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**AN EVALUATION OF THE CONVENTIONAL
MARINE CORPS GARRISON FOOD SERVICE
SYSTEM AT MARINE CORPS BASE
TWENTYNINE PALMS, CA**

by

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents an in-depth evaluation of the existing Marine Corps food service system in order to establish a baseline level of performance against which future, proposed food service system can be tested and measured. The different elements of the food service system that comprise this evaluation are customer attendance and acceptance levels, food service worker attitudes, labor utilization, and system costs.		

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PREFACE

During FY 77, the Operations Research and Systems Analysis Office (OR/SA) of the United States Army Natick R&D Command (NARADCOM) initiated an analysis, design and test program of Marine Corps garrison food service systems for the purpose of improving customer acceptance and utilization. By direction of the Marine Corps, this work was conducted at the Marine Corps Base, Twentynine Palms, CA. Menus, food preparation and service techniques, equipment, dining area, and galley operations, as well as design and decor, consumer and food service worker attitude toward and acceptance of the food service system were all to be included in the analysis.

Alternatives to the existing system (including architectural and design improvements) were to be developed which would improve customer acceptance and attendance, and provide for any possible reduced costs and more efficient operations, yielding an improved food service system overall. The study was conducted as part of the Department of Defense Food RDT&Eng Program under task AC, "Short Range Studies of Military Feeding Systems," of Project Number 1L762724AH99A, "Analysis and Design of Military Feeding Systems." The service requirement for this project is USMC 7-1, Analysis of Marine Corps Garrison Food Service Systems.

An extensive program of data collection and surveys was conducted at MCB Twentynine Palms in order to evaluate the baseline performance of the existing food service system as well as to measure the current levels of consumer attendance and acceptance of the system. This report presents the results of an analysis of this baseline data against which all future changes will be compared.

A

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TABLE OF CONTENTS

	Page
Preface	1
Acknowledgements	2
List of Figures	5
List of Tables	6
Section I	9
Introduction	
Section II	13
Executive Review	
Section III	17
Details of the Current Food Service Systems at MCB, Twentynine Palms	
Mark M. Davis and Philip Brandler	
A. Consumer Attitudes	17
Contributed and Authored By:	William Wilkinson, Behavioral Sciences Division, NARADCOM
B. Analysis of Attendance Patterns	30
Contributed and Authored By:	George Eccleston, Operations Research and Systems Analysis Office, NARADCOM
C. Food Service Worker Opinion Survey Findings	33
Contributed and Authored By:	Lawrence Symington and Marjorie Berman, Behavioral Sciences Division, NARADCOM
D. Labor Utilization Analysis	43
Contributed and Authored By:	Brian Bissonnette, Operations Research and Systems Analysis Office, NARADCOM
E. System Costs	66
Contributed and Authored By:	Brian Bissonnette, Operations Research and Systems Analysis Office, NARADCOM

TABLE OF CONTENTS (cont'd)

APPENDICES

	Page
A. Written Consumer Survey Instrument	75
B. Interview Protocol for Consumer Attitude Survey	91
C. Statistical Analyses of Food Service Worker Survey	95
D. Interview Protocol for Food Service Worker Survey	97
E. Definitions, Work Schedules, Procedures, and Statistical Data for Work Sampling Analysis	103
F. Details of Subsystem Cost Estimates	117

LIST OF FIGURES

	Page
Figure 1. Location Map of MCB Twentynine Palms	9
Figure 2. Map of the Main Base, MCB Twentynine Palms	10
Figure 3. MCB Twentynine Palms Organization Chart	11
Figure 4. Layout of Typical Dining Facility	12
Figure 5. Overall Comparison of Dining Facility at NCB Twentynine Palms to Other Dining Facilities (from interviews)	24
Figure 6. Overall Comparison of Dining Facilities at MCB Twentynine Palms to Other Facilities (from surveys)	25
Figure 7. Food Service Workers Attitudes Toward Military Service	37
Figure 8. JDI Response Comparison Between Food Service Workers at Three Air Force Bases and MCB Twentynine Palms	39
Figure 9. Workers' Comparison of Present Dining Facility With Others In Which They Had Worked	40
Figure 10. Worker Opinion of Customer Attitude	42
Figure 11. Food Service Worker Preference for Messmen Duty Assignment Lengths	44
Figure 12. Food Service Worker Survey — Statistical Analysis Overall Personnel Performance	50
Figure 13. Worker Non-Productivity By Day of the Week	51
Figure 14. Nonproductivity By Hour of the Day — Weekdays All Personnel	53
Figure 15. Nonproductivity By Hour of the Day — Weekends All Personnel	54
Figure 16. Nonproductivity By Hour of the Day — Weekdays (Messcooks)	55
Figure 17. Nonproductivity By Hour of the Day — Weekdays (Bakers)	56
Figure 18. Nonproductivity By Hour of the Day — Weekdays (Supervisors)	57
Figure 19. Nonproductivity By Hour of the Day — Weekdays (Cooks)	58
Figure E-1 Work Sampling Data Collection Form	105

LIST OF TABLES

	Page
Table 1. Demographic Characteristics of SIK and COMRATS Group Samples	20
Table 2. Percentage of Total Survey Sample Indicating Subjective Importance of Various Factors in Food Choice	21
Table 3. Mean Preference Ratings for Specialty Menus	22
Table 4. Proportion of Total Survey Sample Rating the Worst Seven Areas of Concern in the Dining Facilities	27
Table 5. Proportion of Total Survey Sample Rating the Ten Worst Physical Attributes of the Dining Facilities	29
Table 6. Personnel Profile of Individual Attendance Survey Data	31
Table 7. SIK Attendance Rates for 12 Eating Locations	32
Table 8. Composite Percent Attendance Representing the Entire Base Population at MCG, Twentynine Palms	34
Table 9. SIK's Percent Attendance by Meal	35
Table 10. Format for the Work Scale of the Job Description Index	38
Table 11. Actual Dining Facility Staffing Levels	46
Table 12. Food Service Worker Task Definition	48
Table 13. Meals Per Manhour	52
Table 14. Productivity Comparison Between Military Food Service Operations	60
Table 15. Productivity Comparisons with Civilian Food Service Operations	61
Table 16. Productivity Comparisons with Other Marine Corps Base	62
Table 17. Actual vs. Authorized Staffing Levels — Dining Facilities	63

LIST OF TABLES (cont'd)

	Page
Table 18. Actual vs. Authorized Staffing Levels — Food Service Office	64
Table 19. MCB Twentynine Palms Total Cost Analysis	67
Table 20. Cost Per Meal Analysis	68
Table 21. Food Service Office Operating Costs	69
Table 22. Comparison of Total Annual Cost of Military Food Service Operations	70
Table 23. Cost Per Meal Comparison with Other Military Operations	71
Table E-1 Job Definitions	106
Table E-2 Task Definitions	107
Table E-3 Observation Schedule	111
Table E-4 Manhours By Day of the Week	112
Table E-5 Number of Meals Served, Manhours Worked, and Meals Per Manhour	113
Table E-6 Degree of Accuracy	114
Table E-7 Sample Size	115
Table E-8 Percent Time Observed at Work Functions	116
Table F-1 Manpower Allocation	127

AN EVALUATION OF THE CONVENTIONAL MARINE CORPS GARRISON FOOD SERVICE SYSTEM AT MARINE CORPS BASE, TWENTYNINE PALMS, CA

SECTION I

INTRODUCTION

A. THE LOCATION

The site selected by HQMC for the evaluation of the existing Marine Corps garrison food service system was the Marine Corps Base (MCB) Twentynine Palms, California, which is located in the high desert about 140 miles east of Los Angeles (Figure 1). In area, MCB Twentynine Palms is the largest Marine Corps installation in the world. In fact, all of the remaining Marine Corps bases could be placed inside of it and only take up 80% of its area.

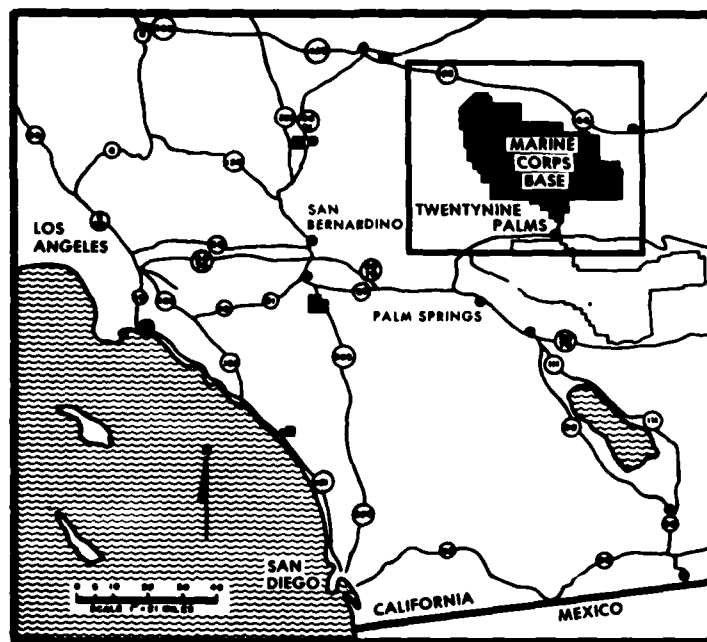


FIGURE 1: LOCATION MAP OF MCB TWENTYNINE PALMS

Although the vast majority of the base is uninhabited desert, which is used primarily for tactical field exercises, this study concerns itself with the food service system that is currently in operation at "mainside" where all of the troops stationed at MCB Twentynine Palms are garrisoned (Figure 2). At the time of the study, the population at the base was approximately 4800 military personnel not including civilians and dependents.

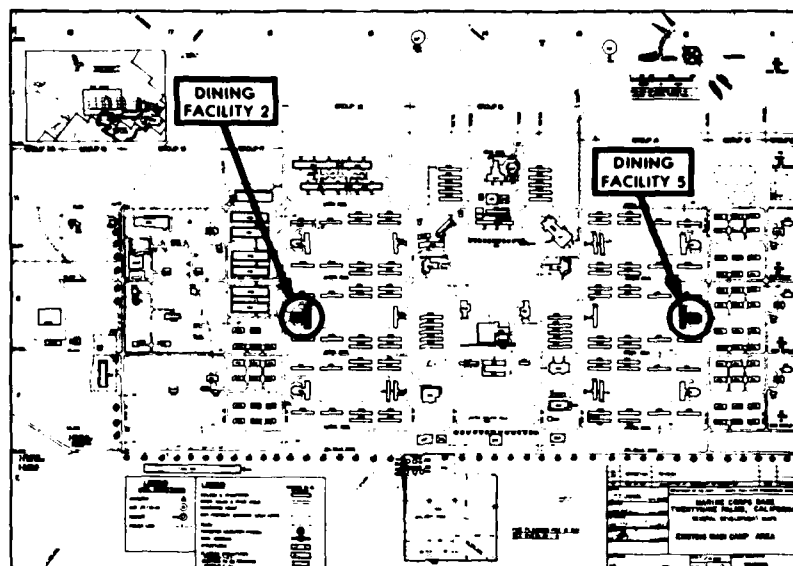


FIGURE 2: MAP OF THE MAIN BASE MCB TWENTYNINE PALMS

The primary mission of MCB, Twentynine Palms is to provide a site for the training of personnel in air-ground combat. The purpose of the majority of personnel stationed there is to participate in and support the field exercises that are continually being conducted. The Marine Corps Communications and Electronics School is also located in the main base area.

B. THE BASE ORGANIZATION

Figure 3 shows the overall organizational chart for MCB Twentynine Palms. It is important to note that while the food service office is part of the base support activities (i.e., a staff function), each dining facility is the responsibility of the unit to which it is assigned. Consequently, the food service office is concerned strictly with providing subsistence to the dining facilities, consolidating reports and financial statements for HQMC, and providing technical guidance on food service related functions. All personnel and administrative matters are handled by the units to which the facilities are assigned.

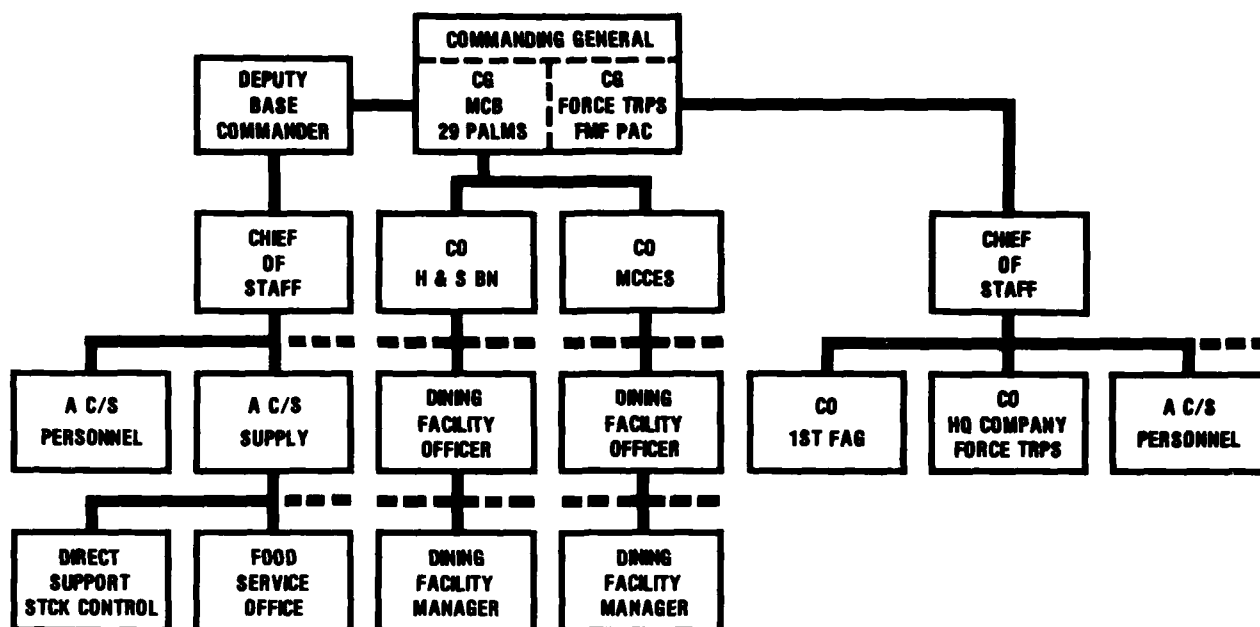


FIGURE 3: MCB TWENTYNINE PALMS ORGANIZATIONAL CHART

The food service office consists of a food service officer, a food technician (senior NCO), several clerks (military), a secretary, and a civilian who oversees the indirect supply requirements for the facilities (e.g., dishware, flatware, soaps, cleaners, etc.).

Each dining facility has a manager (senior NCO) who is responsible for the overall operation of the facility. In addition, there is a dining facility officer who is responsible for reviewing and approving all financial reports that are sent to the food service office. All administrative and personnel matters are handled through the dining facility officer.

A storeroom man is in charge of subsistence in each dining facility. There is also a subsistence clerk who assists in the preparation and completion of required reports. The cooks are divided into two watches (shifts) with the chief cook (shift leader) on each watch reporting to the dining facility manager.

Messcooks are assigned to perform all the sanitation functions and to assist in the serving of the food. Messcooks are unskilled personnel who are assigned to the dining facility for up to 30 days. These individuals have no training or interest in food service and return to their original units when their tours of duty are completed.

C. THE FACILITIES

There are two enlisted dining facilities at "mainbase", located on opposite ends of the base (Figure 2). Each facility is a "T"-shaped structure with the messdecks (dining areas) located in the cross-section and the galley located in the vertical member of the "T" (Figure 4). Within each facility are two serving lines, one serving an A-ration menu based on the standard 42 day menu cycle and the other offering a short-order menu consisting of hamburgers, hotdogs, french fries, etc. The total seating capacity in each facility is 280 seats.

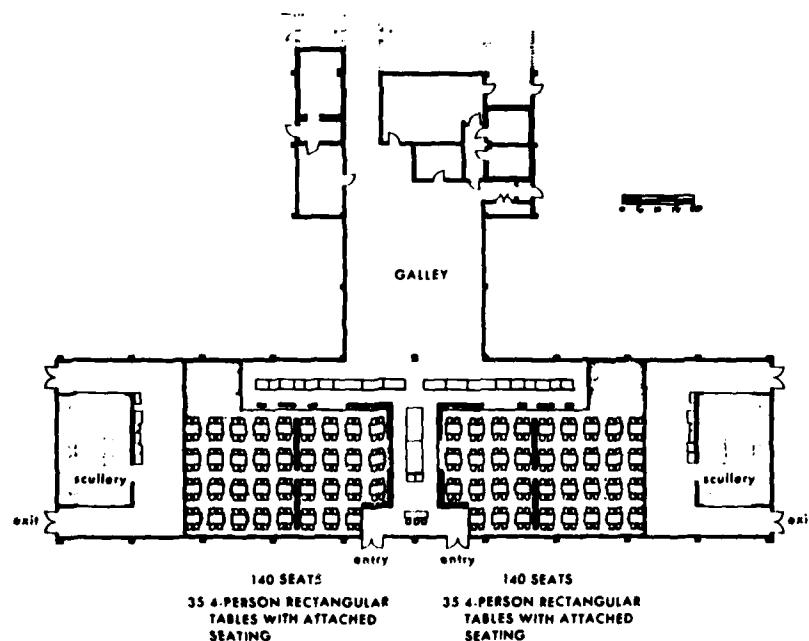


FIGURE 4: TYPICAL 29 PALMS ENLISTED PERSONNEL DINING FACILITY

SECTION II

EXECUTIVE REVIEW

The summary results presented here are the result of surveys conducted and data collected by the Operations Research and Systems Analysis Office of the US Army Natick R&D Command (NARADCOM), the Behavioral Sciences Division of the Food Sciences Laboratory of NARADCOM. The major emphasis of this study was to quantify and analyze the present method of feeding in a garrison situation so that a baseline could be established for comparing future changes to the system. Of particular interest and importance in evaluating the total system were consumer attitude, customer attendance patterns, food acceptance, worker opinion, labor utilization, and systems costs. A capitulation of the summary findings in each of these areas follows below. The detailed discussions in each of the aforementioned areas are presented in Section III of this report.

A. CONSUMER ATTITUDE

The dining facilities at MCB Twentynine Palms were rated by the enlisted consumer as **slightly worse** than other military dining facilities. From their perspective, the most significant problem in the base dining facilities is poor food preparation, one that has been found primary in many other studies of military food service systems. Besides poor food preparation, the two areas of discontent that were most disturbing to the enlisted consumers were the presence of flies in large and annoying numbers, and **too much waiting in line**.

Other problem areas included: **poor general management** — defined as **run-outs**, cold food, absences of proper condiments or utensils, etc. — **too little variety**, **poor attitude of food service personnel**, and **unattractive environment**. The variety of meat offerings and the variety of short order foods were thought to be particularly inadequate. More than half of the respondents thought that the workers were poorly trained to some extent, and that the workers provided slow service, which might account in some measure for the excessive waiting in line reportedly experienced by consumers. Besides infestation by flies, the most significant problems affecting the physical dining environment seem to be overcrowding, lack of aesthetic appeal, noise, and inadequate lighting.

