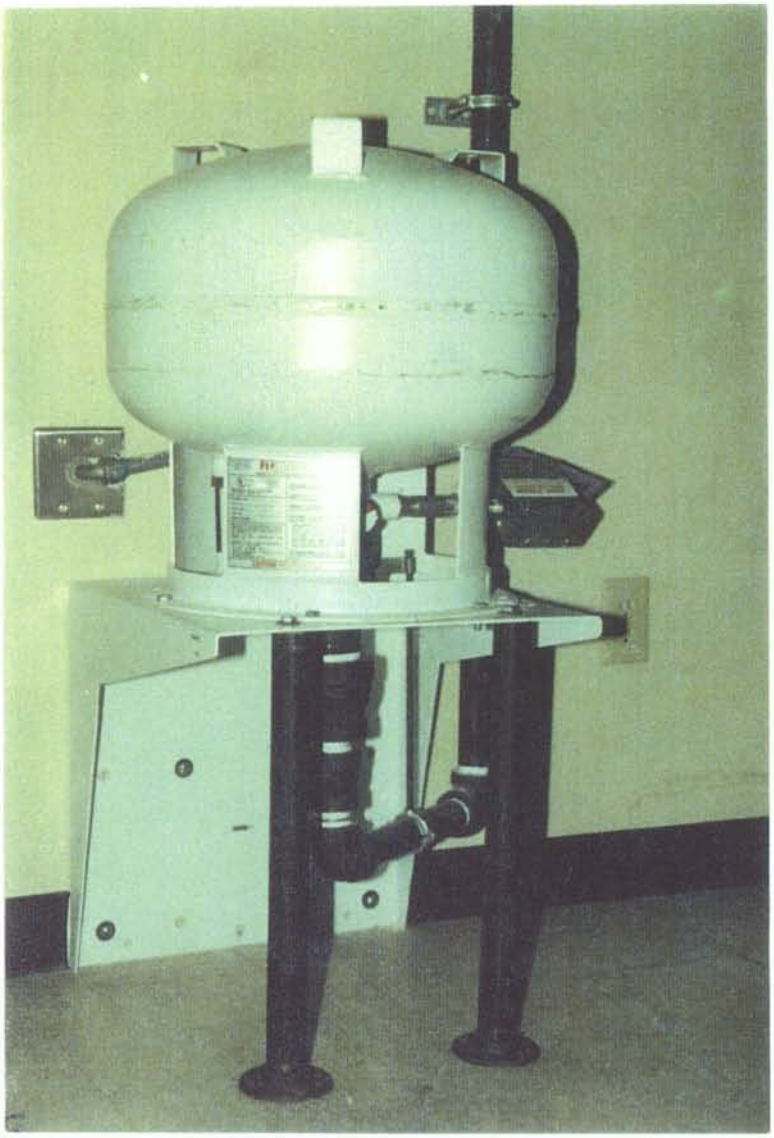
Replacement Canisters of R-500 for York Centrifugal Chillers
at Boiler Plant No. 4 (Building 1876).

Old-Style Automatic Purge Unit
on R-11 Centrifugal Carrier Chiller at Building 2281.

Marley Cooling Tower at Boiler Plant No. 4 (Building 1876). This Cooling Tower Reduces the Cooling Load Placed on the 900-Ton R-500 York Chiller at the Boiler Plant.



900-Ton R-500 Centrifugal York Chiller (Building 1876).



Permanent Halon System used for
Room 0053 (Electrical Area) in Noble Army
Community Hospital (NACH).

ATTACHMENT 7
RESPONSE TO COMMENTS BY ADEM, EPA, AND DOJ

RESPONSE TO COMMENTS
BY ALABAMA DEPARTMENT OF ENVIRONMENT AND MANAGEMENT
DRAFT ENVIRONMENTAL CONDITION OF PROPERTY
DEPARTMENT OF JUSTICE (DOJ), CENTER FOR DOMESTIC PREPAREDNESS
FORT MCCLELLAN, ALABAMA

General Comments

Comment 1. **Information provided in the report indicates that Site Investigations are currently being conducted at three sites (Bldg. 303, 303F, & 304) that are proposed for transfer to the Department of Justice.**

Response: Information provided in the report is correct, site investigations are being conducted at the three sites that are proposed for transfer to the DOJ.

Comment 2. **Site Investigations are being conducted at Buildings 303 and 304; however, no reasons for the investigations are discussion in the report. The rational for the investigations at these locations should be discussed in Section 3.1 of the report.**

Response: The rationale that site investigations to determine presence or absence of contamination for Buildings 303 and 304 will be provided in Section 3.1.

Comment 3. **A statement that a Site Investigation to address possible contamination for the UST at Building 303, Parcel 41(7) is being conducted should be included in Section 3.3.2 of the report. The addition of this type of statement would clarify that environmental investigations are currently being conducted at the site.**

Response: A statement that site investigations are being conducted to determine presence or absence of contamination for the UST at Building 303, Parcel 41(7) will be added in Section 3.3.2 of the report.

