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AN EVALUATION OF AIR FORCE FOOD SERVICE OPERATIONS AT TRAVIS AIR FORCE BASE

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Natick, Massachusetts

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

An evaluation of food service operations at Travis AFB, California was completed, including a system description, an assessment of current performance and a delineation of the major problem areas. The results of this effort were necessary to provide a basis for developing proposed solutions to these problems and to establish a frame of reference for measuring the effectiveness of the solutions.

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INTRODUCTION

During FY 1973–74, the US Army Natick Laboratories conducted an investigation of Air Force food service under Task 03, Project No. 1J662713AJ45, Analysis and Design of Military Feeding Systems, of the DOD Food Research, Development, Testing and Engineering program. The Service Requirement Identification is AF 3–19, Food Service Systems Analysis. The purpose of this project was to define, develop and evaluate broad improvements to the Air Force food service system as represented by food service operations at Travis AFB, California. In particular, the primary objectives were to obtain higher levels of consumer acceptance and satisfaction within existing cost and operational constraints, thereby increasing attendance and utilization of the dining facilities. The focal point of this effort was base level feeding requirements, excluding non-appropriated fund food service activities (e.g., service clubs, recreation center and Base Exchange food outlets), hospital dining facilities and patient feeding, and inflight food service.

The initial studies commenced at Travis AFB in September 1972 and continued through July 1973, examining all aspects of food service in sufficient detail to determine the major problem areas requiring general improvements, and to establish a baseline against which proposed solutions to these problems could be compared and evaluated. This report summarizes the results and findings of the preliminary evaluation–system description, performance and a brief discussion of the problem areas. Following completion of these studies, proposed solutions to the problems were actually implemented and evaluated in a food service experiment at Travis AFB between 1 November 1973 and 31 January 1974. Further information on this latter phase of the project is provided in other reports.

SYSTEM DESCRIPTION

A. Organization and Staffing

The Base Commander, 60th Air Base Group, has primary responsibility for appropriated food service functions at Travis AFB. However, the actual administrative and operational control of these activities are delegated to the Food Service Officer and staff, through the Services Division, as shown in the organization chart in Figure 1.

The food service system consisted of the Food Service Staff Office, commissary support elements, three dining halls, a central pastry kitchen and an inflight kitchen. In addition, a dining hall is maintained at the SAC Alert Facility (although not operating during the first year of this project), and prepared meals are delivered from one of the dining halls to the fire stations as opposed to operating crash kitchens. All dining halls are centrally located in, or adjacent to, one of the three enlisted dormitory areas, as illustrated on the map included in Figure 2.

Actual and authorized manning levels (on 1 January 1973) are compared in Figure 3. Two of the military cooks included in the actual manning level for Dining Hall 1 were on extended temporary duty assignments to an overseas base. The eight personnel assigned to the SAC Alert dining hall were working in other dining halls while that facility remained closed.

B. Operations

All food service operations are generally performed in accordance with Food Service Management (AFM 146–7) and other pertinent regulations and policies. The majority of foods and food products are procured from the commissary on a 2/2/3 day request cycle, and are delivered from the issue point on Monday, Wednesday and Friday of each week. Milk and bread products are obtained under contract to local vendors. The basis for dining hall production operations are United States Air Force Worldwide Menu (AFP 146–17) and Armed Forces Recipe Service (AFM 146–12). The menu, developed by the Air Force Services Office, is planned to be repeated every 42 days during a four-month period, after which time a new one is issued. It specifies a complete menu for each regularly scheduled meal, recipes for each item (from AFM 146–12), and the total ingredients and issue quantities (per 100 persons fed) to be obtained from the commissary. The Worldwide Menu, as written, not only complies with dietary standards and criteria, but conforms to nutritional requirements of the Medical Services Nutritional Standards (AFR 160–95) and can be provided within allowable monetary constraints, i.e., the basic daily food allowance (BDFA). Enlisted personnel on rations-in-kind (RIK) are entitled to eat meals at no cost in the dining halls, whereas, other enlisted personnel receiving a basic allowance for subsistence (BAS) pay for any meals eaten in the dining halls according to an established price schedule.

A schedule of the meals and operating hours for the dining halls in effect at the time of this study is included in Table 1. Two dining halls served the regular meals each weekday and an abbreviated meal schedule on weekends and holidays. The third dining hall served the regular meals every day, and because of its proximity to the major work areas, also served late supper, midnight meal and an early breakfast. The pastry kitchen operated between 0330 and 1300 hours daily, except weekends and holidays, to produce cakes, pies and other pastry items used in the dining halls.

The inflight kitchen was open continuously, and with respect to base food service requirements, provided box meals for personnel unable to attend meals in the dining halls.

C. Consumer Population

There are three separate and distinct enlisted dormitory areas at Travis AFB, as depicted in Figure 2, housing about 3100 troops. The approximate distribution of this population between the three areas is as follows: 60% in the 1300 block (Dining Hall 7), 20% in the 100 block (Dining Hall 1), and 20% in the 800 block (Dining Hall 3). The other enlisted personnel, about 5000 in strength, live in military residential housing on the base or in off-base housing.

D. Facilities

The three dining halls in use at Travis AFB were constructed between 1946–1955. A general description of each facility is provided in Table 2, and photographs of several interior and exterior views are provided as Figures 4 and 5. The interior of Dining Hall 3 was being redecorated (a self help project) in a western motif, i.e., a rustic treatment involving extensive use of wood paneling, WANTED posters, a large painted mural of cowhands and horses, etc. The other two dining halls had retained the traditional military decor –– hard, shiny surfaces, formica and stainless steel, institutional colors, etc.

Overhead heating ducts, electrical conduits, steam pipes, storm drains and other ceiling and wall mounted fixtures were completely exposed in all three facilities. None of the buildings were equipped with air conditioning or humidity control devices, even though outside temperatures may range upwards to 110–115° on some days during the summer. Ventilation was usually obtained in the dining areas through open windows (which often were not properly screened) and from the exhaust hoods above the serving lines and in the kitchens. The dishwashing areas had a fan installed in the ceiling or one wall. Industrial-type flourescent lighting fixtures, providing highly variable and generally poor quality illumination, were used predominately throughout the dining halls. Measured noise levels at sustained peaks, frequently occuring during meal times, were in excess of 95 DB_a, which exceeds the 85–90 DB_a limit established for industrial activities (effective in 1975) by the Environmental Protection Agency.

The pastry kitchen (Building 1322) and the SAC Alert dining hall (Building 1175) are constructed of cement block with masonry/concrete interior and exterior walls and quarry tile flooring. The seating capacity of the SAC Alert dining hall is 56, with a maximum rated capacity of 224. The inflight kitchen (Building 1201) is a brick structure, but with similar types of walls and flooring. Other features of these buildings are very similar in appearance and function to Dining Halls 1 and 7, except that the inflight kitchen has a suspended ceiling in all but the food preparation area and ventilation requirements are less acute.