Of six specialty-type menus rated by the respondents, the top two favorites were "steak house" and "barbeque" in that order. Although there were some tradeoffs in rating the remaining specialties, Mexican food was clearly the least preferred alternative for both groups. For the subsistence in kind (SIK) subsample group, which is the group of primary concern since they are the major users of the dining facilities, the third choice was Italian food.

B. CUSTOMER ATTENDANCE PATTERNS

The attendance rate for SIK's (individuals on subsistence in kind are entitled to eat in the dining halls for free) in the dining facilities was found to be 45.1% based on individual survey data and confirmed by official headcount data. The data also revealed that SIK's skipped approximately 25% of their meals (i.e., they had a total attendance rate for all meals consumed of only 75%). With reference to specific meals, SIK's attended Lunch (Weekdays) the most frequently and Dinner-Brunch (Weekends) the least. Although the eating habits of the total base population (i.e., SIK's and COMRATS) were significantly different, the highest percentage of available meals were consumed by SIK's at the enlisted dining facilities.

C. FOOD SERVICE WORKER OPINIONS

Fifty cooks, five supervisors, and five food service office personnel were surveyed regarding their attitude toward the current food service system. The results indicated that the workers' opinions of the two dining facilities were quite different. The workers in Dining Facility 5 perceived that facility as worse than other facilities in which they had worked, while those in Dining Facility 2 believed it was better than others in which they had worked. The most frequent response concerning bad things about the system were complaints about the fact that the hours worked were too long. With respect to potential system improvements, many suggested additional watches (69%).

In addition to the personal interviews, the cooks were given the job description index (JDI), and these indices were then compared to the Air Force norm. The JDI is a standard paper and pencil instrument which measures satisfaction within five areas (the type of work, the supervision, the co-workers on the job, the opportunities for promotion, and the pay). The results of the JDI show that no statistical differences exist in the area of co-workers either between dining halls or with respect to Air Force norms. However, in all the other four areas, significant differences were found between the Air Force norms and the two dining facilities combined. In all these cases, the Twentynine Palms workers were less satisfied than their Air Force counterparts, with the personnel in Dining Facility 5 feeling more so than Dining Facility 2. The only area in which the personnel in the two dining facilities differed significantly was supervision. The cooks in Dining Facility 2 were more satisfied with their supervisors than the cooks in Dining Facility 5.

With respect to opinions regarding the optimal length of mess duty assignment, a large percentage of messmen (43%) stated a preference for a one week assignment while only 1/3 (31%) favored the standard one month tour. Most cooks (69%), however, preferred one month mess duty assignment, and 68% of cooks, supervisors, and FSO personnel said the advantage of one month is that it reduces total training time over having shorter assignments with frequent personnel turnover, since each messman requires considerable initial training.

D. LABOR UTILIZATION

The overall proportion of time devoted to productive tasks of 64% determined for all food service workers at MCB, Twentynine Palms is comparable to that obtained from other military food service systems, e.g., 67.8% at Travis AFB (Reference 1) and 63.4% at McGuire AFB (Reference 2). However, if the large percentage of cooks in training for field food service during data collection, who were considered as productive at all time, were being utilized in the dining facilities rather than in class, the proportion of nonproductive time would have increased. In contrast, the low productivity index (2.65 meals per manhour) seems to indicate that some proportion of the so called productive work is make work due to overstaffing and to the large number of hours worked per week by each worker, particularly messmen. The high non-productive time (50% to 90%) for messcooks between meals seems to indicate that they should be scheduled in shifts rather than on a daily basis. The highest nonproductive time for messcooks (90%) occurred between meals on weekends, again calling into question the policy of bringing all messcooks in all day, every day. Rescheduling messcooks to better working hours would increase morale and efficiency and make the job appear as the necessary work it is, rather than as the punishment it seems to be. Leveling factors, i.e., adjustments for variations in the efficiency of the individuals, were not applied to any of the work sampling data. However, the subjective judgement and opinion of those collecting the data is that the worker efficiency of messcooks was very poor. Much of the work performed by messcooks was busywork which caused a lack of interest and low morale.

It was determined that cooks spend only 29% of their productive time in food preparation and serving. When cooks in training are not included in the data, the percentage of time in preparation and serving activities rises to 33%. This indicates that cooks are not being properly utilized according to their described duties. On the other hand, supervisors spend 80% of their productive time in supervising and administrative functions; bakers spend 80% of their productive time in food preparation and sanitation functions; messcooks spend 80% of their productive time in food preparation, serving, and sanitation functions. This all appears to be reasonable and consistent with described duties.

E. SYSTEM COSTS

The total cost per meal at MCB Twentynine Palms was \$2.05 with Dining Facility 5 having a total cost of \$2.28 per meal. The most significant difference in the cost per meal between the two dining facilities occurred in labor with Dining Facility 5 being \$0.25 higher per meal.

The considerably greater labor (excluding mess attendants) cost per meal at MCB, Twentynine Palms as compared to analyses of other military bases conducted by NARADCOM seems to indicate that possibly MCB, Twentynine Palms is somewhat overstaffed with food service personnel under the present system. Moreover, the direct and indirect costs per meal in Dining Facility 5 are considerably larger than Dining Facility 2, which indicates that Dining Facility 5 is more overstaffed than Dining

Facility 2 due to its lower utilization. The lower costs per meal for messcook services at MCB, Twentynine Palms, however, as compared to Travis AFB or Ft. Benjamin Harrison seems to support the Marine Corps viewpoint that not contracting out the mess attendance function is more economical. The overhead costs of the food service office seems to be reasonable with respect to the total system costs.

SECTION III

DETAILS OF THE CURRENT FOOD SERVICE SYSTEM

A. CONSUMER ATTITUDE

In support of the OR/SA effort to establish the existing level of quality of the base food service system at MCB Twentynine Palms the Behavioral Sciences Division, Food Sciences Laboratory was given the task of monitoring the attitudes and opinions of the enlisted consumer toward the food service system throughout the course of the study. An initial assessment of current consumer attitudes and opinions, was made in November 1976 employing two overlapping instruments — one, the Consumer Opinions of Food Service Systems (COFSS) survey form, and the other, a specially designed face-to-face interview — with the goals of, (a) identifying the problem areas most significant to the consumer and most in need of modification (diagnostic), and (b) establishing baseline data against which to measure the effects of the programmed modifications at each major stage of implementation.

METHODOLOGY

The original sampling plan for the survey measure specified a 15% sample drawn from the base enlisted population and stratified by work unit, rank, and ration status, to whom the COFSS survey would be administered. One third of this sample (5%) would also participate in the face-to-face interview in addition to completing the COFSS survey. Both sample populations were stratified in exactly the same way. The number of individuals in the sample chosen from any given work unit was proportional to the size of the work unit relative to the base as a whole; e.g., a unit containing 20% of the base enlisted personnel would contribute 20% to the sample. To simplify the stratification by rank, the nine enlisted grades were divided into three categories: E-1 and E-2, E-3 thru E-5, and E-6 thru E-9. Since the respective proportions of base personnel falling into each category was 40%, 40%, and 20% respectively, these same proportions were used to specify the ideal breakout of the proposed sample from within each unit. Finally, for each grade category within each work unit, the ideal sampling plan specified that two-thirds be authorized to subsist at government expense (SIK) and that one-third be receiving separate rations (COMRATS), since those were the proportions of each ration status category occurring within the base enlisted population taken as a whole. The criterion characteristics of the ideal sample population, then, would match those of the base enlisted population, both taken as wholes, even though for any given unit the 40%-40%-20% rank distribution and the 67%-33% ration status distribution might or might not reflect the actual proportion of occurrence within that particular unit. Although normally considered relevant, marital status was not used in this study as a criterion variable for stratification because of its high correlation with ration status in the Marine Corps (i.e., those personnel on separate rations are almost always married, those authorized to subsist at government expense almost never are).

CONSUMER SURVEYS AND INTERVIEWS

For the 5% interview subsample, variable sized groups of four to five enlisted consumers were scheduled per interviewer for each hour block so that each respondent could be personally interviewed on an individual basis for 10 to 15 minutes while the other respondents spent the remaining 45 minutes of the hour working on their COFSS surveys. The COFSS survey, originally developed by NARADCOM in 1972 and updated in 1974, consists of 57 questions — some with several parts — covering a wide range of variables involved in food service. Each question has a limited set of possible responses, allowing for computer scoring of the survey booklets. A copy of the survey is included as Appendix A. The interview instrument, tailored to the specific requirements of this project, consisted of five general sections dealing respectively with, (a) the demographic characteristics of the respondents, (b) their current food habits, (c) their opinions of the dining facility and its food, (d) their specialty food preferences, and (e) various comparisons to other military dining facilities. Most of the questions required either a very objective response from a logically exhaustive set of possibilities or a subjective rating confined to a seven-point scale with predetermined anchors printed on a card shown to the respondent at the appropriate time. A few of the questions, however, were designed to permit relatively open-ended responses, which were recorded as closely as possible by the interviewer and subjected to a content analysis at a later time. A copy of the interview protocol is included as Appendix B.

In most cases, the small groups receiving both instruments were surveyed/interviewed in a briefing room near their work sites. Following a short introduction that included the purpose of the data collection effort, respondents were briefed on general procedures, instructed on some of the more complex items on the survey, and told to feel free to ask questions in the event of any uncertainty. In the instructions the respondents were told to answer only those questions that they could and to leave blank items for which they had insufficient familiarity with the dining facility to answer knowledgeably.

For the remaining 10% of the enlisted population who were to receive only the COFSS survey, six mass survey sessions of 50 to 70 respondents each were scheduled in an unused dining facility. The mass session respondents received the same instructions as those who were interviewed in small groups, except, of course, those pertaining specifically to the interview procedure.

RESULTS OF CONSUMER INTERVIEWS AND SURVEYS

Demographic Characteristics

Face-to-face interviews were actually administered to 201 enlisted personnel constituting 5.2% of the total base enlisted population. Of these, some 120, or 59.7%, were authorized to subsist at government expense (SIK), while the remaining 81, or 40.3%, were receiving separate rations (COMRATS). The COFSS survey was properly completed by a total of 597 personnel, including the 201 interviewees, together constituting 15.4%

of the total base enlisted population. Of the total 597, 361 (60.5%) were SIKs, and the remaining 236 (39.5%) were on COMRATS. For both the 15% total sample and the 5% interview subsample, then, the obtained breakout by ration status was reasonably close to the 67%–33% split characteristic of the population as a whole (See Table 1).

A verification of the expected high correlation between ration status and marital status in the Marine Corps confirmed the hypothesis. There were 30 individuals (some 5%) in the total sample of 597 who were married and not on COMRATS and 25 cases (4%) in which an unmarried person was receiving COMRATS.

A similar check on the stratification by rank revealed that 230 (38.5%) of the total sample, were in the E–1 and E–2 grade category, 290 (48.6%) were in the E–3 to E–5 category, and 77, or 12.9% were in the E–6 to E–9 category, than the COMRATS recipients (5.9%). When asked about their career plans, 35.8% of the COMRATS group interviewed indicated a Marine career orientation, whereas only 15% of the relatively younger SIKs felt so committed. The career orientation question was substantiated by a re-enlistment question in the survey, to which 34.7% of the COMRATS group reported that they would probably or definitely re-enlist, in contrast to 14.8% of the SIK group. On the average, the SIK group expressed, rather firmly, neutral feelings about military service in the Marine Corps, whereas the COMRATS survey group indicated that they did like the service a little.

Current Eating Habits

Eating habits can potentially be determined by a number of factors that vary in importance with the individual or subject population of individuals. Table 2 shows the rank order from top to bottom of factors rated by the enlisted population at MCB Twentynine Palms as being of major, minor, or no importance. Of special note are the top three factors, your liking of the food, food appearance, and food variety in descending order. It is also interesting that food cost and the number of calories in the food appeared to be the factors of least subjective importance. Only 11.4% of the survey respondents reported being on a diet, which at least helps to explain the lack of attention to calories. Further, the large proportion of enlistees on SIK and eating for free in the dining halls would explain some of the lack of concern about cost.

One method of interjecting variety into a menu is by creating specialty outlets offering specialized foods. Preference ratings for six specialty type menus were, therefore, also gathered from the interview sample. Among the six choices — steak house, barbeque, Italian, deli-service, seafood, and Mexican — the order of preference is shown in Table 3. The top two favorites among both ration status groups are the steak house and barbeque, in that order, both in terms of higher mean ratings and in terms of lower frequency of extreme negative evaluation. Below barbeque, however, there is less consensus between the ration status groups — the SIK's generally preferring Italian as a third choice, while the COMRATS recipients tend to prefer seafood as a third alternative, perhaps due to the growing consciousness of nutrition and body weight that might tend to be more

TABLE 1
DEMOGRAPHIC CHARACTERISTICS OF SIK AND COMRATS GROUP
SURVEY SAMPLES*

Group	Mean Age (years)	Mean Time in Service (yrs)	Median Grade	% Certain of Marine Career	% Married
SIK	19.63 (19.91)	2.03 (1.78)	E-2	(15.0)	8.36 (8.33)
COMRATS	23.88 (24.07)	5.31 (5.53)	E-5	(35.8)	88.98 (85.42)

*Survey data are shown above and interview data are shown in parentheses.

TABLE 2
PERCENTAGE OF TOTAL SURVEY SAMPLE INDICATING SUBJECTIVE
IMPORTANCE OF VARIOUS FACTORS IN FOOD CHOICE

Factor	Major Importance	Minor Importance	No Importance	Other
Your Liking of Food	79.4%	11.1%	02.8%	06.7%
Food Appearance	78.2%	16.1%	01.5%	04.2%
Food Variety	69.5%	23.1%	02.7%	04.7%
Nutritional Value of Food	51.3%	32.0%	11.2%	05.5%
Compatibility with Other Foods	47.9%	34.8%	10.2%	07.0%
Familiarity with Food	46.2%	37.0%	11.6%	05.2%
Number of Calories in Food	34.3%	33.5%	26.1%	06.0%
Food Cost	28.5%	29.1%	36.7%	05.7%

TABLE 3
MEAN PREFERENCE RATINGS FOR SPECIALTY MENUS
POSITIVELY, NEUTRAL, OR NEGATIVELY FOR EACH RATION GROUP

Specialty Menu	Percent Ratings						Mean Rating*	
	SIK			COMRATS			SIK	COMRATS
	Positive	Neutral	Negative	Positive	Neutral	Negative		
Steak House	88.4%	9.2%	2.5%	83.9%	14.8%	1.2%	1.83	2.01
Barbeque	85.0%	15.0%	0.0%	82.0%	10.0%	8.0%	2.20	2.18
Spaghetti Factory	78.3%	10.8%	10.8%	76.25%	13.75%	10.0%	2.45	2.44
Deli-service	72.6%	15.8%	11.7%	75.4%	16.00%	8.6%	2.65	2.49
Seafood	66.7%	16.7%	16.7%	80.2%	12.30%	7.4%	2.78	2.20
Mexican	63.3%	18.3%	18.3%	72.9%	14.80%	12.4%	2.99	2.70

*Scale 1 = Prefer Extremely
 2 = Prefer Moderately
 3 = Prefer Slightly
 4 = Neither Prefer nor Dislike
 5 = Dislike Slightly
 6 = Dislike Moderately
 7 = Dislike Extremely

developed in the older COMRATS recipients. Despite this lack of consensus in the middle range of choices, however, both groups re-established agreement on the least preferred alternative, Mexican food, which rested solidly at the bottom for both, perhaps because of the general proximity of MCB Twentynine Palms to the Mexican border, and the consequent availability of the "real thing". With regard to the potential installation of new facilities, it was felt that since the primary dining facility patron is the SIK customer, his or her opinion would be the determining factor in choosing specialty facilities.

Attitudes Toward the Dining Facilities

In general, the dining facilities at MCB Twentynine Palms were rated consistently worse by the SIK's who have to eat in them more often on the average, than by the COMRATS recipients. Overall, the facilities were rated as **slightly worse than other military dining facilities** by the SIK group and as **neutral — neither better nor worse —** by the COMRATS group during the interview (See Figure 5). The survey data (Figure 6), however, show a **slightly worse** evaluation by both groups, but on a five-point, rather than a seven-point scale.

Respondents in the two groups were also asked to rate their dining facilities in comparison to other military dining facilities on five specific attributes — intrameal (within-meal) variety, intermeal (between-meal) variety, the quality of raw food, the preparation and presentation of the food, and the frequency with which published menu items become unavailable, (run-outs). In all five cases, the mean for the COMRATS group indicated a generally neutral attitude — neither better nor worse than other military dining facilities — whereas the mean for the SIK group was always nearer the **slightly worse** anchor in comparison to other facilities.

When asked for the main reason that they do not eat in the dining facility more often, the most frequent reason cited by COMRATS recipients was **prefer to eat with family** (28.6%), followed by **poor food preparation** (18.6%), **cheaper to cook at home** (15.7%), **presence of insects** (8.6%), and **too much waiting in line** (8.6%), with the remainder of responses in small odd categories. Among the SIK's **poor food preparation** was the most frequently cited reason for avoiding the dining facility (23.7%), followed by **too much waiting in line** (20.2%), **presence of insects** (17.5), **poor general management** (7.9%), **too little variety** (7.0%), and **poor attitude of food service personnel** (6.1), with the remainder in odd categories.