Comment 4. **Please consider all the applicable State rules and regulations when UST investigations are being performed.**

Response: UST investigations are being performed in accordance with; applicable UST State rules and regulations, ADEM's Comments and Recommendations for the Unevaluated USTs (CERFA Category 7) at Fort McClellan letter dated March 2, 1999, and ADEM's concurrence to the Final Site-Specific field Sampling Plans and Health and Safety Plans for Underground Storage Tank Closure Assessment dated September 1999, for McClellan, Alabama, letter dated October 7, 1999.

Comment 5: **Keep in mind that several parcel Site Investigations are under ADEM and EPA review at this time (example: Parcel No. 150(7), 95(7), etc.). Many**

concerns as to the Parcels fate (restricted, unrestricted, land use controls, etc.) are under consideration.

Response: Comment noted.

RESPONSE TO COMMENTS
BY UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION IV
DRAFT ENVIRONMENTAL CONDITION OF PROPERTY
DEPARTMENT OF JUSTICE (DOJ), CENTER FOR DOMESTI C PREPAREDNESS
FORT MCCLELLAN, ALABAMA

Overall Comments

Comment 1. **The purpose of this Draft ECOP review was to ensure that a complete picture of environmentally-related findings and conditions is presented. The purpose of the Draft ECOP, as stated in Section 1.0, ". . . is to document the environmentally-related findings and conditions. . .," cannot be realized, since all site investigation reports and/or decision documents for the properties described in the Draft ECOP have not been finalized. For example: The Final Baseline Environmental Investigation Report for the Chemical Defense Training Facility (CDTF), Parcel 126Q-CWM, Area F1.3 in the Draft ECOP, has not been submitted to the EPA for review. Therefore, a complete EPA review of the Draft ECOP cannot be accomplished.**

Response: Comment noted. Field work for all sites on the property requiring investigation has been completed and reports have been submitted for regulatory review. The current report submittal and review status is as follows:

Parcel 75(7) Former Ordnance Motor Repair Building 303/304
Parcel 41(7) UST Building 303F
The draft site investigation report was submitted to the regulators on July 28, 2000. The Fort McClellan Commodity Site Survey Report was submitted to the regulators March 2000. The State of Alabama Department of Public Health concurrence letter was received May 3, 2000. The NRC NFA letter dated July 27, 2000 has been received. The EPA concurrence letter was received September 11, 2000.

Parcel 95(7) Former Hospital
The draft site investigation report was submitted to the regulators on May 25, 2000. ADEM comments were received June 23, 2000. EPA comments were received July 11, 2000. The response to comments package was discussed during the August BCT meeting and the BCT made a decision that no further action is required for Parcel 95(7).

Parcel 126(Q) Chemical Defense Training Facility
Parcel 59(7) CDTF Building 4482 UST
Parcel 104(7) CDTF Incinerator
The draft environmental baseline investigation report was submitted to regulators on December 14, 1999. ADEM concurrence letter was received January 20, 2000. EPA comments were received January 20, 2000. The resolution to comments was delayed until screening and background values were finalized on July 6, 2000. There are no significant issues regarding EPA comments on the draft document. The final report was submitted on August 30, 2000.

Parcel 64Q Radiological Laboratories, Building 1081, Sibert Hall
The Final Survey Report was submitted to the regulators March 20, 2000. NRC comments were received April 11, 2000. The addendum to the Final Survey Report addressing NRC comments was submitted June 19, 2000. NRC release for unrestricted use and license termination letter dated July 27, 2000 has been received. The Alabama Department of Public Health and EPA concurrence letters were received August 16 and September 11, 2000, respectively.

Parcel 79(6) Landfill No. 2
An EECA is currently underway for Landfill No. 2, a draft EECA Report is expected to be submitted in March 2001.

Comment 2. **The Draft ECOP is very draft and should be evaluated and edited for completeness and readability. There are incomplete sentences and typographical errors. EPA review of the revised document will be facilitated by a thorough and complete review within the Army prior to your re-submission or revision.**

Response: Comment noted.

Comment 3: **The proposed transfer includes numerous properties that are environmentally encumbered to a degree. I would suggest that to remove ambiguity, clear statements regarding future investigations, cleanup, response actions, and liability be substituted. This comment applies to this and all future transfer documents. Clear concise statements reduce ambiguity and the resulting questions and comments from the Regulatory Community.**

Response: Comment noted.

Comment 4: **There are numerous comments regarding the Above Ground Storage Tanks and the Underground Storage Tanks. When responding or revising the document, please revise the other portions impacted by any change in Army position regarding storage, release, or jurisdiction, etc.**

Response: All portions of the text, including Section 3.3.1 and 3.3.2 will be revised to reflect the comment.