E. Food Service Equipment

Inventories of the food service equipment in all of the different facilities are provided in the Appendix. Each inventory list indentifies all major items of equipment (for which the initial cost was $40 or greater) by stock number and nomenclature -- including the number of units on-hand, the year the item was acquired, rated capacity, condition of the equipment (as determined by the Food Service Staff Office) and relevant remarks pertaining to replacing certain pieces of equipment. These inventories are consistent with items prescribed in the Table of Allowances, Food Services (TA 504). There was no excess equipment, and the only shortages resulted from the turn-in of authorized items not being used in the dining halls. The capacities of the equipment were generally satisfactory with respect to meeting the production demands required of them.

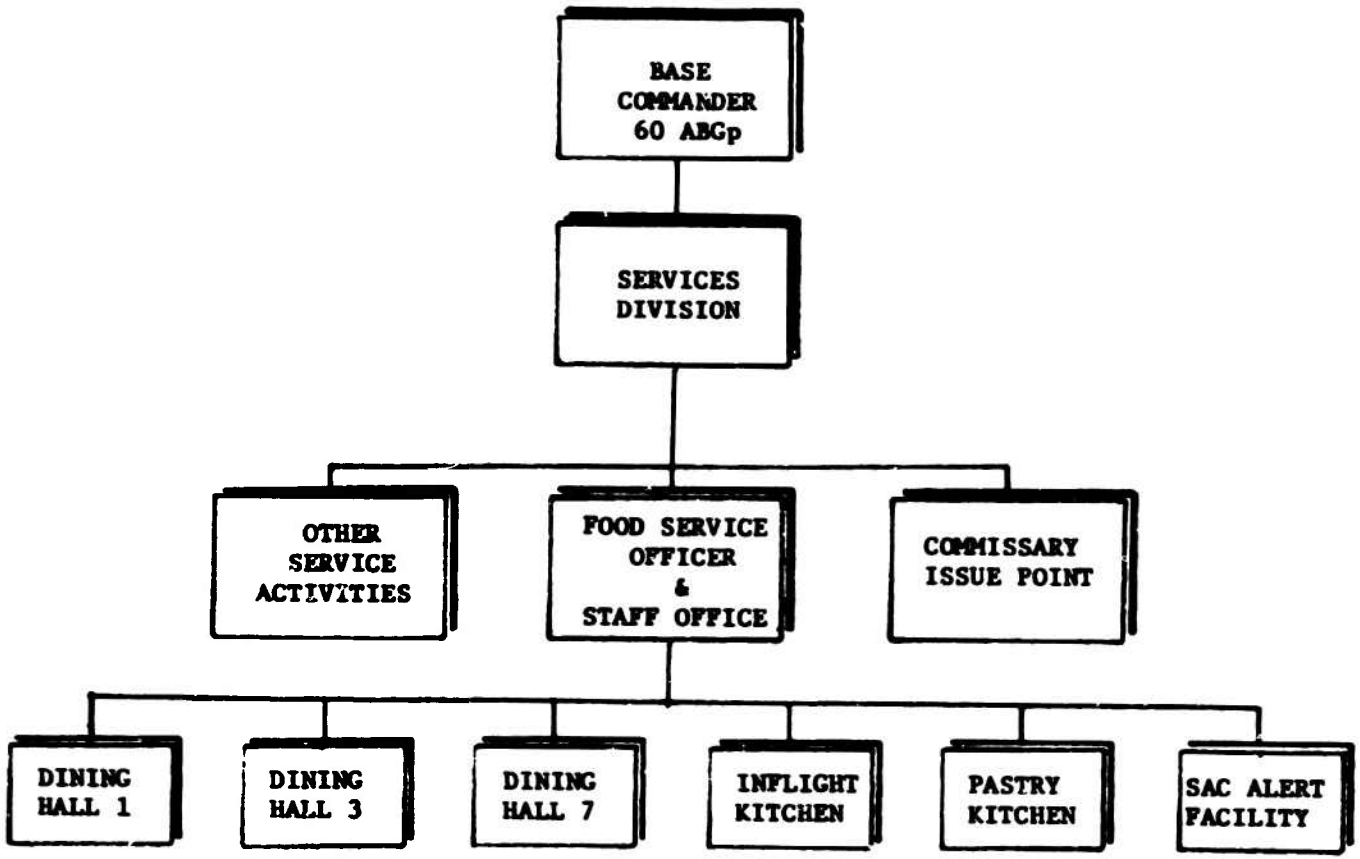


FIGURE 1. FOOD SERVICE ORGANIZATION CHART

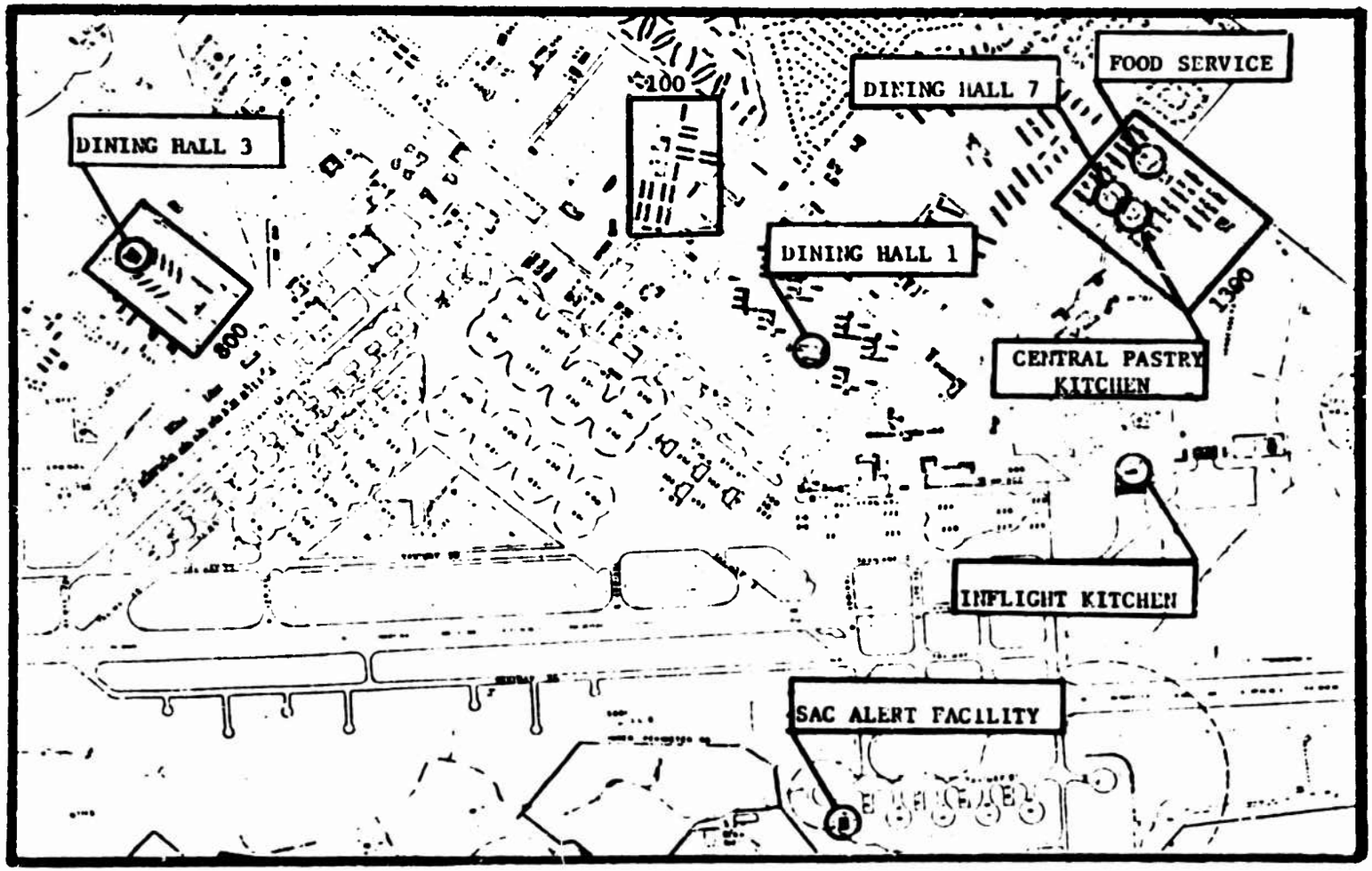
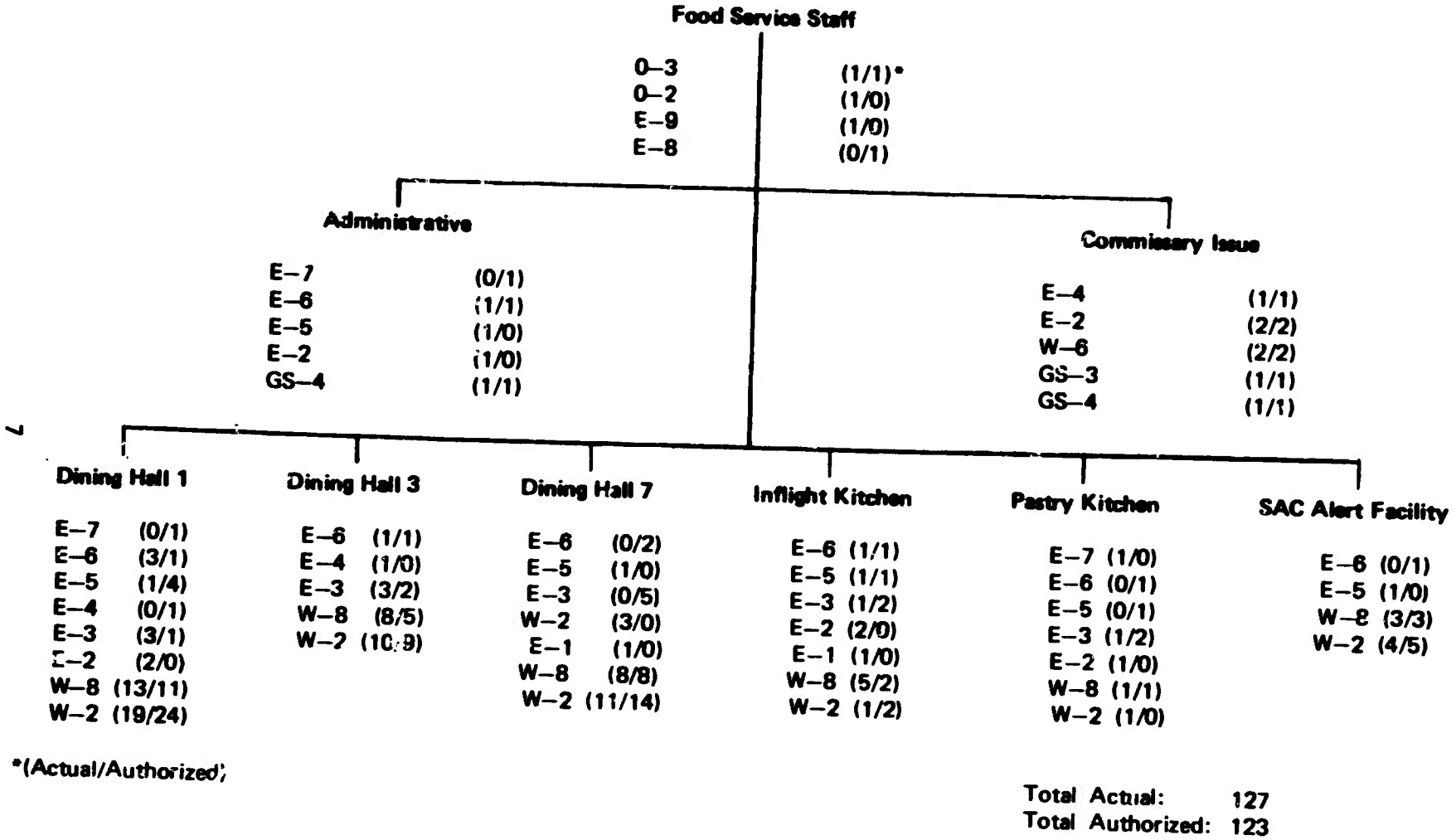


FIGURE 2. LOCATIONS OF FOOD SERVICE FACILITIES



*(Actual/Authorized)

Total Actual: 127
Total Authorized: 123

FIGURE 3. ACTUAL AND AUTHORIZED MANNING LEVELS

TABLE 1

HOURS OF OPERATION

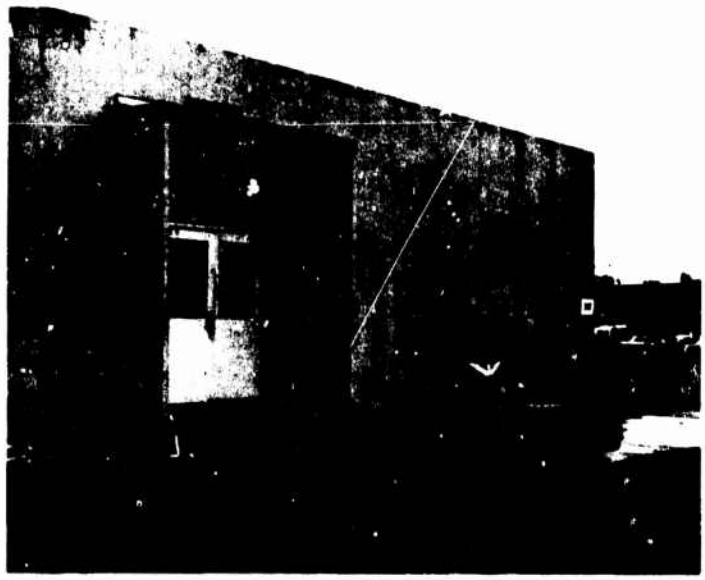
	Meal	Weekdays	Weekends/Holidays
Dining Hall 1:	Breakfast	0600 – 0830	
	Dinner	1100 – 1300	
	Supper	1500 – 1800	Same as
	Late Supper	1930 – 2030	Weekdays
	Midnight Meal	2300 0100	
	Early Breakfast	0230 – 0330	
Dining Hall 3:	Breakfast	0600 – 0800	0700 – 1000
	Dinner	1100 – 1300	1100 – 1500
	Supper	1500 – 1800	
Dining Hall 7:	Breakfast	0600 – 0800	0700 – 1000
	Dinner	1100 – 1300	1100 – 1500
	Supper	1500 – 1800	