Interview respondents were also asked to cite other, more secondary reasons for nonattendance in the dining facilities. The front running secondary complaint among the meal card holders was the **presence of insects specifically flies** — cited by over a third (35%) of the SIK's responding, followed by **poor general management: run-outs, cold food, etc.** (28.49%), **poor food preparation** (21.57%), **too much waiting in line** (20.59%), **too little variety** (18.63%), **unattractive environment** (17.65%), and **poor attitude of food service workers** (16.6%). Among the COMRATS group, the four most frequently

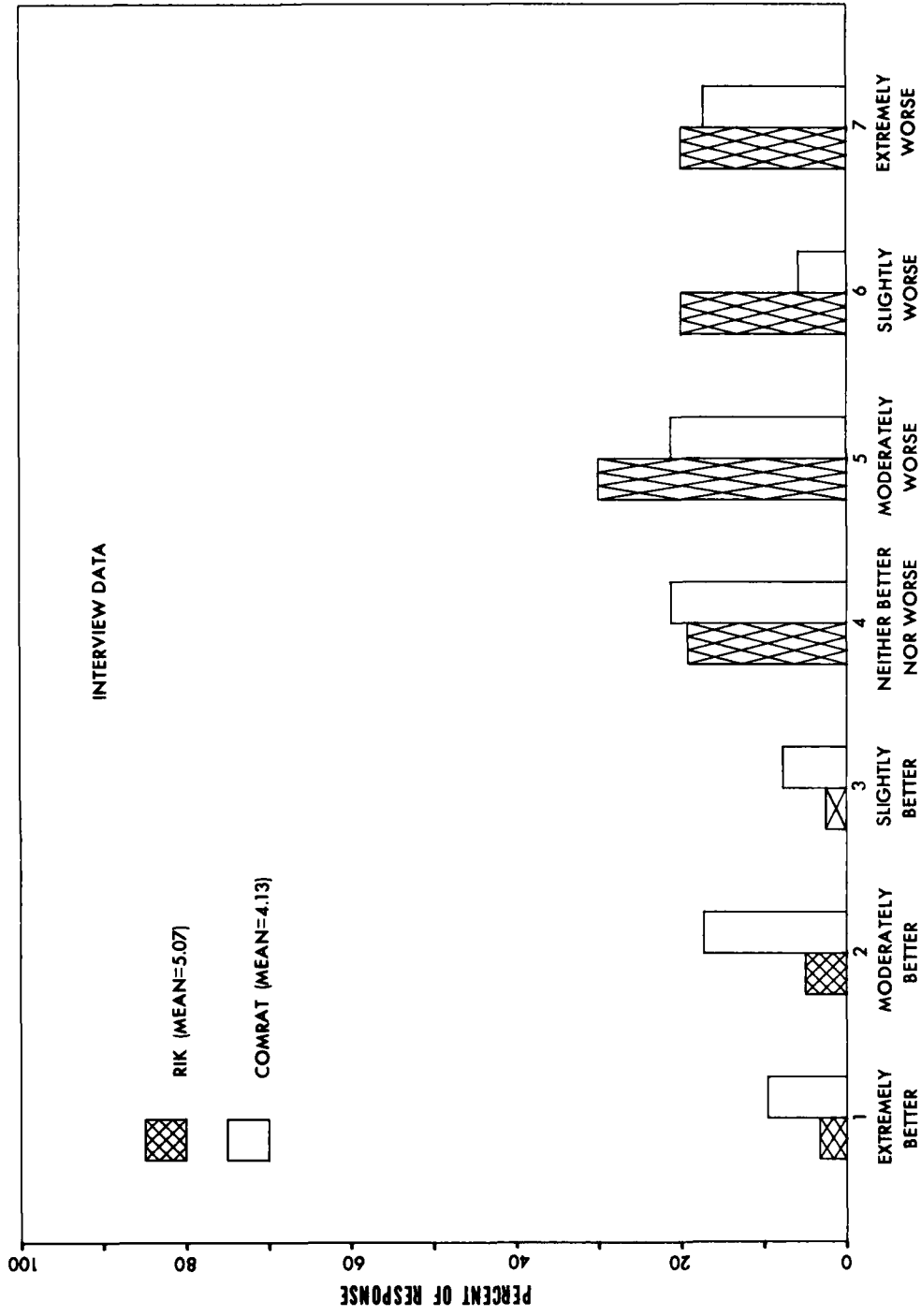


FIGURE 5: OVERALL RATING OF THE TWENTYNINE PALMS DINING FACILITIES IN COMPARISON TO OTHER MILITARY DINING HALLS BY EACH RATION GROUP

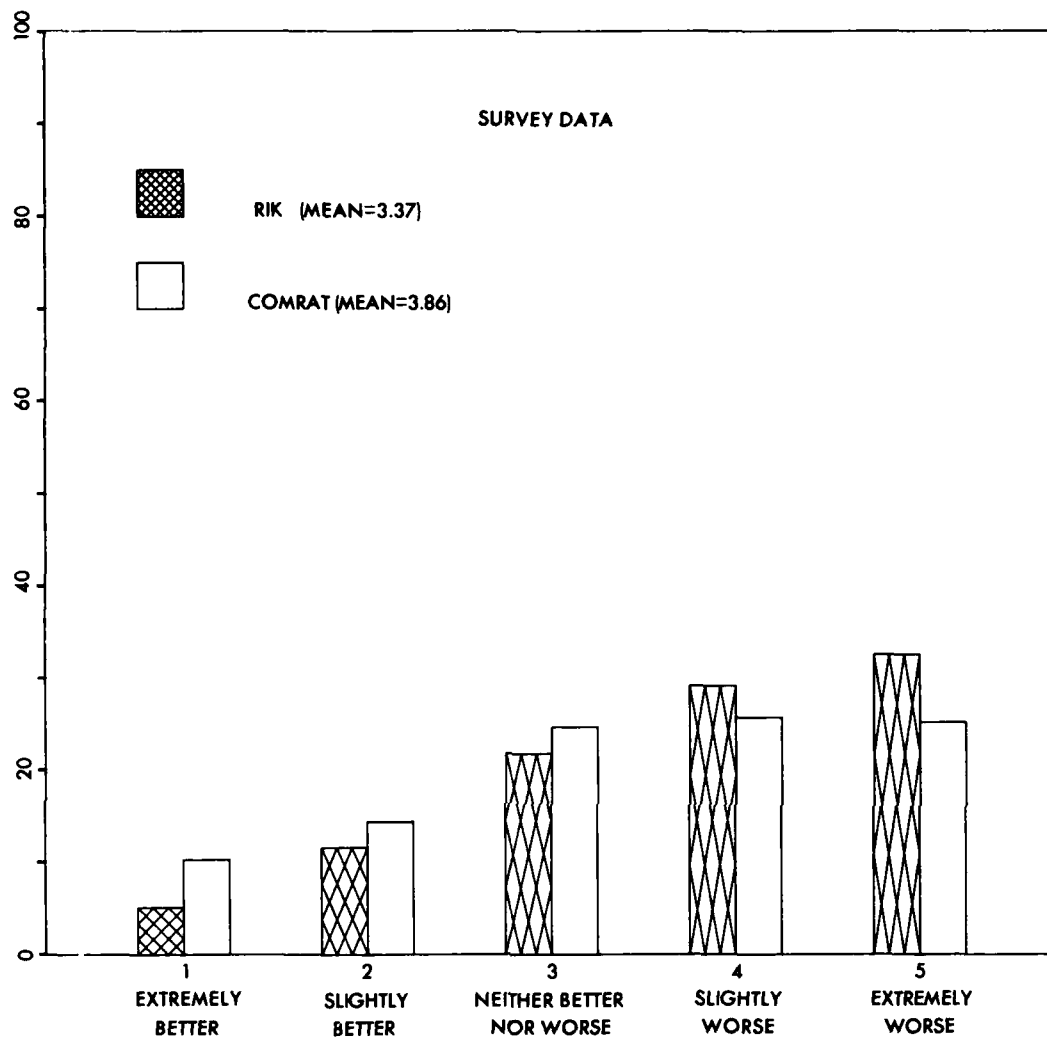


FIGURE 6: OVERALL RATING OF THE TWENTYNINE PALMS DINING FACILITIES IN COMPARISON TO OTHER MILITARY DINING HALLS BY EACH RATION GROUP

cited secondary complaints were poor general management, — run-outs, cold food, etc. (28.57%), too much waiting in line (24.49%), presence of insects — flies (22.45%), and too little variety (20.41%). Thus, besides the ubiquitous problem of poor food preparation, which seems to afflict nearly every military dining facility that has been studied thus far^{1,2,3} the flies and the waiting in line seem to be the two areas of discontent that emerge from the interview data as most disturbing to the consumers at MCB Twentynine Palms. When actually asked in the interview to estimate the average waiting time in minutes. SIK's estimated 15.13 minutes and COMRATS, 12.80 minutes on the average.

The COFSS survey asked respondents to rate their dining facility on 14 general areas of concern and then to indicate whether that particular rating was a major, minor, or irrelevant reason for not attending the dining facility more often. Both ration status groups agreed on the top three major reasons for nonattendance—poor food quality (62.68% SIK, 40.00% COMRATS), long lines and slow service (60.17% SIK, 33.16% COMRATS), and inadequate quantity of food (40.57% SIK, 28.65% COMRATS). The fourth major reason for nonattendance of the COMRATS group was expense (25.64%), due presumably to the redundancy of buying food for self and family separately, whereas, for the SIK group, the fourth major reason was inadequate variety of short order food (40.11%). Both groups then agreed that the fifth most important reason for nonattendance was poor service by dining facility personnel (32.19% SIK, 20.83% COMRATS).

Both groups agreed perfectly on the ordinal positions for the ratings of the seven worst areas of concern, if not on their affect upon attendance. Expense, for example, was not considered particularly bad by the COMRATS recipients, even though it was their fourth major reason for nonattendance. For the sample as a whole then, the proportion of respondents rating these seven areas positively, neutral, or negatively are shown in Table 4 with the original five-point scale condensed to three points.

¹L. G. Branch, H. L. Meiselman, and L. E. Symington. A consumer evaluation of Air Force Food Service. U.S. Army Natick Laboratories Technical Report, 75-22-FSL, July 1974.

²W. C. Wilkinson, L. E. Symington, M. F. Berman, and B. Edelman. Consumer and worker opinions of an a la carte food service system independent of any systematic changes in ration status: Barksdale AFB. U.S. Army Natick Research and Development Command Technical Report, #NATICK/TR-79/006, March 1979.

³W. C. Wilkinson, L. E. Symington, J. R. Siebold, H. L. Meiselman, and D. L. Maas. Consumer and worker opinions of cash food systems: NAS Alameda. U.S. Army Natick Research and Development Command Technical Report, #NATICK/TR-77/023, August 1977.

TABLE 4

**PROPORTION OF TOTAL SURVEY SAMPLE RATING THE WORST SEVEN AREAS OF
CONCERN IN THE DINING FACILITIES**

Area or Topic	Rating		
	Positive	Neutral	Negative
1. Speed of Service or Lines	0.1673	0.1431	0.6896
2. Variety of the Short Order Food	0.1511	0.2444	0.6045
3. Quality of Food	0.1697	0.2491	0.5812
4. Service by Dining Facility Personnel	0.1716	0.3137	0.5148
5. Quantity of Food	0.2588	0.2274	0.5139
6. Monotony of Same Facility	0.1006	0.4159	0.4836
7. General Dining Facility Environment	0.1934	0.3485	0.4580

Another series of questions in the survey asked the respondents to rate each of several attributes of the physical dining facility area. Again, both ration status groups generally agreed upon those attributes most in need of attention. Table 5 shows the proportion of the total sample rating each of the ten worst attributes on a three-point scale, again condensed from the original five points. Obviously insect infestation — assumed from the interview data to be flies in this case — is by far the number one problem with the physical facility, followed closely by crowding, an unpleasant view, noise, and ugly appearance. The remaining five scales seen as describing the worst physical attributes of the facilities are largely redundant with the first five, capturing perhaps a slightly different facet of each problem, but the same problems nonetheless.

Other miscellaneous questions in the survey show that run-outs — the unavailability of a published menu item are indeed a problem, since 58.12% of the sample report run-outs occurring either often or always. Some 70% of the sample complain that the dining facility is either moderately (16.26%) or extremely (53.64%) far from a washroom. The optimal table size appears to be an accommodation for four people, preferred by 68.54% of the respondent sample. Carry out service, if available from the dining facilities, would be enthusiastically received by 77.45% of the respondent sample. A final miscellaneous finding that corroborates the general tenor of the battery of questions evaluating the physical facility is that 61.61% of the respondent sample felt that the feeling of privacy was never good in the dining facility.

The hours of operation of the dining facilities was also the subject of some complaint. Some 39% of the survey sample felt that the weekday breakfast meal should be from 1/2 to 1 hour earlier and 48.34% felt that it should be closed from 1/2 to 1 hour later. The strongest sentiments, however, were expressed for keeping the weekday evening meal open an extra 1/2 to 1 hour later (62.45%). Although weekend meals were generally felt to open early enough, there was a definite preference for keeping at least breakfast, (38.39%), and the evening meal (62.53%), open for an extra 1/2 to 1 hour.

It was the general feeling of the respondent sample as a whole that the attitudes of the food service workers toward their jobs and toward them as consumers were poorer than average (66.30%). Specifically, 51.28% of the sample thought that the workers were from moderately to extremely poorly trained, and 59.44% thought that the workers provided slow service.

As for the food itself, 54.77% of the survey respondents thought that the food was often or always tasteless or bland, 54.46% also thought the food was cold, 54.29% said that the food was often or always greasy, 50.94% tough, 46.75% undercooked, 43.84% dried out, and 41.81% thought that the food was often or always fatty.

Two other general areas of complaint mentioned earlier were food quantity and short order variety. More specific questioning in the survey revealed that 86.50% of the survey sample felt that meat portions were either slightly or much too small. Meats were the only category of food to elicit so unanimous an opinion of inadequate portion size. When

TABLE 5
PROPORTION OF TOTAL SURVEY SAMPLE RATING THE TEN WORST PHYSICAL
ATTRIBUTES OF THE DINING FACILITIES

Attribute	Rating		
	Positive	Neutral	Negative
1. Insect Infestation	0.1421	0.1015	0.7565
2. Crowding	0.0978	0.1827	0.7196
3. Pleasantness of View	0.0627	0.2638	0.6734
4. Noise	0.0968	0.2346	0.6685
5. Beauty	0.0518	0.3383	0.6100
6. Colorfulness	0.1294	0.2662	0.6044
7. Roominess	0.1608	0.2736	0.5656
8. Exterior Appearance	0.1107	0.3247	0.5646
9. Interior Appearance	0.1738	0.2847	0.5416
10. Sunniness	0.1781	0.3711	0.4508

asked in detail about the variety of intrameal offerings (offerings within a given meal), both weekend and weekday, as well as intermeal variety from day to day over the course of a month, meats, again, as well as short order foods, emerged as the categories most in need of diversity — 78.22% responding felt that **slightly** or **much** more choice was needed among meat offerings for any given weekday meal, 77.39% felt similarly about the short order foods; and, again, for weekends, 76.88% felt the need for more meat variety, 73.16%, for more short order variety. During the course of a month, 80.35% responding felt that the day to day turnover of short order foods was inadequate. 78.64% felt that the turnover for meats was inadequate.

B. ANALYSIS OF ATTENDANCE PATTERNS

The collection and analysis of attendance data is considered to be particularly important both for its implications with respect to consumer attitude toward the food service system as well as for its direct relationship to system costs.

METHODOLOGY

The data base used to analyze the individual attendance patterns of the enlisted personnel was derived from an interview survey of approximately 350 individuals during a 16-day period (1-16 March 1977). This survey was conducted by the Letterman Army Institute of Research (LAIR). In this survey each individual having been classified into one of the seven groups shown in Table 6 maintained a daily dairy record of his eating experiences. Table 6 also provides the frequency of observations (total number of man-days monitored for all members of the group) and the group's percentage of the total base population. It can be seen that the base population is composed primarily of male personnel subsisting on Subsisting-In-Kind (SIK), at 64.3%, as opposed to those on Commuted Rations (COMRATS) or Female SIK's, at 35.7% combined.

RESULTS AND ANALYSIS

The primary area for consideration is the attendance patterns of the SIK population since they are the customers for whom the food service system is operated and they constitute the majority of the base population, as well as the fact that they are the target consumer group for the improved food service system.

As shown in Table 7, the attendance rate for the SIK population was 45.1% at the dining facilities, which were also the most frequented location. After the dining facilities, home (barracks) is the next most frequented location for eating meals (10.1%) with the remaining eight locations accounting for 19.4% of the meals consumed. Also of interest is the fact that SIK respondents reported that they skip, on the average, over one-fourth of all meals. In summary, SIK's reported that they consume almost 40% of their meals actually eaten in locations other than dining facilities. This high percentage indicates that a significantly large portion of SIK's are sufficiently dissatisfied with the present

TABLE 6
PERSONNEL PROFILE OF INDIVIDUAL ATTENDANCE SURVEY DATA
SEVEN GROUPS OF MARINE PERSONNEL

Group Number	Group Type and Description	Observation Frequency	Percent of Total Base Population
1	Heavy Activity SIK – Male	752	29.4
2	Heavy Activity COMRATS – Single Male	327	3.0
3	Heavy Activity COMRATS – Married Male	817	11.7
4	Moderate Activity SIK – Male	749	34.9
5	Moderate Activity COMRATS – Single Male	517	4.0
6	Moderate Activity COMRATS – Married Male	912	13.1
7	Moderate Activity SIK – Female	560	3.8

NOTE: Heavy Activity indicates a Marine who undertakes a rigorous training routine (mainly Force Troop and Tanker Battalions) while Moderate Activity indicates a Marine who is either a student or a member of an administrative and support unit.

TABLE 7
SIK ATTENDANCE RATES FOR 12 EATING LOCATIONS
(In %)

	% Attendance
Enlisted Dining Facilities	45.1
Home	10.1
Restaurants	6.8
Bowling Alley	4.4
Vending Machines	2.1
EM Club	1.7
7 Day Store	1.2
Dog House	1.2
Recreation Center Snack Bar	1.0
SNCO Club	0.9
Golf Course Snack Bar	0.1
Baskin Robbins	<u>0.0</u>
TOTAL	74.6%
Meals Skipped	25.4%

dining facility food service system to invest time and money to patronize alternative eating facilities rather than eat in the dining facilities which are free for SIK's and generally more convenient.

Although the objective of this study is to increase the overall attendance rates and acceptance of the SIK population, an analysis of the total enlisted population was also performed in order to provide a reference point for future studies which will affect those individuals receiving COMRATS. Currently, Marine Corps policy discourages individuals receiving COMRATS from eating in the dining facilities, permitting them to eat only one meal a day there and then only during duty hours.

Table 8 shows the overall breakdown of attendance rates for the entire base population including COMRATS. As one would anticipate, the inclusion of COMRATS personnel significantly lowers the attendance rates at the dining facilities and increases the attendance rates at home (only married personnel are usually authorized to receive COMRATS).

Finally, an analysis was done by type of meal to determine which meals were most often attended by SIK's and which the least. As can be seen (Table 9) lunch during the week was the most frequently attended meal with a combined attendance rate for the two dining facilities of 58.8%. Dinner on the weekends was the most often skipped meal with a combined attendance rate of only 30.6%, which is probably due to the fact that individuals are off-base for recreational reasons at these times. Table 9 also shows that at these times, the number of meals eaten at home increased substantially.

C. FOOD SERVICE WORKER OPINION SURVEY FINDINGS

Surveys and interviews were administered to military food service workers at MCB Twentynine Palms in order to assess job satisfaction and attitudes toward the present food service system.

METHODOLOGY

Interviews were administered to fifty cooks, five supervisors and five Food Service Office personnel. They were asked to rate their attitude toward military service in general, to compare their present dining facility with others in which they had worked, to comment on the good and bad aspects of the present food service system and to recommend changes to make the system better. They were questioned about the length of the messmen's duty assignments and were asked about the advantages and disadvantages of one month mess duty assignments. They were also asked to rate the customers' attitude toward the dining facilities. (See Appendix A for survey and interview forms).