Comment 5: **Due to the belated recent discovery of OE/UXO on unrelated, but none the less, transferred Fort McClellan property, confidence in the completeness and accuracy of the Archive Search Report, (ASR) for Fort McClellan within EPA continues to wain. I am confident that the Army is likewise concerned that all transferred property is free of OE/UXO and concerned with the ASR findings also. Due to the proximity of some of the CDP property addressed by this ECOP to previously suspect UXO contaminated property, I would highly recommend that the Army consider ground confirmation of the ASR findings relative to the CDP property. Due to the nature of the training, and live Agent storage within the CDP, an incident involving UXO on this property could likely be more disastrous.**

Response: The following text will be added to Section 3.9 of the ECOP:

Based on a review of existing records and available information, the Property is not known or suspected to contain ordnance or explosives (USACE, 1999). A portion of a 37 mm anti-tank range fan was identified as possibly overlapping the eastern-most boundary of the property. An extensive ground reconnaissance was performed on this overlapping portion of the property to investigate the potential presence of OE. No OE was found during this reconnaissance and the area was relatively clear of trash and debris. Based on these findings, it is believed that OE is not present on the Property. However, since OE has been found on adjoining property, there is a potential for OE to be present in the vicinity of the areas of the granted property, which may pose an explosive safety hazard. The U.S. Army intends to investigate the surrounding property. The investigation may have an impact on the property through use of exclusion zones that intersect the property. The Letter of Transfer will contain the potential for the presence of ordnance and explosives notice provided in the Environmental Protection Provisions (Attachment 1).

The following notice will be added to the EPPs :

NOTICE OF THE POTENTIAL FOR THE PRESENCE OF ORDNANCE AND EXPLOSIVES

An archival search conducted during compilation of the Fort McClellan Comprehensive Environmental Response Facilitation Act (CERFA) Report and the Archives Search Report for Ordnance, Ammunition, and Explosives/Chemical Warfare Materials found there are potential ordnance-related training areas within or immediately adjacent to the Property. An extensive ground reconnaissance was performed on the areas of the property suspected of potential OE contamination. No evidence of OE was found during this investigation. However, in the event the Transferee, its successors, and assigns, should discover any ordnance on the Property, it shall not attempt to remove or destroy it, but shall immediately notify local law enforcement personnel who will notify the nearest military Explosives Ordnance Disposal (EOD) unit to dispose of such ordnance properly at no expense to the Transferee, whenever OE may be discovered.

General Comments

Comment 1: A table of contents should be provided.

Response: A table of contents will be provided.

Comment 2. A complete list of acronyms should be provided.

Response: A list of acronyms will be provided.

Comment 3. **Figures showing the general location of Fort McClellan in relation to the State of Alabama and the location of properties to be transferred in relation to Fort McClellan should be provided.**

Response: Additional figures will be provided to show the general location of Fort McClellan in relation to the State of Alabama and the location of properties to be transferred in relation to Fort McClellan.

Comment 4. **A list of references should be provided and cited within the document text.**

Response: A list of references will be provided and cited within the document text.

Comment 5. **General terms such as "the Army," "the Government," and/or any other ambiguous terms should be clarified. If the document is referring to the United States Army and/or the United States Government, and/or the State Government of Alabama, the Draft ECOP should clearly so state. Please strive to remove ambiguity.**

Response: The term "United States" will be replaced with "U.S Army" in Section 4.0 of the ECOP. The term "Government" will be replaced with "U.S. Army" in the CERCLA Access Clause of the Environmental Protection Provisions. The term "Army" will be prefaced with U.S. throughout the text. No other clarifications are necessary.

Comment 6. **Under separate cover from this property transfer issue, or via e-mail, please explain the modifications to the Parcel designations necessary for property tracking when only portions of parcels remain in Army control. By way of example; only portions of Parcel 95(7) are being transferred to the CDP, and the remainder of that parcel is under Army control. How will these two 95(7) parcels now be tracked?**

Response: Per discussion during the BCT meeting, modifications to parcel designations necessary for property tracking will be addressed in the BCP.

Comment 7. **The section explaining the history and status of the various tanks is extraordinarily difficult for this reader to follow. Please have an outside party review this section and revise upon concurrence.**

Response: The section on the history and status of various tanks in Section 2.0, Area F1.3 will be revised to make it easy to read as follows:

Four above ground storage tanks (AST), are located at the CDTF site. Three of the ASTs were previously located within a concrete berm southwest of Building 4484. However, one of the ASTs, a 4,000-gallon tank that previously held sulfuric acid, has been empty since 1988, and was moved to store diesel fuel on the East Side of Building 4482. Sulfuric acid is no longer used at the CDTF. The second AST is a 4,000-gallon tank that currently holds a caustic soda solution. Both of these tanks had lines that fed into a third AST, a 20,000-gallon

wastewater tank. The wastewater tank contains liquid decontamination wastes generated in the Training Building. The fourth AST, located northwest of Building 4484, is an empty 40,000-gallon fuel oil tank. This AST was used to supply fuel to the Incinerator between 1986 and 1990 prior to the CDTF switching to natural gas.

Specific Comments

Comment 1. **Section 2.0 Property Description. The cross-referencing of text in this section and Figure 1 and Table 1 seems to indicate that Building 4482 has two Parcel numbers associated with it, Parcels 59(7) and 62(1). Please clarify.**

Response: Parcels 59(7) and 62(1) are a former UST and current AST, respectively. Both tanks are associated with Building 4482. Parcel 59(7) is a site for the former 5,000-gallon heating oil UST that was removed in September 1998. Parcel 62(1) is a 4,000-gallon AST that previously held sulfuric acid, but had been empty since 1988 and was moved to store diesel fuel on the east side of Building 4482.