TABLE 2

DESCRIPTION OF DINING HALLS

Dining Hall	1	3	7
Building Number	247	861	1315
Type of Construction			
Frame	Concrete	Wood	Wood
Exterior Walls	Concrete	Cedar Shingle	Concrete Block
Roof	Tar/gravel	Composition	Tar/gravel
Interior			
Walls – Kitchen	Glazed tile	Gypsum board	Glazed tile
– Dining	Concrete	Wood	Gypsum board
Floor – Kitchen	Glazed tile	Glazed tile	Glazed tile
– Dining	Asphalt tile	Asphalt tile	Asphalt tile
Ceiling	Concrete	Wood	Gypsum board
Area, ft^2			
Kitchen	2755	2527	1408
Dining	7884	6350 est.	4144
Serving	700	700 est.	675
Storage	1750	1049	519
Other	4674	1279	1252
Seating			
Actual[1]	312	128	184
Capacity[2]	467	388	216
Maximum Rating[3]	1868	1552	864

[1] Four times the number of tables.
[2] Facilities Inventory, Travis AFB, California, 8 May 1972 (AF Form 1785).
[3] Four times capacity.



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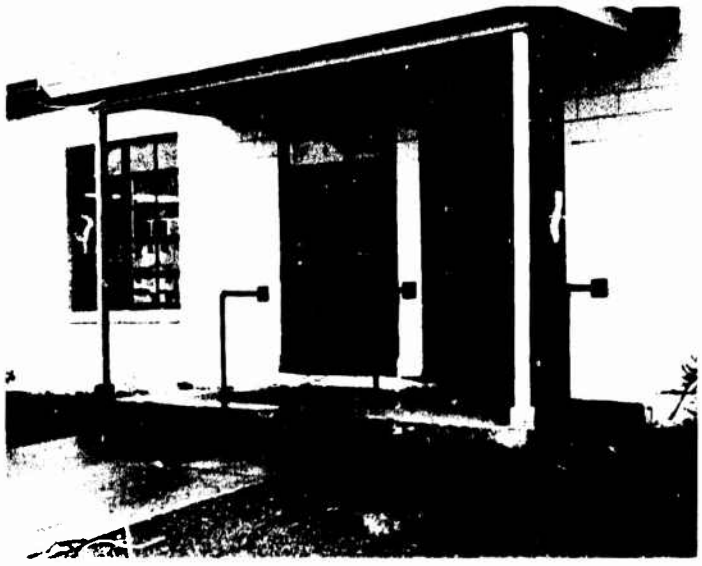

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FIGURE 4. EXTERIOR

247

861

1315

FIGURE 5. INTERIOR

SYSTEM PERFORMANCE

A. Attendance

Headcount data for each month of CY 1972 are summarized in Table 3. An average of 6801.0 meals per month were served in the dining halls, and an average of 6618 box meals were issued each month from the inflight kitchen. Translated into attendance rates*, these data yield the following values:

	RIK	BAS	Total
Dining Halls	29.8%	3.9%	8.9%
Box Meals	2.2	0.6	0.9
Total	32.0	4.5	9.8

Detailed records of individuals attending the dining halls were compiled for a one week period, from 5–11 December 1972. A total of 5803 separate persons were identified from these data, or approximately 73.5% of the present for duty strength for the month of December. The distribution of utilization rates, that is, frequency of meals attended on an individual basis, is described following:

*Attendance rates were calculated using the following equation:

$$\text{Attendance Rate} = \frac{\text{(Total Headcount/Present for Duty Strength)}}{\text{(3 meals per Day x Number of Days)}} \times 100$$

Monthly average values, from Table 3, were assumed for each variable, except that the number of days was set equal to 366/12, i.e., an average of 30.5 days per month for the year.

Number of Meals Per Week	% of Population
0	26.5
1	49.1
2	6.9
3	4.5
4	3.5
5	2.3
6	2.0
7	1.7
8	3.5
	100.0

The total headcount was 12,622, or nearly 1.6 meals/week per person attending the dining halls. Over 75% of the population attended only one meal or less during the week. Slightly more than 5% of the population attended an average of one or more meals a day, which accounted for almost 30% of the total number of meals served during this time.

B. Annual Operating Costs

The estimated annual operating costs for the food service system are presented in Table 4. Personnel costs were calculated using the actual manning levels reported in Figure 3, the Wage Rate Schedule applicable to Travis AFB (assuming Step 2 pay levels plus 8.5% benefits) for wage board workers, the Composite Military Standards (dated 1 May 1972, increased by 6% for the pay adjustments in December 1972) for military staff, and the General Schedule (plus 8.5% benefits) for graded civilian employees. Personnel costs in the inflight kitchen were prorated to include only the portion chargeable to base operations, i.e., 45.8% of the total meals issued were box meals for ground feeding. Box meals were costed at 45% of the BDFA. Food costs were taken as the net cost of food issues between January – December 1972. Net cost of issues to the SAC Alert dining hall during the time it operated in 1972 was excluded. Supply, and repair and

maintenance costs are budgeted figures for FY 1972, again prorating inflight kitchen supply costs as above. Historically, the actual costs in these latter two categories have corresponded very closely to budgeted values. Utility cost estimates were provided by the Base Civil Engineer's Office. Laundry and transportation costs were based on a detailed analysis of actual costs for selected months of operation during 1972. Trash disposal costs were fixed by contract. Capital equipment costs, which were $36,917 in FY 1972, and depreciation on prior year acquisitions are not included in this cost summary. Other costs not specifically identified, e.g., travel and training, are negligible.

A total of 895,537 meals were served to enlisted personnel at Travis AFB in FY 1972. Thus, based on the estimated annual operating costs, the average cost per meal is as follows:

Labor Costs	$1.221	61.5%
Food Costs	.675	34.0
Other Costs	.089	4.5
Total	$1.985	100.0%

C. Productivity

Another measure of system performance is productivity, which is defined simply as the number of meals served per man-hour invested. Absentee rates of 80 civilian food service workers for a period of one year were analyzed with the following results (average number of absentee hours per person):

Annual Leave	144.5
Sick Leave	72.7
Leave w/o Pay	21.3
Holidays	80.0
Total	318.5

All persons hired or who terminated employment during the computation period were excluded from the absentee rate calculation. The actual manning level for the food service system (taken from Figure 3, less two cooks on extended temporary duty assignments and 6.5 persons in the inflight kitchen not involved in base level operations) was 118.5.