TABLE 8
COMPOSITE PERCENT ATTENDANCE REPRESENTING THE ENTIRE
BASE POPULATION AT MCB, TWENTYNINE PALMS

Place	Weekdays			Weekends			Total Week All Meals
	B	L	D	B	L	D	
School Dining Hall 2	18.2	26.9	24.0	16.7	4.2	10.7	19.5
Force Troop Dining Hall 5	12.4	13.4	12.0	13.7	3.4	9.6	11.5
Home	19.0	21.9	36.6	29.8	27.6	40.9	27.8
Restaurant	1.5	3.0	9.0	6.1	10.7	15.3	6.3
Vending Machines	4.2	2.8	1.0	0.2	1.0	1.0	2.1
Staff NCO Club	0.0	2.0	1.1	0.3	0.2	0.6	0.8
EM Club	0.5	2.1	1.8	0.0	0.5	1.6	1.3
Golf Course Snack Bar	0.1	0.2	0.1	0.2	0.4	0.2	0.2
Bowling Alley Snack Bar	1.7	3.5	5.4	0.6	3.3	4.9	3.4
Rec Center Snack Bar	1.0	2.0	0.2	0.0	0.2	0.0	0.8
Dog House	0.2	2.3	1.1	0.0	0.6	0.4	1.0
Baskin Robbins Ice Cream	0.0	0.1	0.1	0.0	0.0	0.0	0.0
7-Day Store	1.5	1.9	0.4	1.0	0.4	0.3	1.1
Meals Missed	39.7	17.9	7.2	31.4	47.5	13.2	24.2

TABLE 9
SIK's PERCENT ATTENDANCE BY MEAL

Place	Weekdays			Weekends			Total Meals All Week
	B	L	D	B	L	D	
School Dining Facility 2	26.2	39.6	36.1	25.2	6.4	16.2	28.8
Force Troop Dining Facility 5	17.6	19.2	17.9	20.7	4.8	14.4	16.8
Home	5.6	5.7	11.6	11.7	14.8	20.4	10.0
Restaurant	1.5	3.2	9.7	6.2	11.7	18.0	6.8
Vending Machines	4.3	2.4	1.2	0.0	1.2	1.1	2.1
Staff NCO Club	0.0	1.5	1.3	0.2	0.0	0.6	0.7
EM Club	0.7	3.0	2.5	0.0	0.7	2.4	1.8
Golf Course Snack Bar	0.1	0.1	0.1	0.0	0.0	0.3	0.1
Bowling Alley Snack Bar	2.2	4.1	7.2	0.8	4.7	6.9	4.3
Rec Center Snack Bar	1.2	2.8	0.3	0.0	0.3	0.0	1.1
Dog House	0.2	2.4	1.6	0.0	0.7	0.6	1.2
Baskins Robbins Ice Cream	0.0	0.0	0.1	0.0	0.0	0.0	0.0
7-Day Store	1.8	2.0	0.4	1.4	0.5	0.2	1.2
Meals Missed	38.6	14.0	10.1	33.9	54.2	18.7	25.1

Average Percentage of Meals Eaten Weekday = 77.1
Weekend = 64.4
Week = 74.9

In addition to the personnel interview, the cooks were given the Job Description Index (JDI).⁴ The JDI is a standard paper and pencil instrument which measures satisfaction within five areas (the type of work, the supervision, the co-workers on the job, the opportunities for promotion, and the pay). Each area is evaluated by responses to a list of adjectives and descriptive phrases (eighteen words and phrases each for work, supervision and co-workers; nine each for pay and promotions).

Thirty-nine messmen were interviewed. They were asked how long they'd been at MCB Twentynine Palms, how long they'd been assigned to their present mess duty and when their next most recent mess duty assignment had been. They were asked what the optimal length of a mess duty assignment should be, and to list the good and bad aspects of having the assignment be one month in duration. (See Appendix D for interview forms).

RESULTS OF WORKER INTERVIEWS AND SURVEYS

The responses of the cooks and supervisors concerning their feelings about military service in general are shown in Figure 7. The mean response for all cooks is just to the **satisfied** side of neutral. However, a X^2 test indicates a significant difference between the attitudes^a toward military service for the cooks at Dining Facility 5 (mean = 3.62, slightly below **neutral**) and at Dining Facility 2 (mean = 4.87, almost like **slightly**). This negative opinion of military service by the workers at Dining Facility 5 is possibly a result of a halo effect of their dissatisfaction with their supervisors, as discussed below, which also led to their negative opinion of their job and the dining facility in general. Four of the five supervisors surveyed indicated that they like military service **very much**. This latter result might have been expected since these personnel are older career marines.

Before discussing the results from the JDI, a brief explanation of the scoring should be undertaken. Each of the five areas of the JDI is evaluated by responses to a list of adjectives or descriptive phrases. Table 10 shows the format and four of the adjectives from the work scale. The respondent circles Y ("yes") or N ("no") to tell whether the work or phrase describes his job or not. He circles ? for those items which he does not understand or on which he cannot decide. Based on a large number of respondents, who were asked to describe the best and worst possible jobs for themselves, the developers of the JDI determined which response should be scored as satisfied for each item. For example, in Table 10, **routine** and **boring** are scored in the satisfied direction if the individual responds N; and **fascinating** and **good** are scored in the satisfied direction if he answers Y. For each scale or area of the JDI, the range of possible scores is from 0 to 54, with 54 indicating maximum satisfaction.

⁴Smith, P.C., Kendall, L.M., & Hulin, C.L. **The measurement of satisfaction in work and retirement**. Chicago: Rand McNally & Co., 1969.

^aLetter superscripts refer the reader to a statistical analysis table in Appendix C.

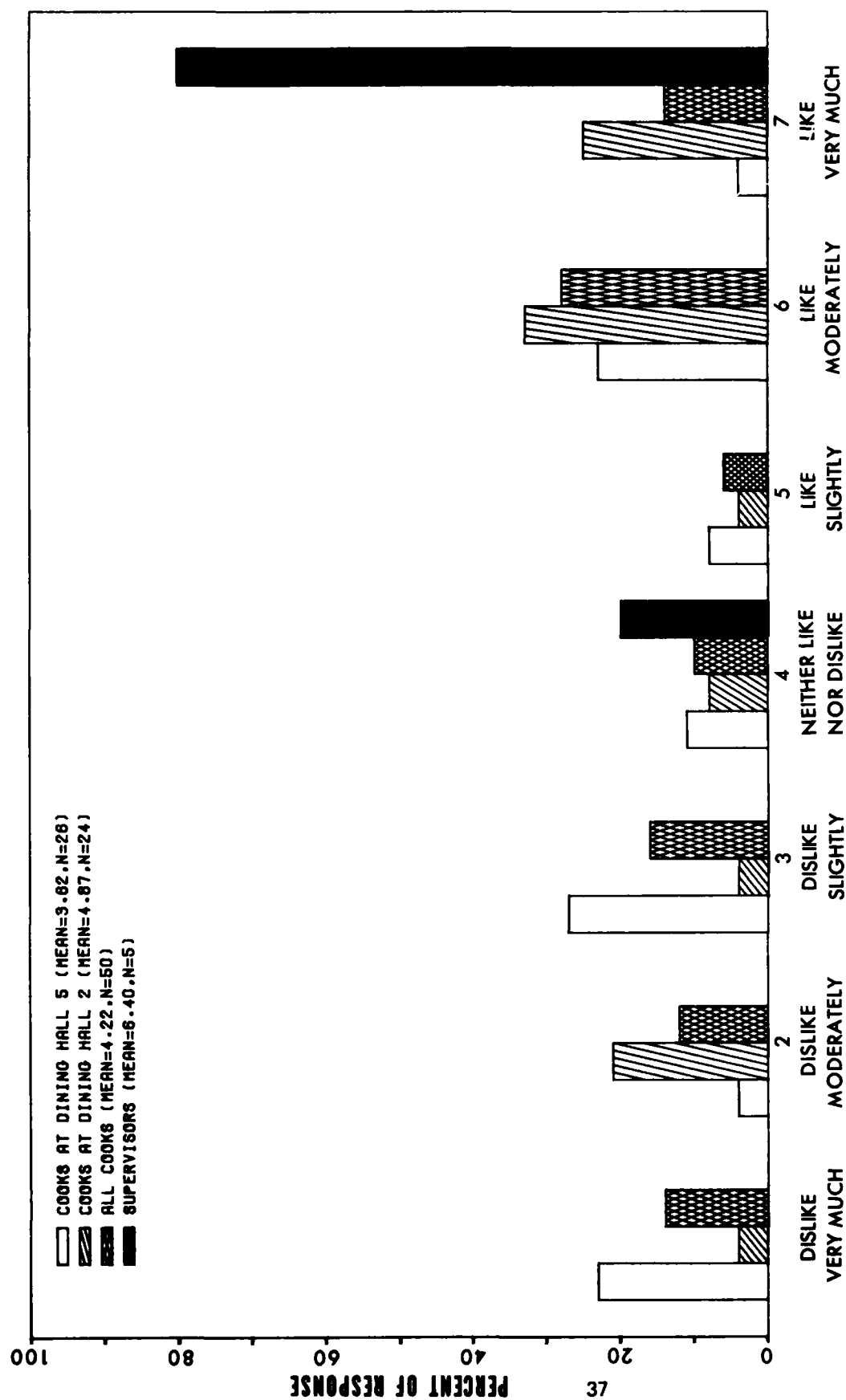


FIGURE 7: ATTITUDE TOWARD MILITARY SERVICE

TABLE 10

FORMAT FOR THE WORK SCALE OF THE JOB DESCRIPTION INDEX

Work

Fascinating	Y	N	?
Routine	Y	N	?
Boring	Y	N	?
Good	Y	N	?

Figure 8 shows the mean responses of the cooks at Dining Facility 2 and Dining Facility 5 to the five scales of the JDI. It also provides the mean responses from a sample of military food service workers at three Air Force bases — Travis, Minot, and Homestead.⁵ X^2 analyses were used to examine the significance of differences between, (1) Dining Facility 2 and Dining Facility 5, (2) between Dining Facility 2 and the Air Force norms, (3) between Dining Facility 5 and Air Force norms and, (4) between Dining Facility 2 and 5 combined and Air Force norms. No statistically significant differences were found in the area of co-workers. However, in all of the other four areas (workers^b, supervision^c, promotion^d, and pay^e) statistically significant differences were found between the Air Force norms and the dining facilities combined. In all of these cases, the MCB Twentynine Palms workers were less satisfied than their Air Force counterparts. When the dining facilities were considered separately, the cooks at Dining Facility 5 were less satisfied than the Air Force food service workers in the areas of work^f, supervision^g, promotion^h, and payⁱ, and the cooks in Dining Facility 2 were less satisfied than the Air Force workers in the area of promotionⁱ. The only specific area in which the two dining facilities differed significantly was supervision. In Dining Facility 2, the cooks (mean = 36.67) were more satisfied with their supervision than the cooks in Dining Facility 5 (mean = 20.15) were with theirs^k. Overall, however, a sign test indicates that workers in Dining Facility 2 were more satisfied with their jobs than the workers in Dining Facility 5^l.

Figure 9 shows the cooks' and supervisors' opinions of their dining facilities compared to others in which they have worked. The workers in Dining Facility 5 perceived that facility as worse than other facilities in which they had worked, while those in Dining Facility 2 felt that Dining Facility 2 was better than others in which they had worked.

⁵Symington, L.E., & Meiselman, H.L. The food service worker and the Travis Air Force Base experimental food system: Worker opinion and job satisfaction. U.S. Army Natick Laboratories Technical Report 75-94-FSL, 1975.

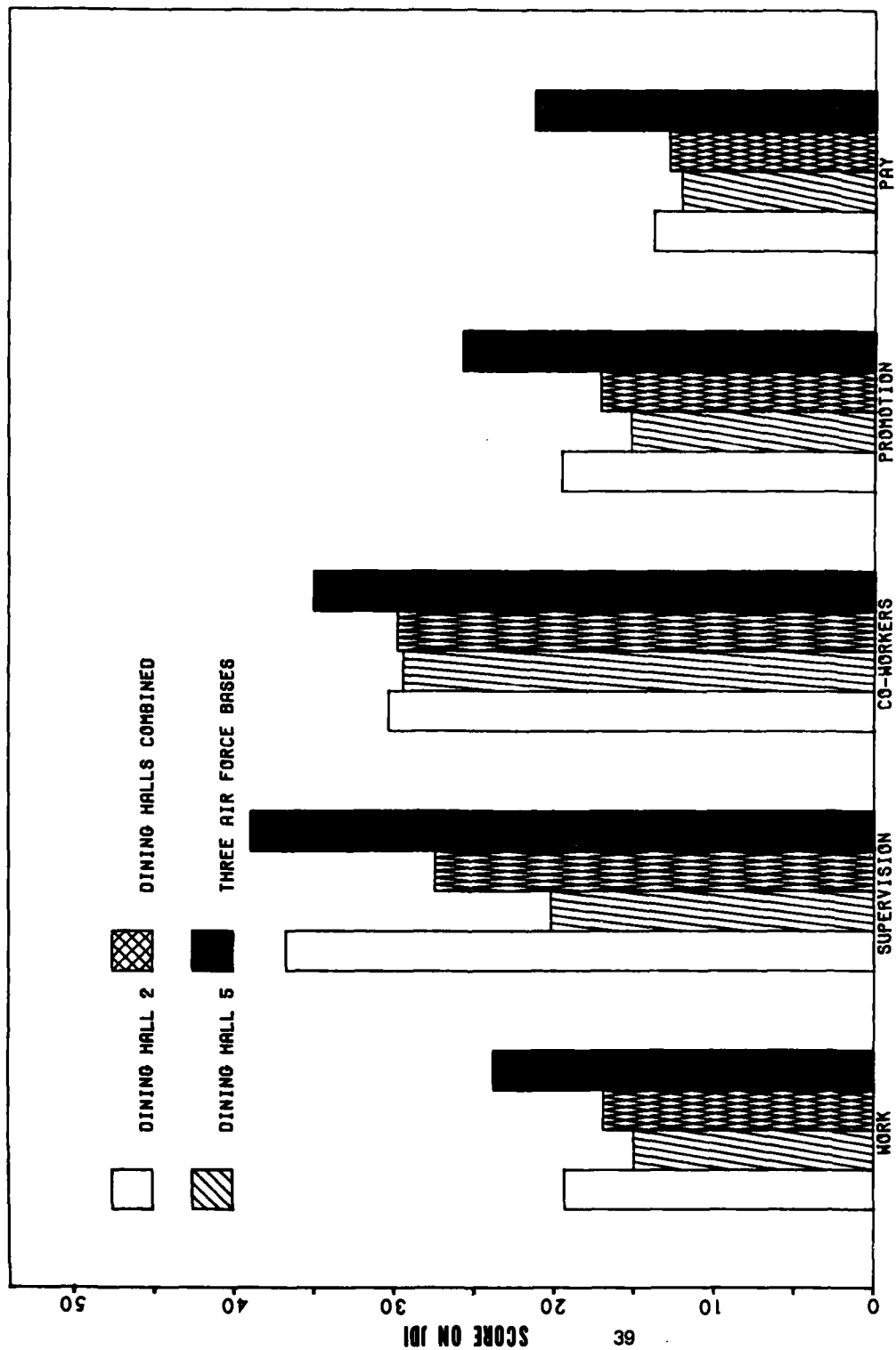


FIGURE 8: MEAN RESPONSES TO THE JOB DESCRIPTION INDEX (JDI) AT 29 PALMS AND FOR THREE AIR FORCE BASES

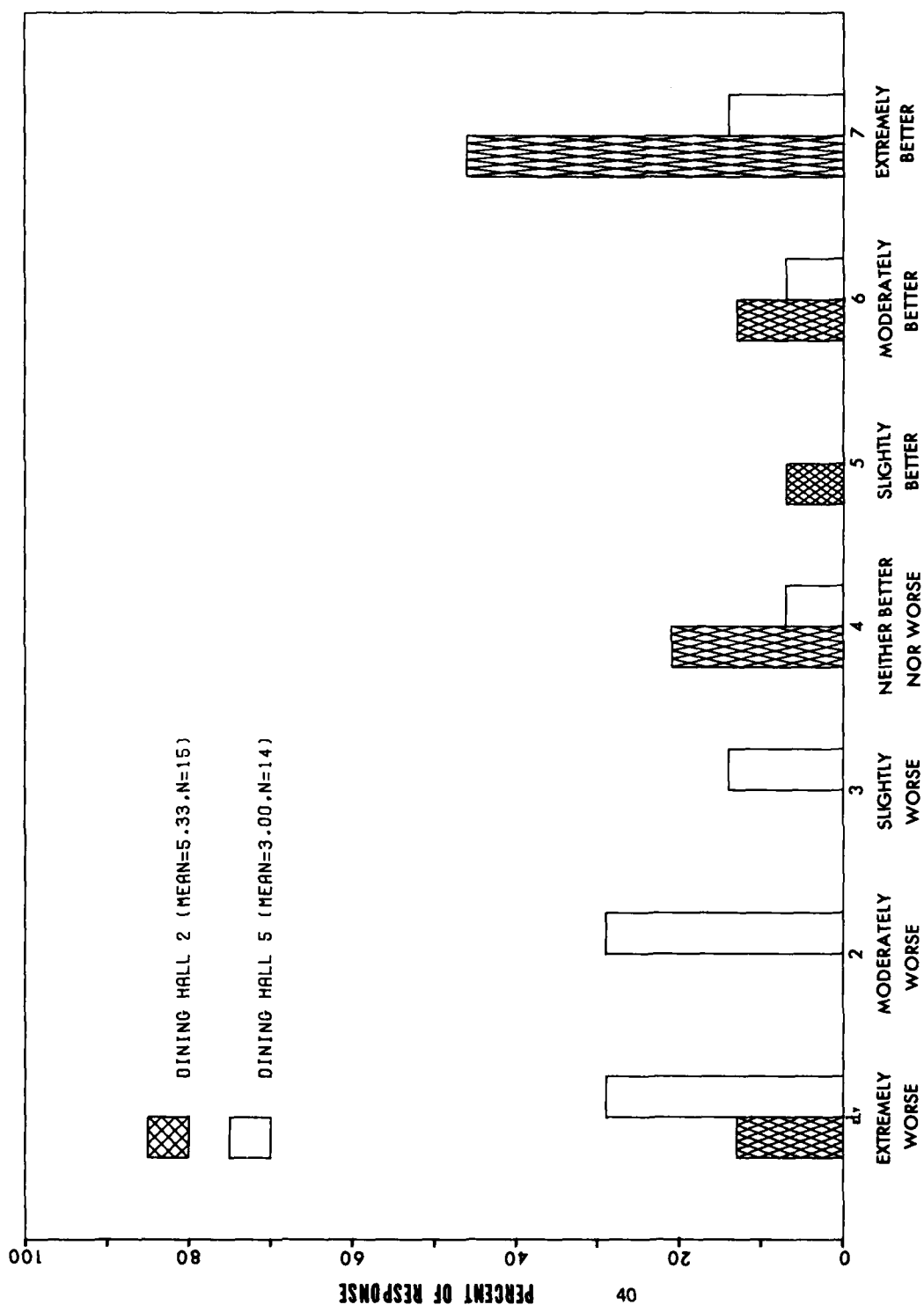


FIGURE 9: COMPARISON OF PRESENT DINING FACILITY WITH OTHERS IN WHICH THEY HAD WORKED

This difference between the dining facilities is statistically significant^m, and probably relates to the halo effect of the differences in opinions regarding supervision.

When asked in the interview about the good aspects of their dining facility, 42% of the cooks and supervisors in Dining Facility 2 said that there were good management/worker relations. Esprit de corps, or cooperation and pride among the cooks was cited as a good aspect by 27% of those interviewed in Dining Facility 2, and 15% said the atmosphere or decor was pleasant.

The most frequent response concerning bad aspects of the system in Dining Facility 2 reflected the working hours. Fifty-two percent said the hours were too long or more watches were needed, and 27% said they had no, or not enough, time off. Other complaints centered around the age of the equipment (15% of the workers registering this complaint) and the age of the facility itself, or at least the decor (12%).