Comment 2. **Section 3.1 Environmental Condition of Property Categories. Building 4481 is not described. Building 4482 is listed as containing both categories 1 and 7. Please correct.**

Response: Building 4481 will be added to the text. Building 4482 contains both Category 1 and 7 sites as explained in response to specific comment 1 above.

Comment 3. **Page 4, Section 3.1, First Paragraph. The title of the paragraph is "Parcel 59(7): one 5,000 Heating Oil UST, Building 4482". However, the text attempts to explain the rationale for reclassification of the property due to a DoD revision of release from an unrelated AST. Please clarify or correct this section and reclassify if necessary.**

Response: The text "Parcel 59(7): one 5,000 Heating Oil UST, Building 4482" is not the title of the paragraph. The sentence is a continuation of the listing of ECP Category 7 sites.

Comment 4. **Page 4, Section 3.1, Second Paragraph. The wording of this paragraph indicates that only chemicals associated with the CDTF were evaluated. Is this correct? If so, how is the Army Environmental Program confident that the entire suite of chemicals used at the former CDTF is known, and therefore contained within the sampling scheme cited at this location.**

Response: This is not correct, the word "site specific" will be deleted and the text changed to read "in 1999 a baseline environmental investigation was conducted for the CDTF property including parcels 62(2), 104(7), 59(7) and 126Q-CWM".

Comment 5. **Section 3.2 Storage, Release or Disposal of Hazardous Substances. This section states that there is no evidence that hazardous substances were stored, released, or disposed on the property in excess of the reportable**

quantities. The text in Section 3.3.2 seems to contradict the above statement. Above-ground Storage Tanks (ASTs) at Buildings 4482 and 4484 have stored sulfuric acid, caustic soda, and liquid decontamination wastes including chorine and DS2, in tanks capable of holding between 4,000 gallons to 20,000 gallons. Several of these substances are listed as hazardous at 40 CFR 302.4 and, as such, should be reported when stored in excess of the reportable quantity or 1000 kilograms, whichever is greater. Please provide the notice required at 40 CFR 373, if applicable, or clarify why such notice is not appropriate.

Response: The text will be revised to indicate that hazardous substances stored at the property were stored at quantities below reportable quantities except for sulfuric acid. Quantities of stored hazardous substances were as follows:
1). 4,000-gallon caustic soda tank: One 55-gallon drum of 50% caustic soda mixed with 4000-gallons of water (EBS, 1998 and Doug Lipsey, 2000- personal communication)
2). 20,000-gallon decontamination wastewater tank: 50-gallons of 4-6% chlorine (household bleach) mixed with 3,000-gallons of water and 2-gallons of decontamination agent (DS2) mixed with 3,000-gallons of water and diluted with wash water to 20,000 gallons. Decontamination waste water in the 20,000-gallon tank is analyzed and checked to ensure that water concentrations are within drinking water standards per ADEM guidelines prior to incineration (EBS, 1998 and Doug Lipsey, 2000-personal communications).
3). 4,000-gallon tank sulfuric acid : 97% sulfuric acid was stored in the tank from 1985 through 1988.

Comment 6. **Section 3.3.1 Storage, Release or Disposal of Petroleum Products. This section states that there is no evidence that any petroleum or petroleum products in excess of 55 gallons at one time were stored, released, or disposed on the property, and that, accordingly, there is no need for notification of petroleum storage, release, or disposal. The following section, Section 3.3.2, describes several Underground Storage Tanks (USTs) and Above Ground Storage Tanks, (ASTs), with storage capacities ranging from 3,000 to 40,000 gallons, which stored a variety of petroleum products, including heating oil, diesel fuel, and fuel oil. In addition, TPH in the soil would seem to indicate that a petroleum release had occurred on the property, and that property should be classified as ECP Category 2 (areas where there has been a release of petroleum or petroleum products). Please clarify the discrepancy in the representations presented within the two sections. Please verify with ADEM the validity of the Army "No Release" determination.**

Response: The discrepancy in the text will be corrected and the text revised accordingly.

Comment 7: **Page 5, Section 3.3.1. Please elaborate on the logic used to claim that no storage of petroleum products in excess of 50 gallons occurred, when the text discussion is about tanks in excess of 3,000 gallons.**

Response: The discrepancy in the text will be corrected and the text revised accordingly.

Comment 8. **Page 5, Section 3.3.2. Attachment 2 is the UST closure reports. Attachment**

1 *of* Attachment 2 is a paragraph stating that ADEM did not regulate the subject tank due to the proximity of the end user. Is there a concurrence letter from ADEM on this determination? From past conversations with ADEM personnel, the jurisdictional determination presented at Attachment 1 is unrecognizable as an ADEM regulation trigger.

Response: The USTs at Buildings 303 and 4482 contained heating oil for consumptive use on the premises where they were stored and were therefore not regulated based on the exemption as stated in ADEM Code 335-6-15-.02 (ddd) 2.