Assuming military absentee rates are approximately equivalent to the civilian rate, there is 208,738 man-hours invested per year to serve 895,537 meals. This yields a total system productivity of 4.29 meals/man-hour. Considering only operating personnel in the dining halls and the inflight kitchen, the productivity is 4.86 meals/man-hour. Disregarding absentee rates, i.e., using 2080 hours per man year, total system productivity is 3.63 meals/man-hour, and the productivity for operating personnel only is 4.12 meals/man-hour.

D. Nutrition

The food items chosen at a meal were recorded for each of 873 randomly selected individuals during all meal periods in the three dining halls for one week. Nutritional values were calculated for each food item using the Armed Forces Recipe Service formulations and USDA Handbook No. 8 food composition data. The nutritional values were summed over all food items comprising a meal, averaged for all meals, and then compared to the daily dietary allowance, as shown in Table 5. Since seconds, multiple servings and plate waste could not be accurately accounted for in the data collection process, the resulting values should only be considered as best estimates of the averages for meals served.

Although mean nutritional levels per meal appear to be satisfactory, since RIK personnel eat an average of only 6.3 meals per week in the dining halls, their total daily dietary requirements are not being met by the system. Other research, reference 7, suggests that only 25% more meals per week are consumed elsewhere (other than in the dining halls), which are not sufficient to compensate for the deficiencies.

E. Consumer Evaluation

Face-to-face directed interviews were conducted with 873 randomly selected individuals in the dining halls over a two week period in July 1973, reference 8. On completing the meal, each person was asked to rate the various food items on a nine-point scale ranging from 1, "dislike extremely", to 5, "Neither like nor dislike", to 9, "like extremely". The data were tabulated by food groups and average ratings determined. Similar ratings were obtained for the overall meal. The results are summarized below for each dining hall and the total system:

Food Group	Dining Hall 1	Dining Hall 3	Dining Hall 7	Total System
a. Entrees	6.41	6.70	6.49	6.50
b. Cereal	7.98	7.61	7.32	7.73
c. Soups	6.30	6.00	5.50	6.03
d. Salads and dressings	6.72	7.60	6.95	6.99
e. Potatoes and starches	6.07	5.94	6.33	6.08
f. Vegetables	6.56	6.44	6.38	6.50
g. Breads and rolls	6.59	6.96	6.91	6.74
h. Beverages	7.75	8.04	7.85	7.84
i. Desserts and fruits	6.84	7.15	6.55	6.85
Overall meal rating	6.33	6.69	6.50	6.45

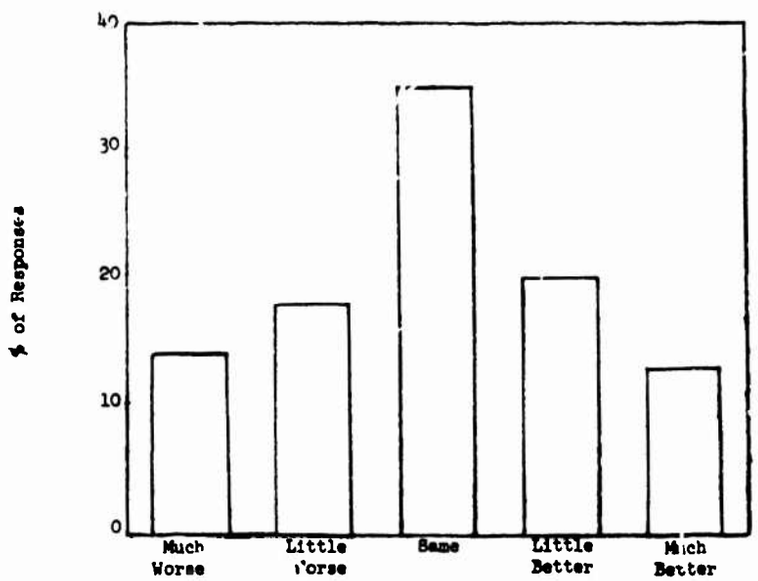
All three dining halls rated between 6 and 7, i.e., "like slightly" to "like moderately", with Dining Hall 3 scoring highest in most food groups as well as for the overall meal.

If the same data are examined in terms of the different kinds of meals served, rather than for each dining hall, food group ratings are consistently higher for breakfast than any other meal. The meal averages are shown below:

Meal	Rating
Breakfast	6.88
Dinner	6.42
Supper	6.34
Late Supper	5.76
Midnight Meal	6.48
Early Breakfast	6.17

The relatively poor rating for late supper resulted from using leftovers from the regular supper and combining food preparation for both meals to save labor. As a result of the length of time and the manner in which (hot) some of the food items were held before serving at the late supper (ranging up to eight hours), their condition and quality had substantially deteriorated.

When the customers compared the meals they had just eaten with other Air Force food service experiences, the results were very similar to those obtained above. The response data for the total system are depicted in the following graph:



When grouped together, the dining halls at Travis AFB were considered by the customers to be no better or worse than elsewhere in the Air Force. However, substantial variations in the ratings of the separate facilities are apparent in the following table, which indicates the proportions of the dining hall user groups responding at each rating level:

Rating	Dining Hall 1	Dining Hall 3	Dining Hall 7
Much Worse	15.7%	10.3%	9.5%
Little Worse	22.8	10.8	21.5
Same	38.0	30.4	35.0
Little Better	13.8	23.5	21.0
Much Better	9.7	25.0	13.0

Again, looking at these data as a function of the type of meal served, breakfast was rated as better than other meals eaten in the Air Force by the largest number of consumers. The results for all meals are displayed below:

	Little Much Worse	Same	Little or Much Better
Breakfast	23%	39%	38%
Dinner	31	34	35
Supper	34	35	31
Late Supper	42	35	23
Midnight Meal	42	33	35
Early Breakfast	47	36	17

TABLE 3

HEADCOUNT SUMMARY, CY 1972

Month	Present for Duty			Dining Hall Headcounts			Box Meals Issued		
	BAS	RIK	Total	BAS	RIK	Total	BAS	RIK	Total
Jan	6845	1525	8370	*	*	77282	*	*	3950
Feb	6941	1763	8704	*	*	78629	2465	1829	4294
Mar	7005	1716	8721	25482	50915	76397	2609	2067	4676
Apr	7044	1691	8735	22577	48131	70708	2767	2200	4967
May	6991	1629	8620	23976	48459	72426	2765	3006	5771
Jun	6827	1597	8424	22864	41246	64110	3063	3178	6242
Jul	6727	1448	8175	23217	36757	59974	3579	3452	7031
Aug	6711	1410	8121	30831	38304	69135	4021	3789	7810
Sep	6632	1414	8046	23844	36282	60126	4182	3081	7263
Oct	6617	1400	8017	24673	39281	63954	5216	3092	8308
Nov	6607	1294	7901	25710	39296	65006	5646	3310	8956
Dec	6516	1378	7894	21896	36478	58374	6149	3999	10148
Monthly Average	6789	1522	8311	24507	41515	66010	3860	3000	6618

*Data not available.