The interview responses of the workers in Dining Facility 5 reflected their lower JDI scores. When asked what was good about their dining hall, 52% replied **nothing**. The only positive response mentioned by more than two people was that they, **liked the people they worked with** (10%).

The most frequent response concerning potential changes or bad things about the system were complaints about the hours or suggestions that there be more watches (69%). Twenty-eight percent complained that they had no time off or no breaks. Fifty-two percent said that the supervision was poor or that there was no support or positive reinforcement from the supervisors. Other comments and the percentage of respondents who made them were: more help was needed (31%), the workers' attitude and morale was bad, or that the workers were not motivated (24%), more training was needed (17%) and the equipment was old (15%).

Cooks at the two dining facilities were asked to render their opinions of the customer attitude toward their dining facilities. As can be seen in Figure 10, workers at Dining Facility 2 saw their customers having a higher opinion of their facility (a mean response of 4.12 on a seven point scale, just to the positive side of **neither good nor bad**) than did the workers in Dining Facility 5 who rated their customer attitude as being between **moderately bad** and **slightly bad** (a mean of 2.86)ⁿ. It should be pointed out that the rating for Dining Facility 2 customers is not particularly high, with 35% of the cooks rating customer attitude on the negative side of neutral. The differences between the two facilities may reflect an actual difference in customer opinion, the cooks' own views of the dining facilities, or, most probably, some combination of the two.

The messmen, workers, and supervisors were asked, "If a marine has to serve on mess duty for 30 days a year, would you prefer having them serve: 1) the entire 30 days at one time, 2) a week at one time, four times a year, or 3) two or three days at a

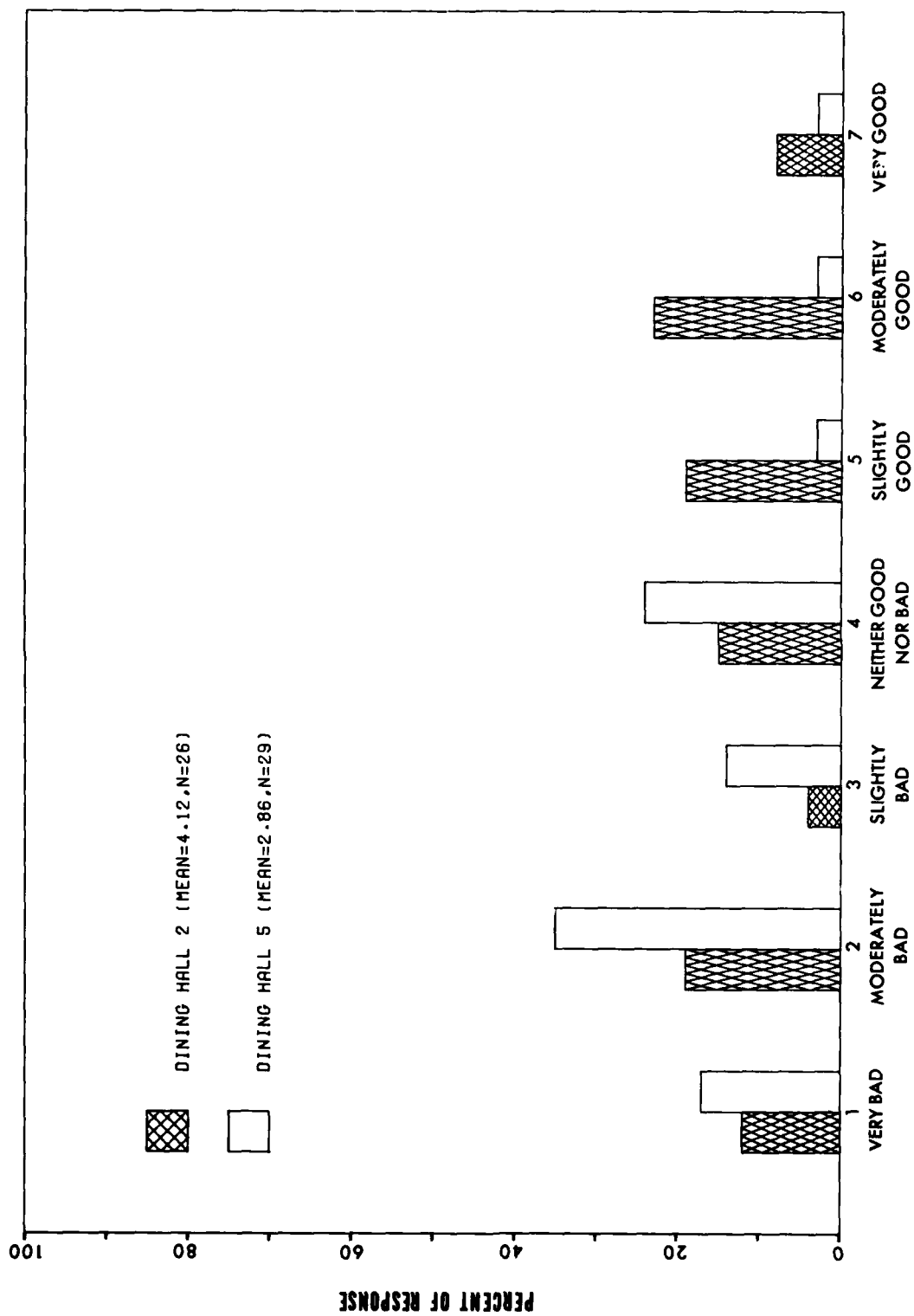


FIGURE 10: WORKER OPINION OF CUSTOMER ATTITUDE

time, every month." They were then asked to list the advantages and disadvantages of serving on mess duty for thirty days in a row. The results follow.

Figure 11 shows the percentages of messmen and cooks who rated one month, one week or two or three days as the best length of the mess duty assignments. Most messmen, 43%, would prefer a one week assignment, but nearly 1/3 (31%) favored a one month tour. More than half (56%) of the messmen interviewed said that the only good thing about having mess duty for one month was that it would get their entire mess duty obligation over with at one time. Eight percent said that they saved money while on mess duty for one month (they had no time to spend any). The problems with mess duty for one month and the percentage of those who responded were: it is tiring (41%); there is no or not enough time off (38%), and one month is too long a time (36%). Eight percent suggested that there should be more watches. A particularly significant finding was that several messmen viewed assignment to mess duties as punishment.

All of the personnel in the base food service office preferred having the mess duty assignments to be one month in length. The cooks would prefer one month assignments; 69% rated it as their first choice. When asked for the advantages of a one month assignment, 68% of the cooks, supervisors and food service office personnel said it reduces total training time over having shorter assignments with frequent personnel turnover, since each messman needs a high degree of initial training. Seventeen percent commented that a one month assignment consolidates a given Marine's entire messman's obligation into a single time space. The disadvantage of a one month mess duty assignment and the percentage of workers who cited them were: the hours are too long for too long a period of time (35%) and there is no or not enough time off (22%). Seven percent suggested there should be more watches or that the messmen should be rotated.

D. LABOR UTILIZATION ANALYSIS

INTRODUCTION

A work sampling study was performed at MCB Twentynine Palms as part of the total analysis of the existing Marine Corps garrison food service system, and included both dining facilities. The purpose of this effort was to determine how food service personnel in the different job categories allocated their time on the job between various productive and non-productive functions in an effort to assess the level of staffing.

In addition to evaluating total results for the combined food service system, differences in manpower utilization for each dining facility were evaluated as a function of:

- a. the hours of the work day,
- b. the days of the week, and
- c. the day type, (i.e., weekday or weekend).

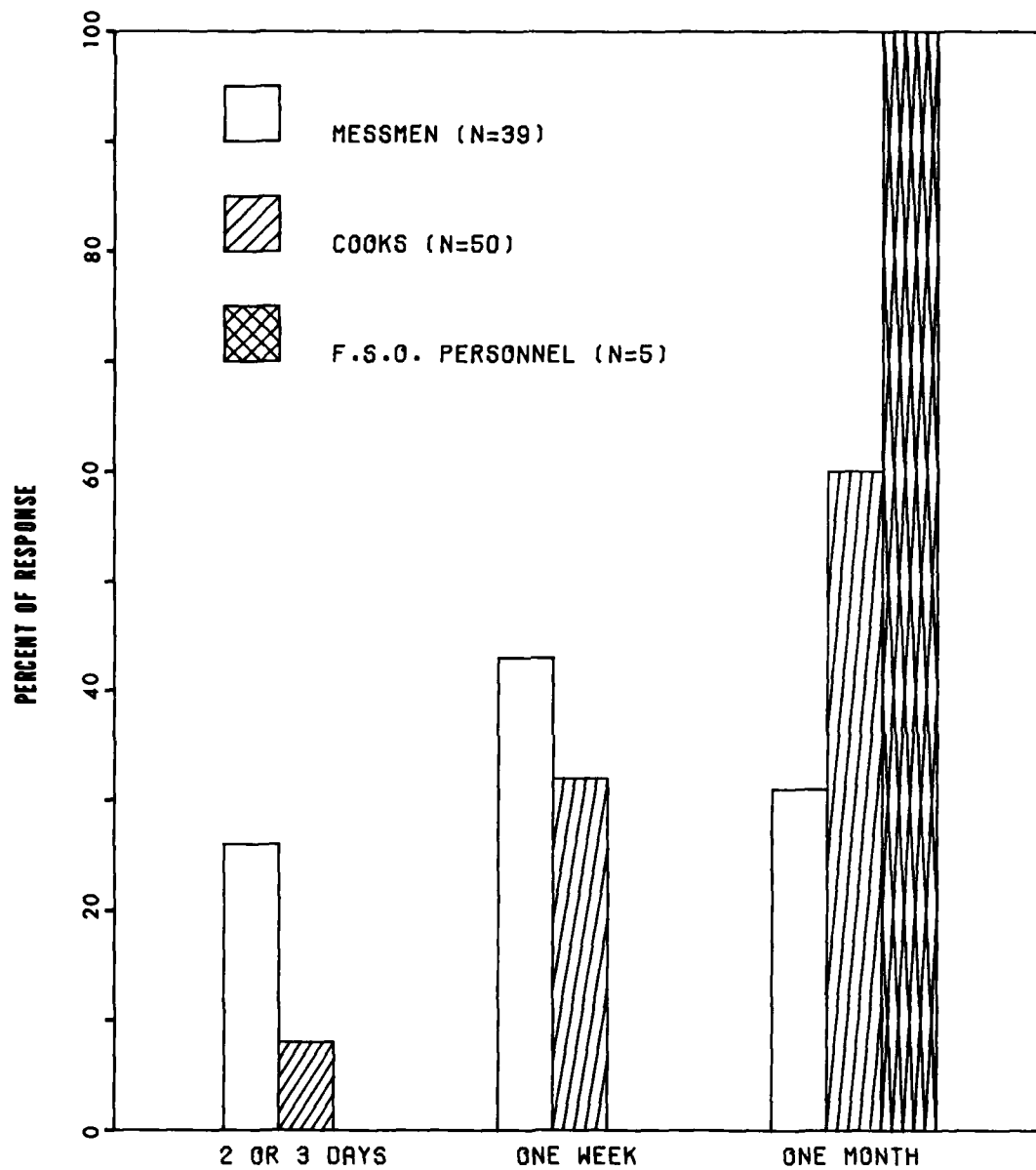


FIGURE 11: FOOD SERVICE WORKER PREFERENCE FOR MESSMEN DUTY ASSIGNMENT LENGTHS

The main purpose of this analysis was to evaluate the productivity of the entire food service system at MCB Twentynine Palms, the analysis of individual dining facilities was a secondary issue.

Work sampling data was collected over the two-week period, 14 February — 28 February 1977. Observations on worker activities were recorded at the rate of four observations per hour. Each hour of the work day was observed an equal number of times in each dining facility.

The results of the study were to be used to:

- a. assess personnel performance,
- b. establish a baseline for comparison with any proposed new system.

SYSTEM DESCRIPTION

A military dining facility supervisor, responsible directly to the base food service officer, is in charge of each dining facility. Each dining facility has the following supervisory positions for each shift: one chief cook, one chief messcook, one chief baker, one cook in charge of salads, and one cook in charge of the storeroom. In Dining Facility 2, chief messcooks only supervised messcooks, while in Dining Facility 5, chief messcooks supervised messcooks as well as performing other productive functions. Personnel staffing levels (actual) for each dining facility are presented in Table 11.

The dining facilities were open for service during the hours shown below:

	Weekdays	Weekends
Breakfast	0530—0730	—
Brunch	—	0730—1100
Lunch	1100—1300	—
Dinner	1600—1800	1530—1700

The work shifts for each dining facility are given below:

Dining Facility 2

	Weekdays	Weekends
1st Watch	0400—1300	0600—1800
2nd Watch	1030—1900	—

Dining Facility 5

	Weekdays	Weekends
1st Watch	0430—1300	0700—1800
2nd Watch	1030—1900	—

TABLE 11
ACTUAL STAFFING LEVELS

	Dining Facility 2 Shift				Dining Facility 5 Shift			
	1	2	Other	Total	1	2	Other	Total
Supervisors			2	2			2	2
Chief Cooks	1	1		2	1	1		2
Chief Messcooks	1	1		2	1	1		2
^a Messcooks			40	40			25	25
Bakers	3	2		5	2	2		4
^b Cooks	12	12		24	11	11		22
Food Technician			1	1			0	0
Training			10	10			4	4
^c Mission			6	6			7	7
	Total			92	Total			68

^aMesscooks: Messcooks worked all day.

^bCooks: Includes all subsistence and storeroom personnel.

^cMessing: Includes all personnel on TAD, leave, night cooks (cooks who were assigned to work from 2000 to 0600), in jail, unauthorized absence, and assigned somewhere other than dining facility.

SURVEY METHODOLOGY

INTRODUCTION

Work sampling consists of taking a large number of observations on individuals performing tasks in a work situation. The task being performed at each observation is recorded. From the ratio of the number of observations of workers performing a specific task to the total number of observations, one can infer the proportion of time that is actually spent on that particular activity. The larger the number of observations, the more accurate is the inference.

Observations are usually made on a random basis to obtain statistically valid results. However, in non-repetitive situations, observations can be made on a systematic basis without introducing bias, provided the interval between observations is sufficiently small. This approach was used in this study to maximize the sample size in any given observation period.

Job Classifications:

For simplicity, job classifications were limited to four categories coinciding with position descriptions:

1. Dining Facility Supervisor
2. Cook
3. Baker
4. Messmen

Complete definitions for these job classifications are included in Appendix Table E-1.

Task Definitions:

The task definitions are given in Appendix Table E-2. For purposes of analysis, these activities were arranged in the groups and subgroups outlined in Table 12.

Observation Schedule and Procedures:

The data collection was scheduled over a period of two weeks: 14-28 February 1977. The purpose of this was to guarantee that (1) a minimum number of observations were taken in any given job category in order to assure a specified level of accuracy, and (2) all hours of the work day for each dining facility were equally represented.

Appendix Table E-3 shows the schedule of observations for the study. Each hour of operation for each dining facility was observed for each day of the week. Observation periods were established at two to three hour intervals. Each observer was assigned a set of observation periods on a random basis at both dining facilities, to minimize observer bias effects. Detailed data collection procedures are provided in Appendix E.

Assumptions:

Several assumptions were made for the purposes of the analysis and are listed below:

1. At least one supervisor was assumed present at the beginning of the shift in each dining facility. If one supervisor was not present at the beginning of the shift a supervisor was marked as nonproductive.
2. If cooks were not present at the beginning of the shift they were marked as nonproductive. The determination of the number of cooks absent was based on the schedule given in Table 11.

TABLE 12
FOOD SERVICE WORKER TASK DEFINITIONS

I. Nonproductive	III. Indirect Work
a. Designated Rest Break b. Idle c. Absent d. Walking e. Conversing	a. Supplies 1. Receives Supplies 2. Maintains Supplies 3. Issues Supplies
II. Direct Work	b. Administrative
a. Food Preparation	1. Prepares Correspondence, Records or Reports 2. Telephone 3. Maintains Menu Boards
1. Prepares Meats and Vegetables for Cooking 2. Cooks Food In Kitchen 3. Prepares and Assembles Salads 4. Prepares and Assembles Salads or Fruits 5. Prepares Bakery Products or Desserts 6. Prepares Cooking Utensiles Desserts 7. Prepares Flight Meals, Picnic Meals or Bag Lunches	c. Supervisory
b. Serving Food	1. Monitors Reports and OJT Program 2. Inspects 3. Receives or Gives Supervision
1. Serves Food 2. Sets up, Replenishes, and Tears Down Serving Line 3. Prepares and Assembles Cold Sandwiches 4. Cooks Food to Order on Serving Line	d. Training
c. Sanitation	1. Field Training
1. Cleans Utensils and Pots 2. Cleans Equipment 3. Cleans Kitchen 4. Personal Hygiene	e. Other
	1. Any Productive Work Not Designated Above 2. Cash Transactions 3. Signature Headcount Monitoring

3. Twenty messcooks were assumed present at all times. If the number of messcooks present was fewer than 20 for either dining facility, the number of messcooks absent was marked as nonproductive.

4. If any worker worked over his scheduled time it was included in the data.

5. If a worker was performing a function that required his presence at a specific location, whether or not he was actually productively engaged, he was recorded as actually performing the task (e.g., a server on the food line was required to be there throughout the meal whether or not there was anyone to serve). When cooks were in training, they were assumed to be 100% productive. Training was from 0800-1700 Monday through Friday.

RESULTS AND ANALYSIS

Overall Personnel Performance:

Figure 12 shows that the overall nonproductive time is about equal for all job categories (38%). Approximately 44% of the overall workforce's time was allocated to direct work (15% in food, 11% in serving, and 18% in sanitation). Bakers demonstrated the largest percent of time spent in food preparation (46%) which is more than double that of cooks who were the second highest in this activity. As was expected, messmen spent the largest percentage of their time performing sanitation functions (32%), which accounts for about 75% of all the sanitary functions performed. Also as anticipated, supervisors spent the majority of their time supervising (37%) and performing administrative tasks (17%). The only group with members in training was cooks, who spent 13% of their time training for field feeding throughout the data collection period.

During the weekend, nonproductivity rose by about 11% for the combined workforce (36% to 47%). Specifically, nonproductive time rose by 15% for cooks and messcooks in Dining Facility 5 on weekends vs. weekdays, while nonproductive time for supervisors and bakers remained the same. In Dining Facility 2 the weekend nonproductive time for cooks and bakers on weekends increased by 20% over weekdays, while nonproductive time for supervisors and messcooks rose by 12% and 3%, respectively. This increase can be attributed primarily to the practice of maintaining a constant workforce even though there is a decrease in the number of meals being served.

Between facilities, nonproductive time for cooks and messcooks in Dining Facility 5 was about 13% higher than that in Dining Facility 2.

Performance by Day of the Week:

As presented in Figure 13, overall nonproductivity was highest on weekends, which, as previously stated, can be attributed to the decreased number of meals served on weekends.

Messcooks and cooks, in particular, showed a significant change in nonproductive time from weekdays to weekends, even though their nonproductive time from weekday to weekday remained relatively constant.