Comment 9. **Page 5, Section 3.3.2. I would recommend that the Army discuss the various ASTs and USTs with ADEM to verify that what the Army interprets as an ADEM NFA letter for a tank is in actuality an ADEM NFA letter. By way of example, was 175 mg/kg the applicable TPH trigger for excavated soil. I make this recommendation as a way of ensuring that the Army does not become liable for a cleanup of a long forgotten tank assumed to be unregulated, or determined to be clean. The above example may well be a release under CERCLA in need of proper notification within the Transfer Documents. Please verify with ADEM.**

Response: Based on ADEM comments to the Environmental Baseline Survey and BCT consensus, all USTs were designated Environmental Condition of Property Category 7 requiring further evaluation. All USTs are currently undergoing site investigations regardless of their closure status prior to BRAC. Closure reports are presented in the attachment to document tank history.

Comment 10. **Page 5, Section 3.3.2. Implied in the UST discussion is the assumption that the tanks are unregulated. Please verify this assumption with ADEM.**

Response: See response to Specific Comment 8.

Comment 11. **Page 5, Section 3.3.2 Please explain how a 5,000 gallon tank storing sulfuric acid, and a 20,000 gallon tank used to store DS2 and chlorine are not sufficient in size or content to qualify for storage of Hazardous Substances and therefore in need of proper notice and documentation within the Transfer Document.**

Response: See response to Specific Comment 5.

Comment 12. **Page 6, Section 3.7. The discussion of the CDTF radiological issues indicates that a close-out report was not done for the instrument storage area as this area is to be used for the same purpose by the CDP. Will the CDP assume the NRC license? If no final radiological report exists, what protects the Army from liability from potential future radiological cleanups? What protects the CDP from inheriting radiological contamination left over from Army activities?**

Response: The M8A1 Chemical Agent Detectors and Chemical Agent Monitors were

transferred to EGG Defense Materials Inc. EGG currently holds the NRC Materials License (License # 43-27467-01) for the detectors and monitors. The instruments are stored in the Operation and Maintenance Building (Building 4484) and in use at the Training Building (Building 4482) for training purposes.

The U.S. Army Chemical School conducted alpha surveys and wipe tests on the instruments prior to transferring them to EGG Defense Materials Inc. Results from the surveys and wipe tests were negative. Results from the wipe tests are maintained in the Radiation Testing and Tracking System (RaTTS). The RaTTS is a computer database used by the Army for tracking the history of the instruments by serial number from the time they enter the Army until the time they are disposed.

The CDTF was turned over to the Department of Justice as an operating facility. Liability issues are addressed in the ECOP and will also be addressed in the Letter of Transfer.

Comment 13. **Page 6, Section 3.7. See comment 8 above. If there are potentially dangerous radiological conditions within the buildings being transferred, specifically the instrument storage area, shouldn't the property recipient be apprized of the same within the transfer documents and the appropriate restrictions be implemented?**

Response: See response to Specific Comment 12 above.

Comment 14. **Page 6, Section 3.7. The final sentence in the paragraph explaining the radiological issues at the CDTF contradicts the three preceding paragraphs. Please correct this section.**

Response: The comment is not clear. Attachment 4 includes the radiological close out report for the mechanical and blood draw rooms. The preceding paragraphs addresses Building 1081. The final sentence in the paragraph addressing CDTF issues does not address Building 1081.

Comment 15. **Page 8, Section 3.10. The nerve agent "BG" should be defined. If the document section cites the chemical warfare agent sarin (GB), the Draft ECOP should so state.**

Response: The text will be revised to read sarin (GB).

Comment 16. **Section 4.0 Remediation. This section states that the Army's reservation of the right to conduct remediation activities is included in Attachment 1, the Environmental Protection Provisions (EPPs). The EPPs do not include an obvious reservation of such "right." The EPPs do, however, contain two confusing statements. One states that the Army will take all action necessary to protect human health and the environment. The other states that the DOJ agrees to be responsible for any future remediation, but also states that no further investigation, remediation or clean up of the CDTF is**

required at this time. These statements do not appear to comprise a "reservation." Please clarify the location of the Army's reservation. This confusion implicates the issue of the relative responsibility for remediation of the CDP property between the Army and the DOJ. Please clarify the roles of the two federal agencies in the cleanup of the property.

Response: By substituting the term "Government" with "U.S. Army" in the CERCLA Access Clause as stated in the response to General Comment 5, the Army clearly reserves the right to conduct remediation activities.

Comment 17. **Page 8, Section 4.0, Second Sentence. The United States Government entity that will conduct remedial action(s), if necessary, needs to be specified. There are contradictions within the document on this important point. Please read the document and remove the ambiguity and contradictions.**

Response: See response to General Comment #5 and Specific Comment #16.