TABLE 4

ESTIMATED ANNUAL OPERATING COSTS

Personnel Costs	
Management	$ 71,597
Operations	969,791
Commissary Support	52,503
Food Costs	604,786
Supply Costs	40,328
Repair and Maintenance Costs	15,000
Utility Costs	10,272
Laundry Costs	6,192
Transportation Costs	1,424
Trash Disposal Contract	6,900
Total	$1,778,793

TABLE 5

NUTRITIONAL EVALUATION

Nutritional Components		DDA[1]	Average Meal Values	% of DDA
Energy	cal	3400	1235	36
Protein	g	100	62	62
Fat[2]	g	152	56	37
Calcium	mg	800	675	84
Iron	mg	14	7.4	53
Vitamin A	IU	5000	2750	55
Thiamine	mg	1.7	0.7	41
Riboflavin	mg	2.0	1.2	60
Niacin	mg	22	9.0	41
Ascorbic Acid	mg	60	51	85

1. Daily dietary allowances for male personnel as prescribed by AFR No. 160–95, Medical Nutritional Standards, 10 August 1972.

2. Should not exceed 40% of total caloric intake.

MAJOR PROBLEM AREAS

A. Manpower Utilization

The problem of inefficient and ineffective use of available manpower is discussed in greater detail in reference 3. Actual manning levels in the food service system are not considered to be insufficient, but there are discrepancies in the allocations of food service personnel to the different facilities, and between shifts within each facility, relative to actual workload requirements. To a lesser extent, the lack of effective supervision and the use of people in functional areas not essentially related to their jobs also contribute to this overall problem. Although productive work time at Travis AFB compares favorably to that reported by other Air Force bases, it was concluded that worker efficiency is less than observed in industrial and commercial operations of the same type -- resulting from many factors, including lack of interest, low morale and poor training and skills.

B. Dining Hall Design and Decor

The dining facilities were built about twenty years ago, and the basic design and decor have since been maintained. Although highly functional and utilitarian, current standards for an acceptable food service facility have long since rendered these dining halls obsolete. Appearance is definitely one problem area that needs considerable attention, but equally important are environmental deficiencies -- e.g., poor ventilation, lack of air conditioning and humidity controls (in a sometimes very hot climate), poor quality lighting and unusually high noise levels -- that also need to be corrected. The locations and arrangements of the serving lines and customer self-service areas (beverage lines and salad bars) are not compatible with present menu concepts and good food merchandising practices, and kitchen layouts suffer from too many singular "improvements" and ad hoc equipment installations and/or replacements. See references 4, 5, and 6 for a more complete discussion of this general problem area.

C. Equipment

Although the authorized allowance of equipment is available in all facilities, except as previously noted, many of the items are in poor or fair condition or are obsolete, i.e., exceed their life expectancies, and need to be replaced. This situation has developed over a period of years because of the lack of a well-defined and funded equipment replacement program. These conditions were further aggravated by inadequate engineering support for installation, repair and maintenance of the equipment. For example, delays of several months have been reported on the installation of new items and the repair of non-operable equipment. In the latter case, however, the delay may sometimes be attributed to the fact that the required parts are not readily available through normal supply channels, or even from the equipment manufacturers.

D. Menu

The U. S. Air Force Worldwide Menu represents minimum standards for Air Force dining halls, which can, and are encouraged to be expanded to include local food preferences and to achieve greater variety. In practice, however, the menus actually served in the three dining halls were usually quite different from one another and bear little resemblance to the Worldwide Menu. Arbitrary changes were introduced quite freely (generally unrelated to consumer preferences) which tends to create other problems. For instance, to the consumer, lack of variety is an important factor affecting attendance, particularly as manifested by the frequency of left-overs and run-out of items on the menu, i.e., insufficient quantities are prepared to meet the total customer demand. This occurs for several reasons. To create a wide choice or selection, a single meal offered as many as five or six entrees, some of which were on the menu the previous day, and others of which were scheduled to appear on the menu during the next day. The quantity of each entree prepared is, of course, less than if fewer were to be offered. Further, entrees may be very similar, e.g., lasagna and ravioli. Instead of variety, the opposite effect is obtained: the appearance of one or more items on several successive days, even if freshly prepared each time, creates the illusion of left-overs; the reduced quantities promote the occurrence of run-outs; and, the similarity of entrees does not, in effect, provide for any real choice. In other words, variety at Travis AFB did not include the essential elements of difference and change, as well as choice. Variety in the short order menu is virtually non-existent; the same very limited selection of items was offered every day. Also, little variety was provided in the way of different types of menus such as a periodic Soul-food or Luau dinner. References 1, 2, and 7 address these problems in further detail.

E. Quality of the Food

The quality of the food served in the dining halls is recognized as the most important consumer problem, references 1 and 7. "Quality" includes the ability of the cooks; raw food characteristics (gristle, fat, bruised fruit, etc.); preparation (undercooked, greasy, bland, etc.); and presentation (cold, dried-out, stale, etc.). Observations and evaluations by professional food personnel verify the substance of these points, reference 2. The poor techniques and working habits of the cooks and food service workers, the rejection of progressive cookery as a normal operating procedure and the lack of necessary equipment for holding prepared foods at proper temperatures (either hot or cold) are all important elements affecting the food quality. Microbiological quality of the food may also be a matter of concern, reference 9.

F. Customer Services

Various aspects of customer services and relations are discussed in references 1, 4, and 7. Generally, the attitudes and behavior of the food service personnel having direct

contact with the customer on the serving line, in the dining room and the clipper (dishwasher) room, are viewed as very poor by the customers. Additionally, the food service workers and cooks are blamed for the run-outs on the serving line and failure to keep the salad bars and beverage dispensers supplied. Other problems include insufficient silverware, glasses, cups, etc. available during the meal; not providing or replacing condiments, napkins, etc. on the tables and in the self-service areas; dishes and silverware not being clean, and, the generally poor sanitary condition of the dining halls. Consumer survey results indicate that many of the customers would like to have the dining hall hours of operation adjusted to more convenient times, consistent with their preferred eating times. In some cases, the locations of the dining halls, with respect to the dormitories and work sites, are so inconvenient as to discourage attendance.

G. Job Satisfaction

Clearly, from reference 3, there is a need for improvements in the food service system relating to the overall job satisfaction and morale of the food service workers, both military and civilian. These extend into the areas of promotional opportunities and pay advancement; i.e., career progression, working conditions and equipment, interrelationships between co-workers (particularly the military and civilian contingents), and supervision.

SUMMARY AND CONCLUSIONS

Base level appropriated fund food service operations at Travis AFB consisted of three dining halls, supported by a central pastry kitchen, and an inflight kitchen. About 75,000 meals per month were served (including more than 6600 meals per month issued from the inflight kitchen for ground feeding), of which 60% were to RIK personnel. The overall attendance rate for the approximately 8100 enlisted personnel assigned or attached to the Base was 9.8%.

Average cost per meal served was estimated as nearly $1.985 of which more than 61.5% is attributable to labor costs and 34% is raw food costs. Labor productivity was calculated as 3.63 meals/man-hour.