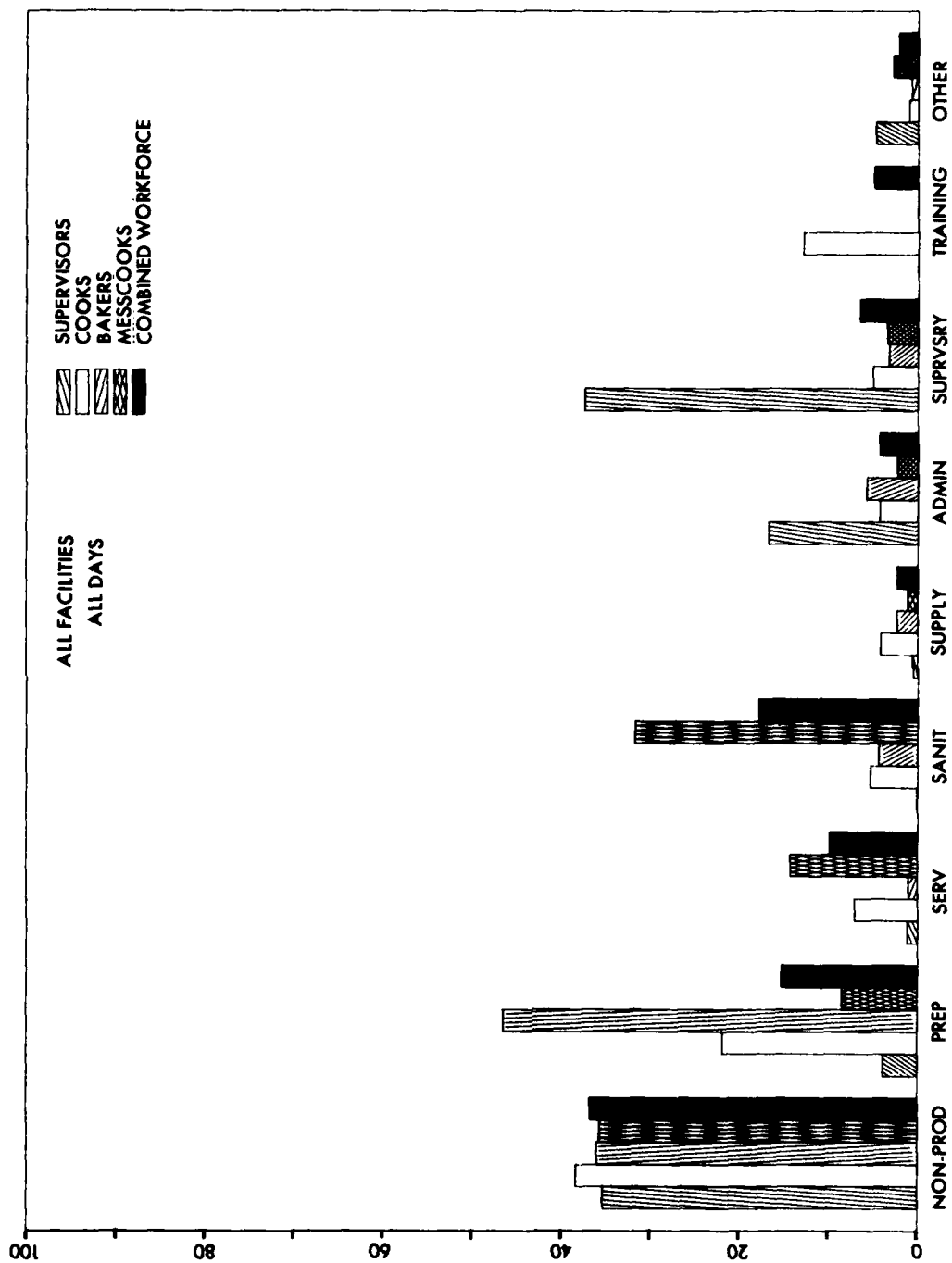


FIGURE 12: OVERALL PERSONNEL PERFORMANCE

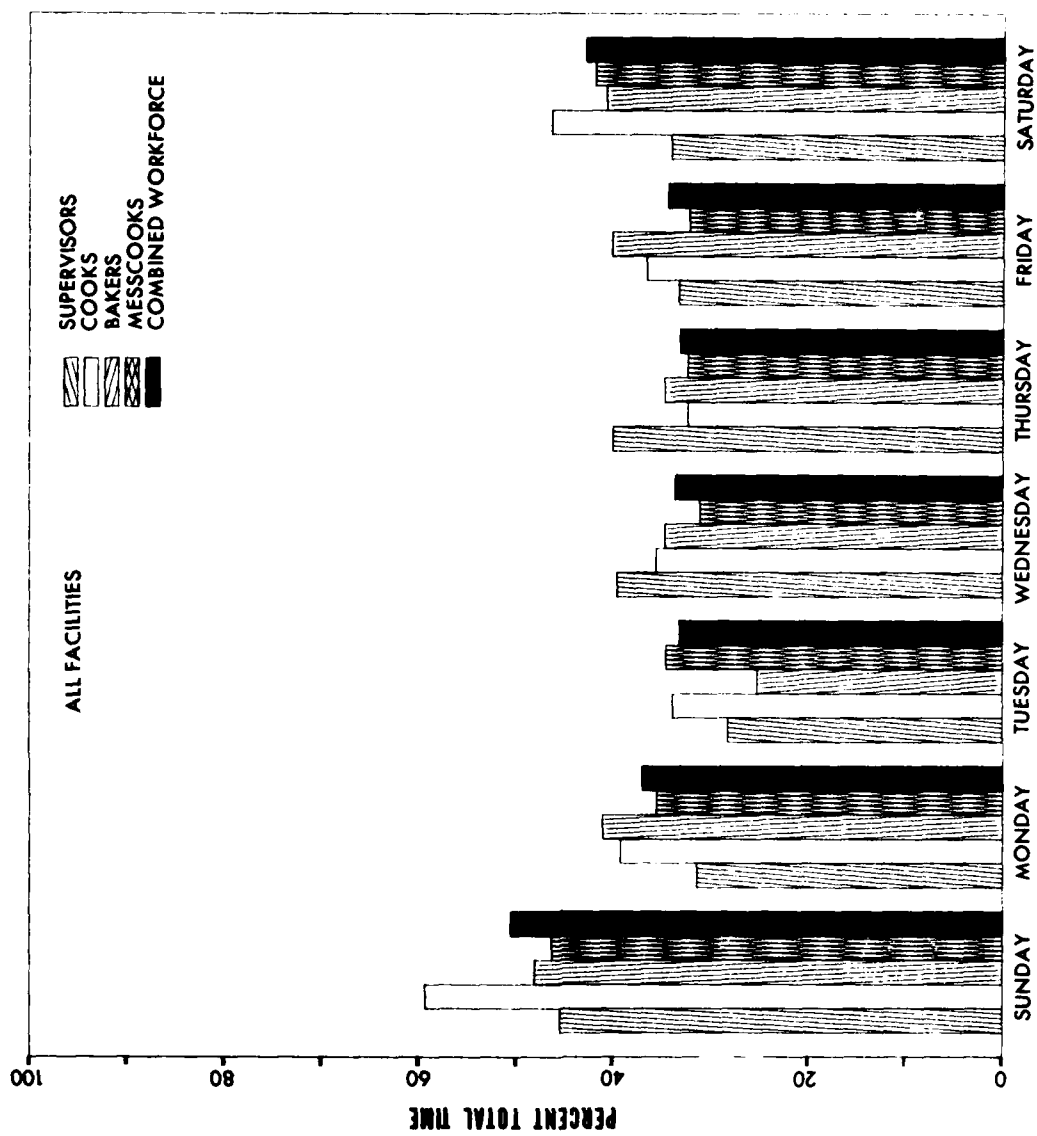


FIGURE 13: NON-PRODUCTIVITY BY DAY OF THE WEEK

Performance by Hour of the Day:

Productivity by hour of the day for all personnel is highly related to meal times for both weekdays and weekends, as is clearly demonstrated in Figure 14 and 15. Figures 16, 17, 18, and 19, which present nonproductive time by hour of the weekday for each individual worker category, show that while nonproductivity tends to be higher between meals in all categories except supervisors, it is most pronounced in messcooks, who were 15% nonproductive during meals and 50% nonproductive between meals. On weekends, nonproductivity for messcooks between meals rose to 20% during meal times and 95% between meals.

Productivity Index:

The number of meals served per manhour utilized in providing food service is generally considered to be a key food service productivity index. Appendix E presents the index calculation assumptions and procedures and Table 13 the results.

TABLE 13
MEALS PER MANHOUR

	Dining Facility		Dining Facilities Combined
	2	5	
With Messcooks	2.79	2.44	2.65
Without Messcooks	7.64	5.74	6.82

It can be seen from Table 13 that the large percentage of messcook manhours affects productivity substantially in both dining facilities. Further, it may be noted that Dining Facility 2 has a higher productivity than Dining Facility 5 in terms of meals per manhour, both with and without messcooks, which should seem to indicate that Dining Facility 5 is overstaffed compared to Dining Facility 2 relative to the number of meals served per day in each facility.

The number of meals served and number of manhours worked at each dining facility over the two week period the data were collected are included in Appendix Table E-4, and were used to calculate the meals per manhour figures for each day of the week shown in Appendix Table E-5. As can be seen from the latter table, the overall differences in productivity, measured in meals per manhour, between dining halls relates to the weekday operations since productivity on weekends is approximately equal in both dining facilities.

Substantially lower weekend attendance, as indicated in Appendix Table E-5 should tend to substantially reduce weekend productivity given a constant workforce. However, as the number of weekend manhours worked is also lower (at least for personnel other