Comment 18. **Page 9, Section 8.0. In the conclusion section the statement is made that the Army will be responsible for the completion of the environmental program at the U.S. Garrison, Fort McClellan. As the title,"U.S. Army Garrison, Fort McClellan is undefined, the meaning of this sentence is unknown. Please revise this sentence and make it applicable to the property under discussion. Does the U.S. Army Garrison, Fort McClellan include CDTF/CDP property before and after transfer?**

Response: With the exception of the CDTF as spelled out in the Environmental Protection Provisions, The U.S. Army is responsible for any post transfer remediation that may be necessary on the property and for any post transfer contamination caused by the Army that may be found in the future. The U.S. Army Garrison, Fort McClellan is the name of the installation formerly known as U.S. Army, Fort McClellan.

Comment 19 **Section 8.0 Conclusion._This section states that the DOJ will agree to a right of entry over and through the property, granting access to complete any action necessary in order to complete post-transfer environmental requirements. First, please note that EPA would like to review the transfer documentation in order to verify such statements. Second, please revise this sentence, adding after "requirements," "or in the event further remedial action is necessary."**

Response: A copy of the Letter of Transfer will be provided for your records. The sentence will be revised.

Comment 20. **Environmental Protection Provisions. These provisions indicate that the Army will not incur liability for non-Army contamination. Please clarify that this sentence, in particular, the phrase "or other non-Army entities," refers to post-transfer contamination, in light of the covenant contained in the section entitled "Environmental Responsibilities," which is consistent with CERCLA's scheme of joint and several liability.**

Response: Since the property is passing from one U.S. Government Agency to another U.S. Government Agency, there is no abrogation of responsibility. What will be delineated fully in the Letter of Transfer is the U.S. Government Agency responsible for pre and post transfer environmental remediation.

Comment 21. **Environmental Protection Provisions. The Notice of the Presence of Asbestos-Containing Materials (ACM) and Covenant. Paragraph b indicates that the asbestos surveys are contained as Attachment 2. Attachment 2 is the UST Closure Report for Building 303. Please clarify the location of the asbestos surveys.**

Response: The text will be changed to indicate that asbestos surveys are included in Attachment 3.

Comment 22. **Environmental Protection Provisions. See Comment 12. The paragraph entitled "Environmental Responsibilities" does not provide a clear statement of the relative responsibilities of the two federal agencies involved in this property transfer. On the one hand, it contains the statement that the Army will take all action necessary to protect human health and the environment with respect to any hazardous substances that either are present on the property at the time of transfer or come to be located on the property after transfer as a result of the acts or omissions of the Army. In addition, this paragraph states that the parties agree that no further investigation, remediation or clean up of the CDTF is required at this time. On the other hand, the paragraph states that the DOJ agrees to be responsible for any future investigation, remediation or clean up of the CDTF that may be necessary as a result of cessation of operations, facility disposal or transfer, or for any other reason.**

Response: With the exception of the CDTF as spelled out in the Environmental Protection Provisions, The U.S. Army is responsible for any post transfer remediation that may be necessary on the property and for any post transfer contamination caused by the Army that may be found in the future.

Comment 23. **Section 330 of the Defense Authorization Act for Fiscal Year 1993, Public Law 102-484 as amended by Section 1002 of the Defense Authorization Act for Fiscal Year 1994, Public Law 103-160 provides that the Secretary of Defense shall hold harmless, defend and indemnify the persons that acquire ownership or control of any facility at a military installation that is closing or closed pursuant to a base closure law from any claim for personal injury or property damage or economic loss that results from the release of hazardous substances or petroleum products as a result of DoD activities. Please note that this indemnification provision is an ongoing obligation of the Secretary of the Defense and should be discussed in the ECOP documentation.**

Response: This provision is not applicable in Fed-to-Fed transfers as the U.S. Government is not a person. The intent of the law was to establish a

scheme of indemnification for transfers outside of the U.S. Government.

RESPONSE TO COMMENTS
BY THE DEPARTMENT OF JUSTICE
DRAFT ENVIRONMENTAL CONDITION OF PROPERTY
DEPARTMENT OF JUSTICE (DOJ), CENTER FOR DOMESTI C PREPAREDNESS
FORT MCCLELLAN, ALABAMA

Comment 1: **Page 1, paragraph 1.0: In the second line, change the acreage to read "approximately 62 acres".**

Response: The acreage will be changed to approximately 62 acres.

Comment 2: **Page 1, paragraph 2.0: In the first line, change the acreage to read "approximately 62 acres".**

Response: The acreage will be changed to approximately 62 acres.

Comment 3: **Page 1, paragraph 2.0, 3rd paragraph: As we discussed, indicate the usage of building 1081 was the U.S. Army Chemical School and appropriate functions of the school.**

Response: The text will be revised to reflect the comment.

Comment 4: **Page 2, paragraph Area F1.3, 2nd paragraph: In the sixth line, the phrase should read "designed to train up to 10,000". The 10,000 throughput is based on the CDTF capability, less mobilization, and the CDP's training load consisting of 200 students per week for 50 weeks per year.**

Response: The text will be revised to reflect the comment.

Comment 5: **Page 2, paragraph Area F1.3, 2nd paragraph: In the eleventh line, omit the words "waste treatment and".**

Response: The words "waste treatment and" will be omitted.