A nutritional evaluation of the meals served indicates that dietary standards were being satisfied for the average of 6.3 meals per week attended by RIK personnel in the dining halls, but that their total nutritional intake may be deficient.

In general, the consumer population at Travis AFB regards the meal service there to be essentially the same as elsewhere in the Air Force. The meal ratings in the dining halls varied between "like slightly" and "like moderately".

A variety of problem areas were determined to exist. These included manpower utilization, facilities and equipment, and quality of the food, customer services and relations, and employee job satisfaction and morale.

It is concluded that the performanca and effectiveness of the existing food service system can be significantly improved by resolving the major problems identified. Solutions to these problems should result in achieving greater customer satisfaction, and thereby, higher attendance and utilization rates in the dining halls.

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APPENDIX

Food Service Equipment Inventory

Dining Hall #1

Stock Number	Item	On-Hand	Acquired	Capacity	Condition	Remarks
4110-170-1441	Ice Cream Cabinet	2	1972	35 gal	New	(1),(2),(3), not funded.
4110-194-1572	Refrigerator	1	1962	55 cu ft	Poor	
4110-935-1601	Machine, Ice Cube	2	1966-1969	500 lb	Good	
7310-151-6493	Toaster, Electric	2	1972	540 slices/hr	New	
7310-151-6547	Range, Gas	2	1972		New	
7310-165-6793	Urn, Coffee Twin	1				(4) Additional unit on order, not funded.
7310-177-4817	Oven, Revolving Tray	1	1971	7 trays	Good	
7310-242-8414	Urn, Coffee	1	1972	6 gal	New	Not in use, to be installed.
7310-244-0100	Cooker, Steam	1	1966	3 compartment	Poor	(2)
7310-271-1620	Steam Table, Steam	2	1966		Good	
7310-272-2516	Griddle, Self-Heating	2	1966		Good	
7310-273-1885	Kettle, Steam Jacketed	2	1968	60 gal	Fair	
7310-286-5272	Cold Food Counter	2	1972	5 inserts	New	
7310-758-8564	Pan, Frying Tilting	2	1971		Good	
7310-760-1358	Food Warmer, Infrared	2			Poor-Fair	(1),(2)
7310-878-6706	Fryer, Deep-Fat	2	1968	60 lb	Good	
7310-910-6261	Cabinet, Warmer Food	2	1966		Good	
7310-944-6569	Coffee Maker, Electric	2				Not in use, to be turned in.
7310-981-1792	Dispenser, Beverage	1			Good	
7310L0401424427	Roll-a-grill, Electric	1	1972	720 franks/hr	New	
7320-114-0387	Dispenser, Butter	2	1972		New	
7320-205-2098	Dispenser, Tableware	4	1973		New	Glass & cup
7320-205-2780	Mixing Machine, Food	1	1966	80 qt	Poor	(2),(3), not funded.
7320-222-4177	Meat Slicing Machine	1	1972	40 slices/min	New	
7320-234-1799	Dishwashing Machine	1	1959	165 racks/hr	Fair	(1)
7320-240-2547	Vegetable Cutter-Slicer	1			Good	
7320-243-2198	Vegetable Peeler	1	1966	50 lb	Fair	
7320-262-9169	Preflushing Machine	2	1966		Poor	(2)
7320-531-4047	Dispenser, Tableware	4			Good	(1), plates
7320-574-2555	Dispenser, Tableware	4	1973		New	Trays
7320-724-4450	Dishwashing Machine	1	1969	275 racks/hr	Good	
7320L0271404427	Food Mill, Electric	1	1968			

REMARKS:
(1) Age of item exceeds life expectancy (AFM 146-7).
(2) Needs replacement.
(3) Replacement on order.
(4) Replacement on hand, to be installed.

Food Service Equipment Inventory

Dining Hall #3

Stock Number	Item	On-Hand	Acquired	Capacity	Condition	Remarks
4110-170-1441	Ice Cream Cabinet	2	1972	35 gal	New	
4110-177-8832	Ice Cream Maker	1	1973		New	
4110-787-2223	Refrigerator	2	1972	65 cu ft	New	
4110-935-1601	Machine, Ice Cube	2	1969	500 lb	Good	
7310-151-6483	Toaster, Electric	2	1972	540 slices/hr	New	
7310-151-6547	Range, Gas	2	1972		New	
7310-166-6793	Urn, Coffee, Twin	1				(4) Additional unit on order, not funded
7310-177-4816	Oven, Revolving Tray	1		7 trays		.
7310-177-5024	Griddle, Self-Heating	2	1960-1964		Fair	(1)
7310-242-8414	Urn, Coffee	1	1972	6 gal	New	Not in use, to be installed.
7310-271-1620	Steam Table, Steam	2	1955		Fair	(1)
7310-272-9547	Cooker, Steam	1	1960	3 compartment	Poor	(1),(2),(3), not funded.
7310-273-1884	Kettle, Steam-Jacketed	2	1966	60 gal	Fair	
7310-286-5272	Cold Food Counter	1	1972	5 inserts	New	
7310-482-6348	Roll-a-grill, Electric	1	1972	420 franks/hr	New	
7310-738-8564	Pan, Frying Tilting	2			Good	
7310-760-1358	Food Warmer, Infrared	2			Good	(1)
7310-878-6706	Fryer, Deep-fat	2	1968	60 lb	Good	
7310-910-6261	Cabinet, Warmer Food	2	1966		Good	
7310-981-1792	Dispenser, Beverage	1	1968		Good	
7320-114-0387	Dispenser, Butter	2	1972		New	
7320-205-2098	Dispenser, Tableware	4	1973		New	Glass, & Cup
7320-205-2778	Mixing Machine, Food	1	1964	80 qt	Poor	(1),(2),(3), not funded.
7320-222-4177	Meat Slicing Machine	1	1968	40 slices/min	Good	
7320-243-2198	Vegetable Peeler	1	1966	50 lb	Good	
7320-290-4236	Dishwasning Machine	1	1973	350 racks/hr	New	Additional unit (7320-177-4993) on order, funded.
7320-390-5559	Meat Tenderizer, Elec.	1	1968		Good	
7320-531-4047	Dispenser, Tableware	4			Good	(1) plates
7320-574-2555	Dispenser, Tableware	4	1973		New	Trays
7320-611-9582	Dispenser, Sliced Bread	1				
7320L0271404427	Food Mill, Electric	1	1968		Good	

REMARKS:
(1) Age of item exceeds life expectancy (AFM 146-7)
(2) Needs replacement.
(3) Replacement on order.
(4) Replacement on hand, to be installed.