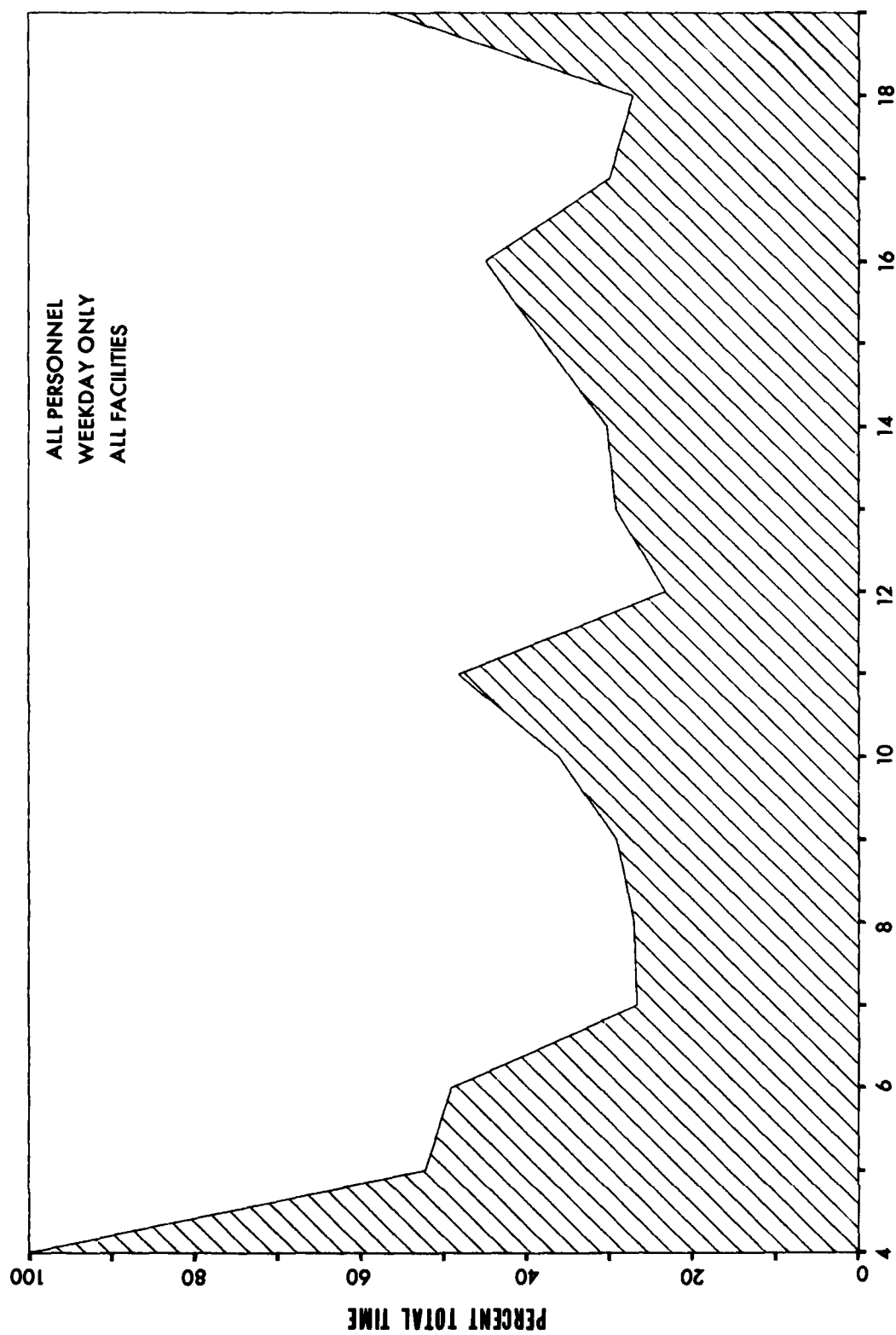


FIGURE 14: NON-PRODUCTIVITY BY HOUR OF THE DAY

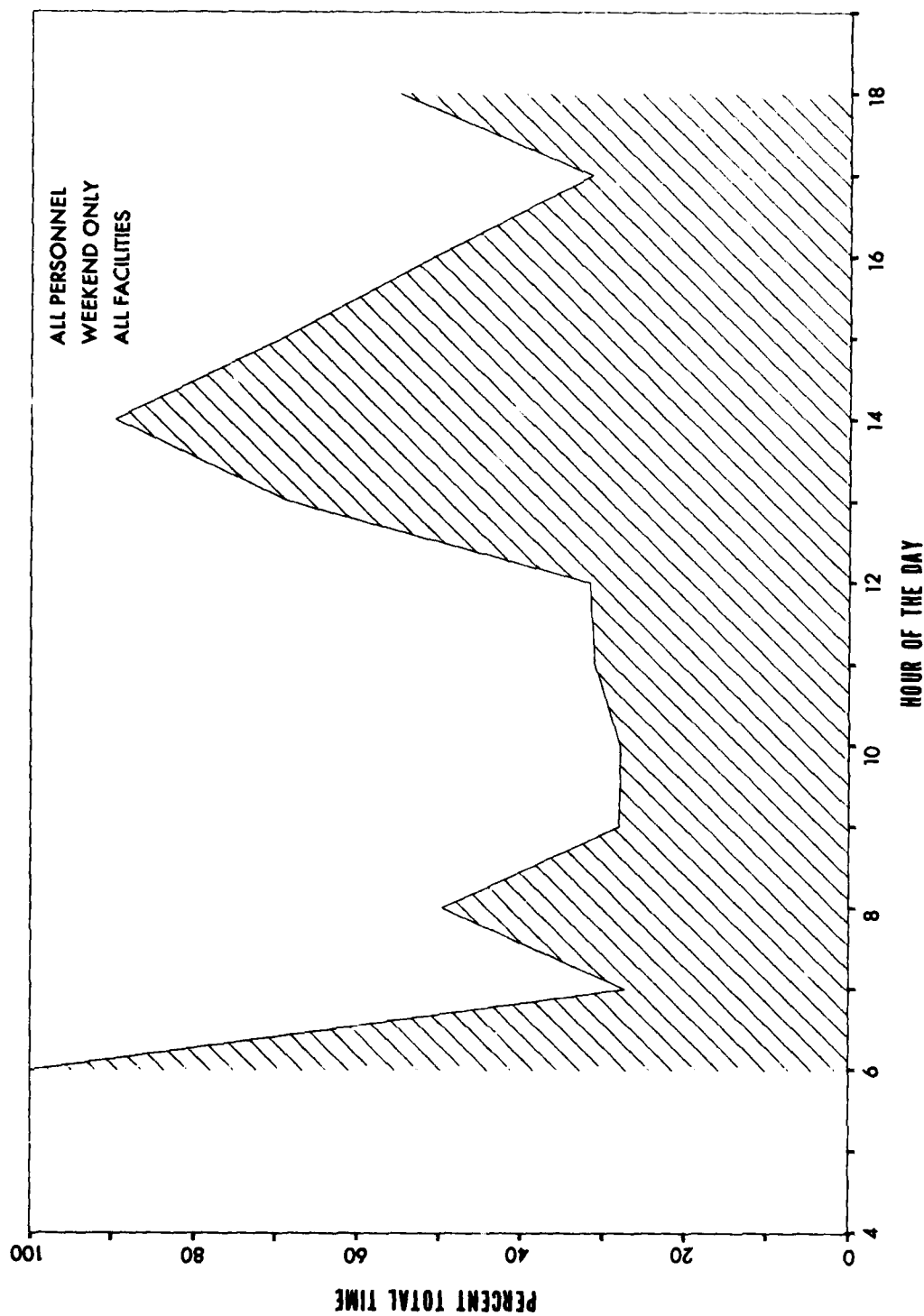


FIGURE 15: NON-PRODUCTIVITY BY HOUR OF THE DAY

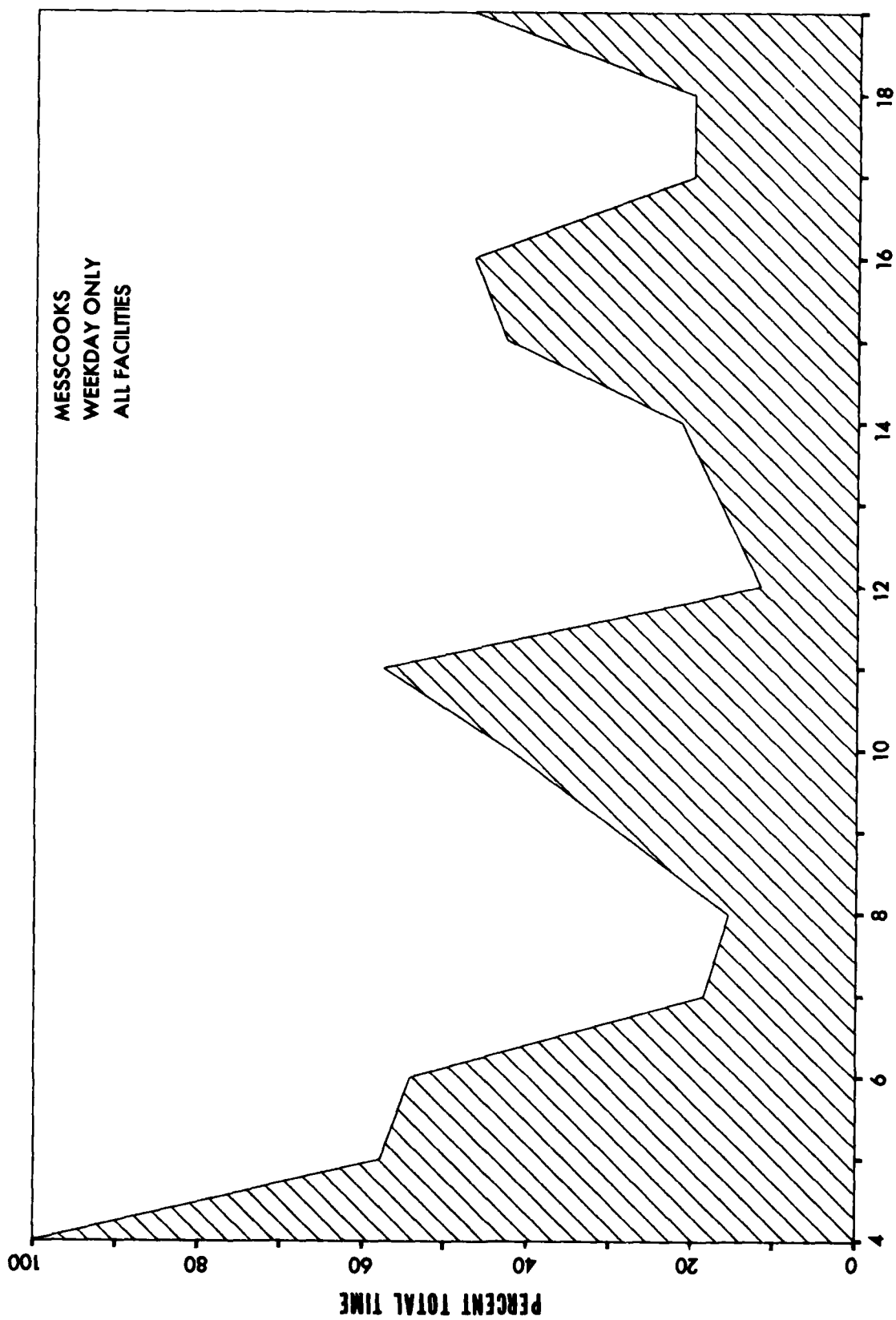


FIGURE 16: NON PRODUCTIVITY BY HOUR OF THE DAY

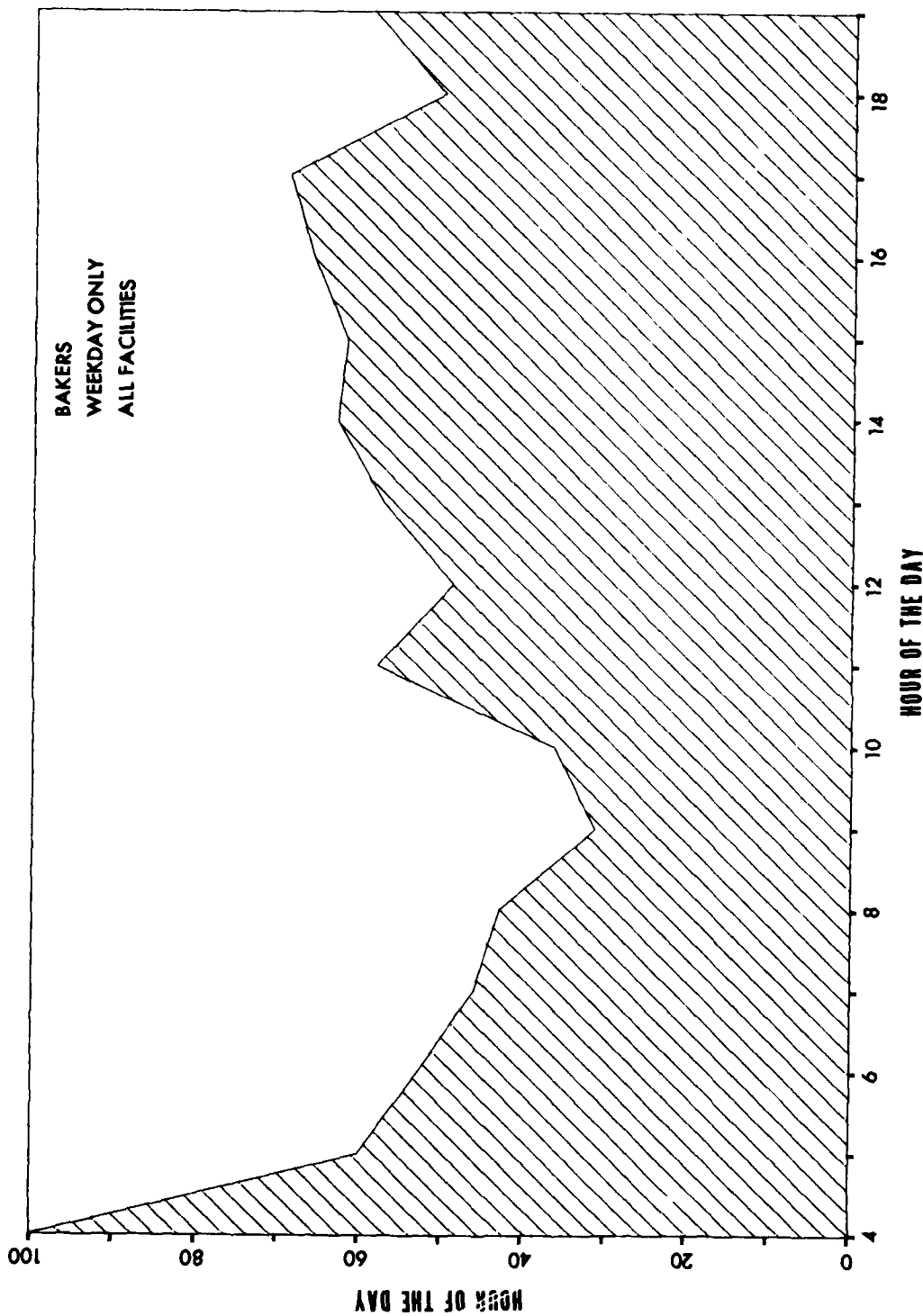


FIGURE 17: NON-PRODUCTIVITY BY HOUR OF THE DAY

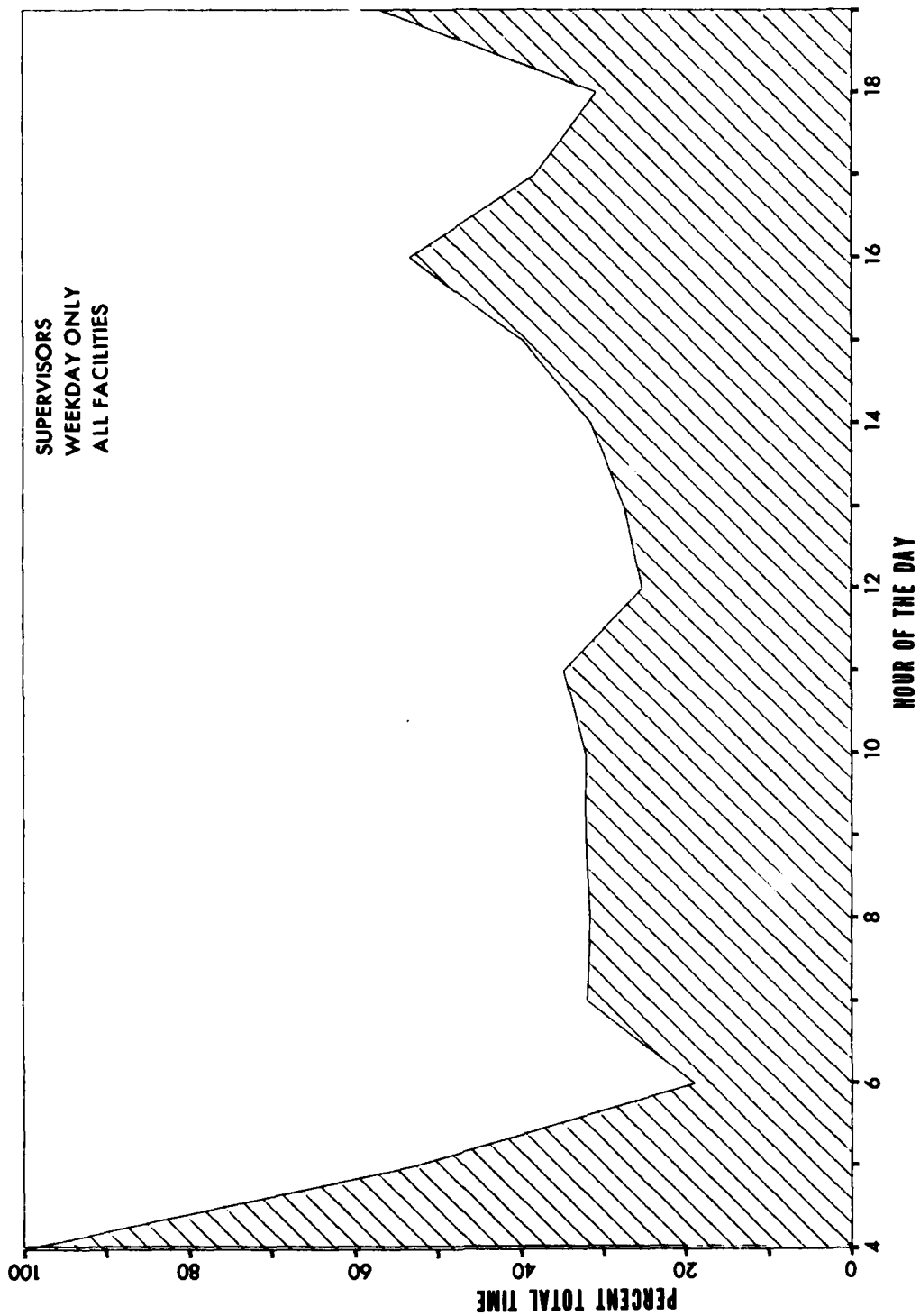


FIGURE 18: NON-PRODUCTIVITY BY HOUR OF THE DAY

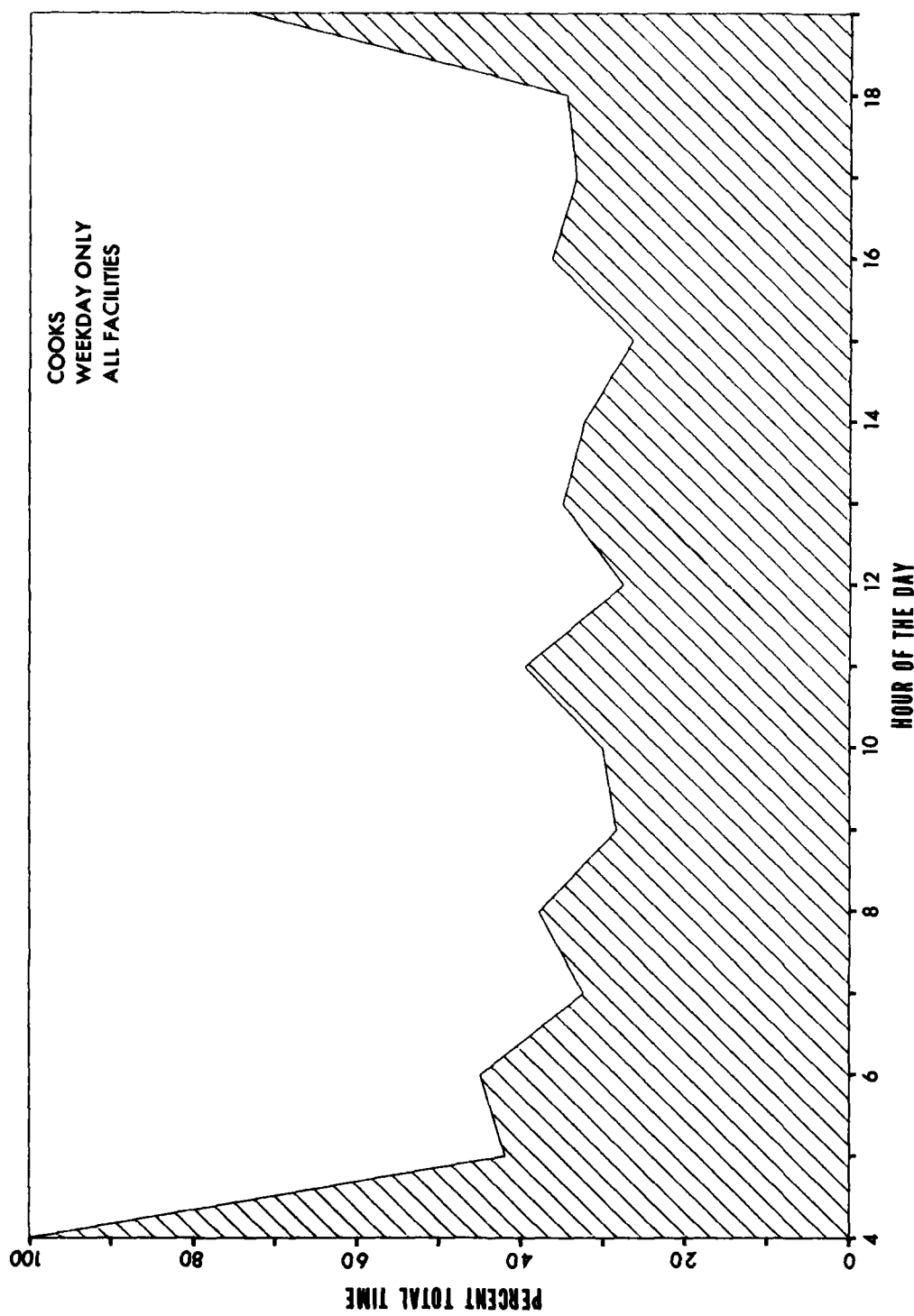


FIGURE 19: NON-PRODUCTIVITY BY HOUR OF THE DAY

than messcooks), weekend productivity, measured in meals per manhour, was approximately the same as obtained on weekdays. As it was determined earlier that the percentage of idle time is higher on weekends, we can, however, conclude that both dining facilities are relatively more overstaffed on weekends than on weekdays.

Table 14 gives comparisons of productivity index figures for MCB Twentynine Palms with several other military food service systems. Since some of the food service systems in Table 14, use civilian contractors to do the majority of the sanitary functions and for which labor input data was not available, comparisons are made with and without the sanitation function.

As can be seen, the number of meals served per employee per year for MCB Twentynine Palms is the largest on the list, yet the number of meals per manhour is one of the smallest because the average number of hours worked for each employee per week is considerably higher than that at any of the other bases. This occurs because messcooks at MCB Twentynine Palms are on duty an average of 97 hours a week and make up about 40% of the entire work force increasing considerably the average number of hours worked per week by a food service worker. As noted before, these long work days could be shortened by eliminating make work and by more appropriate scheduling.

Table 15 compares the food service operation at MCB Twentynine Palms to civilian operated food service systems. No adjustments with respect to sanitation are necessary in this table since all the systems utilize a completely in-house staff. Table 15 again shows that productivity at MCB Twentynine Palms is relatively low in comparison to other food service systems.

Finally, a comparison is made between productivity at MCB Twentynine Palms and other Marine Corps installations. As seen in Table 16 only Quantico has a lower productivity level.

Tables 17 and 18 are presented here to show differences in authorized and actual staffing levels for each dining facility and the food service office. As can be seen, both dining facilities have almost twice the number of workers authorized. Two further comparisons, one giving the Army staffing for cooks, the other⁶ used to determine staffing levels for cooks and messcooks for any military food service system, are presented for comparison purposes. As can be seen, both show MCB Twentynine Palms being overstaffed considerably.

⁶Giglio, R., Davis, R. D., Grabiec, R. A., and Weitz, R. A methodology to Estimate Work Force Requirements in Military Food Service Facilities. University of Massachusetts, Amherst, MA, November 1977.

Table 14

PRODUCTIVITY COMPARISON BETWEEN MILITARY FOOD SERVICE OPERATIONS

WITH AND WITHOUT SANITATION FUNCTION

	Number Employees	Number of Meals Per Year	Number of Meals Per Employee Per Year	Average Number Of Hours Worked Per Week	Total Hours Worked Per Year Per Employee	Meals Per Manhour
MCB Twentynine Palms (With)	124	1,428,610	11,521	66	3,432	2.65
MCB Twentynine Palms (Without)	120	1,428,610	11,905	66	3,432	3.46
NAS Alameda (Without)*	39	329,576	8,451	49	2,548	3.32
Travis AFB (With)	105	846,196	8,059	40	2,080	3.87
Travis AFB (Without)	77	846,196	10,989	40	2,080	5.28
Air Force (Without)*	11,671	122,064,000	10,460	40	2,080	5.03

*Data for productivity with sanitation function not available.

Table 15

PRODUCTIVITY COMPARISONS WITH CIVILIAN FOOD SERVICE OPERATIONS

	# Employees	# Meals Per Year	# Meals Per Employee	Avg # Of Hrs. Per Week	Total Hrs Per Yr	Meals Per Man Hour
MCB Twentynine Palms	152	1,428,610	9,399	70	3640	2.58
Harvard University	594	4,000,000	6,734	40	2080	3.23
Beverly Enterprises	800	10,950,000	13,688	40	2080	6.58
Atlanta Public Schools	870	15,937,980	18,320	40	2080	8.81

TABLE 16
PRODUCTIVITY COMPARISONS WITH OTHER MARINE CORPS BASES

	No. of Dining Halls	Total Meals Per Year	Meals Per Man Hour
Twentynine Palms	2	1,428,610	2.65
Pendleton	17	9,295,543	3.33
Yuma	1	791,294	6.11
Quantico	7	1,381,762	2.23
Paris Island	6	6,034,108	5.38

TABLE 17

STAFFING LEVELS

Actual vs. Authorized

	Dining Hall 2				Dining Hall 5			
	¹ Act	² Auth 1	³ Auth 2	⁴ Civ	¹ Act	² Auth 1	³ Auth 2	⁴ Civ
Food Svc Tech	2	1			0	1		
Asst. Dining Fac Man	1	1			1	1		
Chief Cook	2	2			2	2		
Chief Messcooks	2	1			2	1		
Cook	20	12			16	6		
Vegetable Prep. Man	1	1			1			
Total Cooks	25	16	14	8	21	9	9	8
Baker	5	3			12	2		
Messcooks	40	34		16	25	22		9
Subsistence	2	0			1	0		
Basic Food Service	16	0			7	0		
Total	91	55	-	-	67	35	-	-

¹Act = Actual number of workers present as of March 1977.²Auth 1 = Number of workers authorized by Marine Corp Personnel Requirements Criteria Manual (MCO, P5320.5B).³Auth 2 = Number of Cooks only authorized by Army (AR 570-2).⁴Civ = Staffing levels determined by University of Massachusetts study for cooks and messcooks only (See Reference 6).

TABLE 18
STAFFING LEVELS
Actual vs. Authorized
Food Service Office

	Actual	Authorized
Food Service Officer	1	1
Food Service Tech	1	1
Baker	1	0
Subsistence	3	0
Warehouseman	1	0
Civilians	<u>2</u>	<u>0</u>
Total	9	2

CONCLUSIONS AND RECOMMENDATIONS

1. Productive work time of 64% for all food service workers for all days considered is comparable to that obtained for other military food service systems, 67.8% at Travis AFB and 63.4% at McGuire AFB.^{7,8} However, if the large percentage of cooks in training, who were considered as productive at all times, were being utilized in the dining facilities, this would increase the nonproductive time and thus indicate possible overstaffing.