Comment 6: **Page 2, paragraph Area F1.6: Include appropriate comments from the site investigation for the old hospital area.**

Response: Appropriate comments will be incorporated in the text from the Old Hospital SI report.

Comment 7: **Page 3: As discussed, you were going to include an ECP category key and cross reference ECP Category 7 to appropriate tables.**

Response: An ECP Category key will be included in the revised text.

Comment 8: Page 4, the second and third paragraphs on the page: Phrase should read "risk to either human health or the environment" in each instance.

Response: The text will be revised to reflect the comment.

Comment 9: Page 4, paragraph 3.2: As discussed, correct the paragraph to reflect actual circumstances concerning storage.

Response: The text will be revised to reflect the actual storage of hazardous substances in excess of reportable quantities only.

Comment 10: Page 5, paragraph 3.3.2: In the fifth line, the residue was not stockpiled on site but transported to an approved landfill off the installation.

Response: Both the closure report, prepared by Theta (1996), and included as Attachment 2 in the ECOP and the Final UST Summary Report prepared by IT Corporation (1999) indicate that the excavated soil was stockpiled on site. Stockpiled soil was sampled and analyzed. Soils not exhibiting evidence of contamination were used to backfill the excavation. Approximately 24 cubic yards of contaminated soil were stockpiled to await thermal volatilization. The remaining soil not exhibiting evidence of contamination was transported to the Base Borrow Pit.

Comment 11: Page 8, paragraph 3.10: In the second line, change BG to read GB.

Response: The text will be changed to read "GB".

Comment 12: Table 1: As we discussed, you were going to include a key for the Non-CERCLA Issues codes.

Response: A key for Non-CERCLA issues will be included for Table 1.

Comment 13: The ECOP must further address the following issues:

The suspected construction debris landfill located on the west side of the Chemical Defense Training Facility (CDTF) to include any information that the material is non-hazardous.

Please reference the letter from Mr. Ron Levy to your office dated August 10, 2000. As explained in the letter, the suspected fill area consists of fill materials generated during a standard construction-type "cut and fill" operation during the CDTF construction. The fill area represents an area that does not pose any hazard to either human health or the environment.

The presence of ozone depleting substances (ODS) contained in chillers, water fountains, etc.

Section 3.10 will include the text addressing ODS contained in chillers and water fountains, etc. An attachment will be added including details of the ODS survey.

Incorporate by reference, the letter from the OASA (IL&E), dated September 1, 1998, concerning the Army's environmental liability.

Incorporation of this letter will be considered as an attachment to the Letter of Transfer. The issues raised in this letter are not appropriate for inclusion in this ECOP.

RESPONSE TO COMMENTS
BY THE ASSOCIATE GENERAL COUNSEL, DEPARTMENT OF JUSTICE
DRAFT ENVIRONMENTAL CONDITION OF PROPERTY
DEPARTMENT OF JUSTICE (DOJ), CENTER FOR DOMESTIC PREPAREDNESS
FORT McCLELLAN, ALABAMA

Comment 1: **Page 1, Fourth Paragraph – As some confusion has arisen in the part regarding Sibert Hall (apparently there have been two buildings designated as Sibert Hall on the Fort McClellan compound), some explanation of which Sibert Hall is being addressed, and a note relating to the now-defunct Sibert Hall, might be appropriate in order to avoid confusion.**

Response: Building 1081 was constructed in three phases. The original portion known as Faith Hall was built in 1954. Part of the Academic Facility was added in 1977. The last portion of the Academic Facility known as Sibert Hall was constructed in 1989.

The Academic Facility within Building 1081 constructed in 1989 known as Sibert Hall is the facility included in the ECOP.

Comment 2: **Page 2, Third Paragraph – Reference is made to building 303. Has the Office of Justice Programs (OJP) committed to taking this building and the attached structures?**

Response: Yes. Building 303 was in OJP's original property request.

Comment 3: **Page 4, First Paragraph – For the four above-ground storage tanks (ASTs) at this site, the draft ECOP states that based "on review of existing records, there is no documentation of any release or disposal of hazardous substances." Was any additional investigation done to confirm this statement such as visual inspection and/or sampling of the area(s) below and adjacent to the ASTs?**

Response: As stated in Section 3.0 physical and visual inspections were conducted for the Property including ASTs. In addition, sampling for areas below and adjacent to the ASTs was conducted during the baseline environmental investigation activities.

Comment 4: **Page 4, Second Paragraph – The referenced baseline environmental investigation report for the Chemical Defense Training Facility (CDTF) should be provided to the Center for Domestic Preparedness (CDP) and its contractor as soon as possible.**

Response: A copy of the draft baseline environmental investigation report was provided to DOJ. A copy of the final report will be provided to the DOJ once available.

Comment 5: Page 4, Fourth Paragraph – When will the site investigations for Parcels 75(7), 95(7), and 41(7) be available? How does their current unavailability affect the third party review of the ECOP and its estimated completion date?