Food Service Equipment Inventory

Dining Hall #7

Stock Number	Item	On-Hand	Acquired	Capacity	Condition	Remarks
4110-170-1441	Ice Cream Cabinet	2	1972	35 gal	New	
4110-194-1572	Refrigerator	2	1962	65 cu ft	Fair	(1),(3), not funded.
4110-935-1601	Machine, Ice Cube	2	1962	500 lb	Good	
7310-151-6493	Toaster, Electric	1	1972		New	
7310-151-6547	Range, Gas	2	1969		Good	
7310-165-6793	Urn, Coffee Twin	1				(4)
7310-177-4816	Oven, Revolving Tray	1		7 trays		
7310-244-0100	Cooker, Steam	1	1966	3 compartment	Poor	(2),(3), not funded.
7310-271-1620	Steam Table, Steam	2	1955		Good	(1)
7310-272-2516	Griddle, Self-Heating	2	1966		Fair-Good	(2) - One needs immediate replacement.
7310-273-1884	Kettle, Steam-Jacketed	2	1966	60 gal	Good	
7310-282-9827	Toaster, Electric	1	1969	540 slices/hr	Good	
7310-286-5272	Cold Food Counter	1	1972	5 inserts	New	
7310-758-8564	Pan Frying Tilting	2	1971		Good	
7310-760-1358	Food Warmer, Infrared	2	1969		Poor-Good	(1),(2) - One needs immediate replacement.
7310-878-6706	Fryer, Deep-Fat	1	1968	60 lb	Good	
7310-882-0686	Urn, Coffee	1	1972	6 gal	New	Not in use, to be installed.
7310-910-6261	Cabinet, Warmer, Food	2	1969		Good	
7310-981-1792	Dispenser, Beverage	1	1972		New	
7320-114-0387	Dispenser, Butter	2	1972		New	
7320-205-2098	Dispenser, Tableware	2	1973		New	Glass & cup
7320-205-2780	Mixing Machine, Food	1	1969	80 qt	Good	
7320-222-4177	Meat Slicing Machine	1	1972	40 slices/min	New	
7320-230-3463	Dishwashing Machine	2	1959	165 racks/hr	Poor	(1),(2),(3) - one replacement.
7320-243-2196	Vegetable Peeler	1	1966	50 lb	Fair	
7320-262-9169	Preflushing Machine	2	1966		Fair	
7320-390-5559	Meat Tenderizer	1	1969		Good	
7320-531-4047	Dispenser, Tableware	3			Good	Plates
7320-574-2555	Dispenser, Tableware	4	1973		New	Trays
7320L0271404427	Food Mill, Electric	1	1968			

REMARKS:
(1) Age of item exceeds life expectancy (AFM-146-7)
(2) Needs replacement.
(3) Replacement on order.
(4) Replacement on hand, to be installed.

Food Service Equipment Inventory

Pastry Kitchen

Stock Number	Item	Units	Acquired	Capacity	Condition	Remarks
7310-163-9928	Oven Tray Revolving	1	1963		Fair	(1)
7310-271-1674	Range, Gas 2 or 4	1	1955		Fair	(1)
7310-551-3583	Kettle, Steam-Jacketed	1	1972		Good	
7320-184-0084	Dough Divider, Roll	1	1972		New	
7320-205-2780	Mixing Machine, Food	2	1955–1970		Good	(1) 1955
7320-241-3678	Rack, Doughnut	4				
7320-241-3679	Rack, Bread Baker's	4				
7320-266-7097	Stand, Doughnut	1				
7320-268-4169	Doughnut Machine	1	1966		Fair	
7320-273-9221	Dough, Proofing Box	1	1970		Good	
7320-637-6221	Dough, Rolling Machine	1	1970		Good	

REMARKS:
(1) Age of item exceeds life expectancy (AFM 146–7).
(2) Needs replacement.
(3) Replacement on order.
(4) Replacement on hand, to be installed.

Food Service Equipment Inventory

Inflight Kitchen

Stock Number	Item	On–Hand	Acquired	Capacity	Condition	Remarks
4110-022-0589	Ice Making Machine	1	1972		New	Not in use, to be installed.
4110-194-1572	Refrigerator	3	1960–1962	65 cu ft	Fair-Good	(1),(3), not funded.
4110-541-5999	Frozen Food Cabinet	1	1965		Good	
4110-640-1941	Chest, Ice Storage	2	1965		Good	
4110-837-6442	Ice Making Machine	1	1955		Poor	(1),(2),(4)
7310-144-5993	Oven, Baking & Roasting	1	1967		Good	
7310-151-6547	Range, Gas	1	1955		Poor	(1),(2)
7310-242-8415	Urn, Coffee Twin	1	1967	6 gal	Fair	
7310-878-6706	Fryer, Deep Fat	2	1968	60 lb	Fair-Good	
7310-944-7573	Urn, Coffee Twin Electric	1	1972		New	
7310L0198994427	Sandwich Wrap Machine	1				Contractor supplied.
7320-222-4177	Meat Slicing Machine	1	1971	40 slices/min	Good	
7320-238-3461	Dishwashing Machine	1	1965		Good	(1)
7320L0271404427	Food Mill Electric	1				

REMARKS:

(1) Age of item exceeds life expectancy (AFM 146–7)
(2) Needs replacement.
(3) Replacement on order.
(4) Replacement on hand, to be installed.

Food Service Equipment Inventory

SAC Alert Facility

Stock Number	Item	On—Hand	Acquired	Capecity	Condition	Remarks
4110-165-492[illegible]	Ice Cream Maker	1	1972		New	
4110-170-1441	Ice Cream Cabinet	1	1972	35 gal	New	
4110-194-1572	Refrigerator	1	1960	65 cu ft	Fair	(1),(3) not funded.
4110-541-5999	Frozen Food Cabinet	1	1960		Fair	(1)
4110-837-6442	Ice Making Machine	1	1971		Good	
7310-177-5024	Griddle Self-Heating	2	1965—1969		Fair—Good	(1) 1965, used for back-up only.
7310-271-1622	Steam Table, Type II	1	1960		Good	(1)
7310-272-7891	Toaster, Electric	1	1968		Good	
7310-282-6626	Range, Electric	1	1971		Good	
7310-286-5272	Cold Food Counter	1	1972	5 inserts	New	
7310-809-9390	Fryer, Deep-Fat	1	1970		Good	
7310L0018024427	Urn, Coffee	1	1966		Good	
7320-114-0387	Dispenser, Butter	1	1972		New	
7320-205-2777	Mixing Machine, Food	1	1967		Good	
7320-222-4177	Meat Slicing Machine	1	1967	40 slices/min	Good	
7320-243-2193	Vegetable Peeler	1	1966		Good	
7320-271-1624	Dishwashing Machine	1	1967		Good	
7320-390-5599	Meat Tenderizer, Electric	1	1970		Good	
7320-530-3464	Rinser-Sterilizer	1	1971		Good	
7320-574-2555	Dispenser, Tableware	1				Trays
7320-611-9582	Dispenser, Sliced Bread	1				
7320-871-9680	Dispenser, Iced Tea	1				
7320L0271404427	Food Mill, Electric	1	1966		Good	
7330-272-2580	Opener, Can Electric	1	1970		Good	

REMARKS:
(1) Age of item exceeds life expectancy (AFM 146—7)
(2) Needs replacement.
(3) Replacement on order.
(4) Replacement on hand, to be installed.