Response: Fieldwork for all sites on the property requiring investigation has been completed and reports have been submitted for regulatory review. The current report submittal and review status is as follows:

Parcel 75(7) Former Ordnance Motor Repair Building 303/304
Parcel 41(7) UST Building 303F
The draft site investigation report was submitted to the regulators on July 28, 2000. The Fort McClellan Commodity Site Survey Report was submitted to the regulators March 2000. The State of Alabama Department of Public Health concurrence letter was received May 3, 2000. The NRC NFA letter dated July 27, 2000 has been received. The EPA concurrence letter was received September 11, 2000.

Parcel 95(7) Former Hospital
The draft site investigation report was submitted to the regulators on May 25, 2000. ADEM comments were received June 23, 2000. EPA comments were received July 11, 2000. The response to comments package was discussed during the August BCT meeting and the BCT made a decision that no further action is required for Parcel 95(7).

Parcel 126(Q) Chemical Defense Training Facility
Parcel 59(7) CDTF Building 4482 UST
Parcel 104(7) CDTF Incinerator
The draft environmental baseline investigation report was submitted to regulators on December 14, 1999. ADEM concurrence letter was received January 20, 2000. EPA comments were received January 20, 2000. The resolution to comments was delayed until screening and background values were finalized on July 6, 2000. There are no significant issues regarding EPA comments on the draft document. The final report was submitted on August 30, 2000.

Parcel 64Q Radiological Laboratories, Building 1081, Sibert Hall
The Final Survey Report was submitted to the regulators March 20, 2000. NRC comments were received April 11, 2000. The addendum to the Final Survey Report addressing NRC comments was submitted June 19, 2000. NRC release for unrestricted use and license termination letter dated July 27, 2000 has been received. The Alabama Department of Public Health

and EPA concurrence letters were received August 16 and September 11, 2000.

Parcel 79(6) Landfill No. 2
An EECA is currently underway for Landfill No. 2, a draft EECA Report is expected to be submitted in March 2001.

Comment 6: Page 4, Last Paragraph – This section notes that "there is not evidence that hazardous substances were stored for more than one year..." Did the radiological lab at Sibert Hall, or the CDTF, ever store substances for more than one year?

Response: There is no record of storage of hazardous substances in the radiological laboratory at Sibert Hall. However, Section 3.2 will be revised to include hazardous substances that were stored in excess of reportable quantities at the CDTF.

Comment 7: Page 5, Second Paragraph – It is noted that "there is no evidence that any petroleum or petroleum products in excess of 55 gallons at one time were stored... on the property." The next paragraph, however, notes the existence of an underground storage tank (UST), building 303F, which contains 3,000 gallons of heating oil. These statements appear to be contradictory. Further, at Page 5, Paragraph 5, it is noted that one AST that formerly held sulfuric acid now holds "backup fuel" and that there is a 4,000 gallon diesel fuel AST east of building 4482. Again, this does not appear to agree with the statement made above.

Response: The discrepancy in the text will be corrected and the text revised accordingly. Section 3.3 will be revised to reflect the comment.

Comment 8: Page 5, Last Paragraph – It is stated that one 20,000 AST contains liquid decontamination wastes. Will these wastes be properly disposed of prior to the proposed property transfer? Also, see comment number 1 above in regards to the level of investigation conducted for the tanks referenced in this paragraph.

Response: The U.S. Army analyzed and checked the 20,000-gallon decontamination wastewater tank to ensure that water concentrations were within drinking water standards per ADEM guidelines. Wastewater was then incinerated and the tank completely emptied prior to the tank being used by the DOJ. The CDTF is being transferred as an operational facility, and therefore, the wastewater tank will continue to be used for similar purposes.

Comment 9: Page 8, Fourth Paragraph – This paragraph does not appear to be accurate. It is our understanding that the air permit has already been transferred to OJP at the Army's insistence.

Response: The text will be revised to reflect the comment.

Comment 10: Page 8, Last Paragraph – This sentence should state that the Army, as opposed to the current wording, the United States, will conduct the appropriate remedial action.

Response: The term "United States" will be replaced with "U.S Army" in Section 4.0 of the ECOP.

Comment 11: Page 9, Second Paragraph – This National Environmental Protection Act (NEPA) discussion should reference OJP's Environmental Impact Statement (EIS) which was specifically done in anticipation of the proposed property transfer.

Response: The OJP Environmental Impact Statement addresses the environmental impacts associated with the operation of the Center for Domestic Preparedness and is not applicable to the ECOP.

Comment 12: Attachment 1 – The first sentence should indicate that the stated conditions, restrictions, and notifications are proposed to be included in the property transfer letter. Otherwise, they will need to be initially negotiated with OJP and the completion of the ECOP delayed until these negotiations are completed.

Response: Conditions, restrictions, and notifications identified in the EPPs will remain as an attachment to the ECOP. However, the letter of transfer will include conditions, restrictions, and notifications agreed upon during the negotiations between TRADOC, Mobile USACE, and OJP.

Comment 13: Copies of the Environmental Protection Agency's (EPA's) and Alabama Department of Environmental Management's (ADEM's) comments on the ECOP should be provided to all other reviewers as soon as each agency's comments are available.

Response: Response to comments by ADEM and EPA will be included as attachment to the final ECOP.