2. The low productivity (2.65 meals per manhour) seems to be attributable both to overstaffing and to the unnecessarily large number of hours worked per week by each worker, particularly messmen.

3. The high nonproductive time (50% to 90%) for messcooks between meals seems to indicate that messcooks should be scheduled in shifts instead of for the whole day so that a larger number of messcooks are present during meals, with fewer messcooks between meals. The highest nonproductive time between meals 90%, occurred on weekends which would indicate particularly poor utilization of messcooks at these times. Rescheduling messcooks to better working hours would increase morale and efficiency and make the job appear as the necessary work it is, rather than as the punishment it seems to be.

4. Cooks spend only 29% of their productive time in food preparation and serving. When cooks in training are not included in the data, the percentage of time in preparation and serving activities rises to 33%. This seems to indicate that cooks are not being utilized according to their described duties.

5. Supervisors spend 80% of their productive time in supervising and administrative functions. Bakers spend 73% of their productive time in food preparation functions. Messcooks spend 72% of their productive time in serving and sanitation functions. These all appear to be reasonable and consistent with described duties.

6. Differences in productivity among dining facilities indicates discrepancies in staffing levels between dining facilities relative to work loads.

⁷ Davis, M. M. and Wetmiller, J. R. A Work Analysis of Food Service Personnel at Travis AFB, California, TR 74-35-OR/SA, US Army Natick Laboratories, Natick, MA, July 1975.

⁸ USAF Management Engineering Study, "Efficiency Foods Test", MACNET, Det. 1, McGuire AFB, New Jersey, 1969.

7. Leveling factors, i.e., adjustments for variations in the efficiency of the individuals, have not been applied to any of the work sampling data. The subjective judgment and opinion of the data collectors is that the worker efficiency of messcooks was very poor. Much of the work performed by messcooks was busy work which caused a lack of interest and low morale.

E. SYSTEM COSTS

The annual costs for the food service operation at MCB Twentynine Palms was estimated from actual costs incurred from January through March 1977 and normalized over a year. The details of these and other cost estimates are presented by dining facility in Appendix F. It should be noted that some costs have been grouped into a composite category; for example, supplies and work contracted out (which includes the rental and cleaning of aprons, white shirts, trousers, etc.) are included in the entry "supplies". Total meals served annually were estimated from a daily average obtained in the Labor Utilization section of this report. As seen in Table 19, both dining facilities show similar total cost profiles, with direct costs comprising approximately 90% of the total costs.

The total annual costs for each food service system should be significantly affected by the number of meals served, therefore, the costs per meal for each dining facility and the overall food service system were calculated and are presented in Table 20. The most significant differences between the two dining facilities are in the direct labor costs per meal (\$0.465 vs. \$0.676) and the indirect expenses (\$0.145 vs. \$0.221). Both of these factors are significantly affected by economies of scale. Consequently, these differences can be primarily attributed to the fact that Dining Facility 2 serves almost twice as many meals as Dining Facility 5, although total costs in Dining Facility 5 are half of those in Dining Facility 2. Therefore, Dining Facility 2 has the lower costs per meal.

In addition to the costs of operation for the two dining facilities, the annual costs for the food service office must also be taken into account. These costs are presented in Table 21 and seem to be appropriate overhead costs relative to the total operation.

Table 22 shows a comparison of total annual costs for three military food service operations and Table 23 compares these three systems on a cost per meal basis. While MCB Twentynine Palms has the lowest total cost per meal, it has the highest labor cost per meal of all three systems. The savings incurred are a result of the use of Marines for messcooks (\$0.386 per meal vs. \$0.728 and \$0.639 for the other two systems. The high relative total labor costs are again indicative of possible overstaffing in the dining facilities, while the lower KP costs seem to indicate the merit of using military messcooks as opposed to contract KP's from a simple cost viewpoint, i.e., ignoring considerations of impact on morale.

Table 19

MCB TWENTYNINE PALMS TOTAL COST ANALYSIS

	Dining Facility 2		Dining Facility 5		System Total	
	\$	% Total	\$	% Total	\$	% Total
Direct Costs:						
Food	\$ 804,142	47.5	\$ 464,788	40.4	\$1,268,930	44.6
Labor	421,212	24.9	354,044	30.8	775,256	27.3
Messcook Labor	<u>335,568</u>	<u>19.8</u>	<u>216,048</u>	<u>18.8</u>	<u>551,616</u>	<u>19.4</u>
Total Direct Costs	\$1,560,922	92.2	\$1,034,880	90.0	\$2,595,802	91.3
Indirect Costs:						
Utilities	\$ 57,852	3.4	\$ 54,600	4.7	\$ 112,452	4.0
Maintenance	16,000	.9	17,400	1.5	33,400	1.2
Supplies	44,250	2.6	30,923	2.7	75,173	2.6
Commissary Support	10,214	.6	10,214	.9	20,428	0.7
Transportation	<u>2,600</u>	<u>.2</u>	<u>2,600</u>	<u>.2</u>	<u>5,200</u>	<u>0.2</u>
Total Indirect Costs	\$ 130,916	7.7	\$ 115,737	10.0	\$ 246,653	8.7
Total Cost	\$1,691,838	100.0	\$1,150,617	100.0	\$2,842,455	100.0
Total Meals Served Annually	905,565		523,410		1,428,975	

Messcook Labor includes cost of labor for two Chief Messcooks.

Table 20

COST PER MEAL ANALYSIS

	Dining Facility 2	Dining Facility 5	Total
Direct Costs:			
Food	\$0.888	\$0.888	\$0.888
Labor	0.465	0.676	0.542
Messcook Labor	<u>0.371</u>	<u>0.413</u>	<u>0.386</u>
Total Direct Costs	\$1.724	\$1.977	\$1.816
Indirect Costs:			
Utilities	\$0.064	\$0.104	\$0.079
Maintenance	0.018	0.033	0.023
Supplies	0.049	0.059	0.053
Commissary Support	0.011	0.020	0.014
Transportation	<u>0.003</u>	<u>0.005</u>	<u>0.004</u>
Total Indirect Costs	\$0.145	\$0.221	\$0.173
Total System Costs	\$1.869	\$2.198	\$1.989

TABLE 21
FOOD SERVICE OFFICE OPERATING COSTS

Cost Category	Annual Cost	% Total	Cost Per Meal
Labor	\$113,980	98.4	\$0.0810
Supplies	600	0.5	0.0004
Maintenance & Utilities	<u>1,200</u>	<u>1.1</u>	<u>0.0008</u>
	\$115,780	100.0	\$0.0822

TABLE 22
COMPARISON OF TOTAL ANNUAL COSTS OF MILITARY FOOD SERVICE OPERATIONS
(FY 77 Dollars)

	Travis AFB		Ft. Benjamin Harrison		MCB Twentynine Palms	
	\$	% Total	\$	% Total	\$	% Total
Direct Costs:						
Raw Food	\$1,351,650	39.3	\$ 732,792	39.2	\$1,268,940	42.9
Labor (excluding mess attendants)	781,943*	22.8	399,132	21.3	889,236**	30.1
Mess Attendant	<u>1,108,857</u>	<u>32.3</u>	<u>527,334</u>	<u>28.2</u>	<u>551,616</u>	<u>18.6</u>
Total Direct Costs	\$3,242,450	94.4	\$1,659,258	88.7	\$2,709,782	91.6
Indirect Costs:						
Utilities	\$ 110,619	3.2	\$ 27,863	1.5	\$ 112,452	3.8
Maintenance	18,006	0.5	59,421	3.2	34,600	1.2
Supplies	55,900	1.6	35,964	1.9	75,773	2.5
Laundry	8,206	0.3	8,357	0.4		
Commissary Support			71,527	3.8	20,428	0.7
Transportation	<u>1,709</u>	<u>0.1</u>	<u>8,951</u>	<u>0.5</u>	<u>5,200</u>	<u>0.2</u>
Total Indirect Costs	\$ 194,440	5.6	\$ 212,083	11.3	\$ 248,453	8.4
Total Costs	\$3,436,890	100.0	\$1,871,341	100.0	\$2,958,235	100.0
Total Meals Served Annually	1,522,128	825,216	1,409,252			

*Utilizes civilians

**Utilizes military personnel

TABLE 23
COST PER MEAL COMPARISON WITH OTHER MILITARY OPERATIONS

	Travis AFB	Ft. Benjamin Harrison	MCB Twentynine Palms
Direct Costs:			
Raw Food	\$0.888	\$.888	\$0.888
Labor (excluding mess attendants)	0.514	.484	0.542
Mess Attendant	<u>0.728</u>	<u>.639*</u>	<u>0.386</u>
Total Direct Costs	\$2.130	\$2.011	\$1.816
Indirect Costs:			
Utilities	\$0.073	\$0.033	\$0.079
Maintenance	0.012	0.072	0.023
Supplies	0.037	0.044	0.053
Laundry	0.005	0.010	
Commissary Support		0.087	0.014
Transportation	<u>0.001</u>	<u>0.011</u>	<u>0.004</u>
Total Indirect Costs	\$.128	\$0.257	\$0.173
Total Costs	\$2.258	\$2.268	\$1.989
Total Meals Served Annually	1,522,128	825,216	1,409,252

*Mess Attendant Contract include other costs incurred for contract.

CONCLUSIONS

1. The considerably greater labor costs per meal at MCB Twentynine Palms as compared to those at Travis AFB and Ft. Benjamin Harrison seems to indicate that MCB Twentynine Palms is possibly somewhat overstaffed under the present system.

2. The lower costs per meal for mess attendant services at MCB Twentynine Palms as compared to those at Travis AFB or Ft. Benjamin Harrison seems to support the Marine Corps viewpoint that not contracting the mess attendant function out is more economical.

3. The labor and indirect costs per meal in Dining Facility 5 (which serves fewer meals) are considerably larger than those in Dining Facility 2 which seem to indicate that Dining Facility 5 is more overstaffed.

This document reports research undertaken at the US Army Natick Research and Development Command and has been assigned No. NATICK/TR-79/039 in the series of reports approved for publication.

REFERENCES

1. BRANCH, L.G., H.L. MEISELMAN, and L.E. SYMINGTON. A Consumer Evaluation of Air Force Food Service. U.S. Army Natick Laboratories Technical Report, 75-22-FSL, July 1974.
2. WILKINSON, W.C., L.E. SYMINGTON, M.F. BERMAN, and B. EDELMAN. Consumer and Worker Opinions of an A La Carte Food Service System Independent of any Systematic Changes in Ration Status: Barksdale AFB. U.S. Army Natick Research and Development Command, Technical Report, NATICK/TR-79/006, March 1979.
3. WILKINSON, W.C., L.E. SYMINGTON, J.R. SIEBOLD, H.L. MEISELMAN, and D.L. MAAS. Consumer and Worker Opinions of Cash Food Systems: NAS Alameda. U.S. Army Natick Research and Development Command Technical Report NATICK/TR-77/023, August 1977.
4. SMITH, P.C., KENDALL, L.M., & HULIN, C.L. The Measurement of Satisfaction in Work and Retirement. Chicago: Rand McNally & Company, 1969.
5. SYMINGTON, L.E. & MEISELMAN, H.L. The Food Service Worker and the Travis Air Force Base Experimental Food System: Worker Opinion and Job Satisfaction. U.S. Army Natick Laboratories Technical Report 75-94-FSL, 1975.
6. GIGLIO, R., DAVIS, R.D., GRABIEC, R.A., WEITZ, R.R. A Methodology To Estimate Work Force Requirements in Military Food Service Facilities. University of Massachusetts, Amherst, MA, November 1977.
7. DAVIS, M.M. and J.R. WETMILLER. A Work Analysis of Food Service Personnel at Travis AFB, California. TR 74-35-OR/SA, US Army Natick Laboratories, Natick, MA, July 1973.
8. USAF Management Engineering Study, "Efficiency Foods Test," MACMET, Det. 1, Maguire AFB, New Jersey, 1969.

APPENDIX A
WRITTEN CONSUMER SURVEY INSTRUMENT

CONSUMER'S OPINIONS OF FOOD SERVICE SYSTEMS

U. S. ARMY NATICK LABORATORIES

NOVEMBER 1974

Booklet Serial Number

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In the grid to your right, please fill in
the ovals corresponding with the Booklet
Serial Number that is stamped directly
above the numeric grid.

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

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11. At how many installations (besides this one) have you been assigned where you ate regularly in the installation dining hall?

0 1 2-4 5-7 8 or more
☐ ☐ ☐ ☐ ☐

12. Do you plan to REENLIST when your present enlistment ends? Darken the appropriate circle.

☐ Definitely yes
☐ Probably yes
☐ Undecided
☐ Probably no
☐ Definitely no
☐ No, retiring

13. What are your FEELINGS ABOUT THE MILITARY SERVICE? Darken the appropriate circle.

Dislike Dislike Dislike Neutral Like Like Like
very much moderately a little a little moderately very much
☐ ☐ ☐ ☐ ☐ ☐

14. Where were you raised? Darken the appropriate circle.

☐ In the country
☐ In a town or small city with less than 25,000 people
☐ In a city with more than 25,000, but less than 100,000 people
☐ In a large city with more than 100,000, but less than one million people
☐ In a very large city with over one million people
☐ In a suburb of a large or very large city

15. In what STATE were you raised? Darken the appropriate circle.

☐ 01 Alabama	☐ 28 Nevada
☐ 02 Alaska	☐ 29 New Hampshire
☐ 03 Arizona	☐ 30 New Jersey
☐ 04 Arkansas	☐ 31 New Mexico
☐ 05 California	☐ 32 New York
☐ 06 Colorado	☐ 33 North Carolina
☐ 07 Connecticut	☐ 34 North Dakota
☐ 08 Delaware	☐ 35 Ohio
☐ 09 Florida	☐ 36 Oklahoma
☐ 10 Georgia	☐ 37 Oregon
☐ 11 Hawaii	☐ 38 Pennsylvania
☐ 12 Idaho	☐ 39 Rhode Island
☐ 13 Illinois	☐ 40 South Carolina
☐ 14 Indiana	☐ 41 South Dakota
☐ 15 Iowa	☐ 42 Tennessee
☐ 16 Kansas	☐ 43 Texas
☐ 17 Kentucky	☐ 44 Utah
☐ 18 Louisiana	☐ 45 Vermont
☐ 19 Maine	☐ 46 Virginia
☐ 20 Maryland	☐ 47 Washington
☐ 21 Massachusetts	☐ 48 West Virginia
☐ 22 Michigan	☐ 49 Wisconsin
☐ 23 Minnesota	☐ 50 Wyoming
☐ 24 Mississippi	☐ 51 Washington, D.C.
☐ 25 Missouri	☐ 52 Other U.S. territories or possessions (For example, Puerto Rico or Virgin Islands.)
☐ 26 Montana	☐ 53 Outside the U.S. or U.S. Territories or possessions.
☐ 27 Nebraska	

16. Darken the circle which indicates your PRESENT GRADE.

- ☐ E-1
- ☐ E-2
- ☐ E-3
- ☐ E-4
- ☐ E-5
- ☐ E-6
- ☐ E-7
- ☐ E-8
- ☐ E-9
- ☐ Officer

17. Do you receive a SEPARATE RATIONS ALLOWANCE (money instead of free meals)?

Darken the appropriate circle.

- ☐ Yes
- ☐ No

18. What ONE TYPE OF COOKING were you raised on? Darken the appropriate circle.

- | | |
|---|---|
| ☐ 01 Chinese | ☐ 09 Jewish |
| ☐ 02 English | ☐ 10 Mexican |
| ☐ 03 French | ☐ 11 New England |
| ☐ 04 General American Style | ☐ 12 Polish (& Eastern Europe) |
| ☐ 05 German | ☐ 13 Soul |
| ☐ 06 Greek | ☐ 14 Southern |
| ☐ 07 Italian | ☐ 15 Spanish (not Mexican) |
| ☐ 08 Japanese | ☐ 16 Other (please specify _____) |

19. What TYPE OF COOKING OR SPECIALTY FOODS do you like best? Please darken the circles of your TOP THREE CHOICES.

- | | |
|---|---|
| ☐ 01 Chinese | ☐ 09 Jewish |
| ☐ 02 English | ☐ 10 Mexican |
| ☐ 03 French | ☐ 11 New England |
| ☐ 04 General American Style | ☐ 12 Polish (& Eastern Europe) |
| ☐ 05 German | ☐ 13 Soul |
| ☐ 06 Greek | ☐ 14 Southern |
| ☐ 07 Italian | ☐ 15 Spanish (not Mexican) |
| ☐ 08 Japanese | ☐ 16 Seafood |
| | ☐ 17 Other (please specify _____) |

20. HOW MANY MEALS DO YOU EAT DURING A TYPICAL WEEK, REGARDLESS OF WHERE YOU EAT THEM? For each meal darken TWO circles, one to indicate how often you have that meal during typical weekdays (Monday through Friday) AND a second to indicate how often you have that meal during a typical weekend (Saturday and Sunday).

	Weekdays					Weekend	
	1	2	3	4	5	1	2
Break fast	☐	☐	☐	☐	☐	☐	☐
Mid day Meal	☐	☐	☐	☐	☐	☐	☐
Evening Meal	☐	☐	☐	☐	☐	☐	☐
After Evening	☐	☐	☐	☐	☐	☐	☐

21. HOW MANY MEALS DO YOU EAT AT YOUR DINING FACILITY DURING A TYPICAL WEEK?
For each meal darken TWO circles, one to indicate how often you have that meal during typical weekdays (Monday through Friday) AND a second to indicate how often you have that meal during a typical weekend (Saturday and Sunday).

	Weekdays					Weekend	
	1	2	3	4	5	1	2
Breakfast	☐	☐	☐	☐	☐	☐	☐
Mid-day Meal	☐	☐	☐	☐	☐	☐	☐
Evening Meal	☐	☐	☐	☐	☐	☐	☐
After Evening	☐	☐	☐	☐	☐	☐	☐

22. WHERE DO YOU EAT when you do not eat in the military dining facility? Indicate how often by filling in one circle in each line.

	Never	Less than once a week	1-3 times a week	4-7 times a week	8-14 times a week	15 or more times a week
a. Private residence (girlfriend's house, friend's or relative's house, your home, your barracks, bringing your food, etc.)	☐	☐	☐	☐	☐	☐
b. Other installation facility (NCO Club, the exchange, etc.)	☐	☐	☐	☐	☐	☐
c. Diner, snack bar, pizza parlor, or drive-in off the installation (or having it delivered)	☐	☐	☐	☐	☐	☐
d. Bar or tavern (with alcoholic beverages) off the installation	☐	☐	☐	☐	☐	☐
e. From vending machines	☐	☐	☐	☐	☐	☐
f. From mobile snack or lunch trucks	☐	☐	☐	☐	☐	☐
g. Other (write it below and indicate how often)	☐	☐	☐	☐	☐	☐

23. Listed below are 14 GENERAL AREAS OF CONCERN. For each area indicate whether in your opinion it is very bad, moderately bad, neither bad nor good, moderately good, or very good for your dining facility.

	Area or topic	Very Bad	Moderately Bad	Neither Bad Nor Good	Moderately Good	Very Good
a.	Convenience of location	☐	☐	☐	☐	☐
b.	General dining facility environment	☐	☐	☐	☐	☐
c.	Degree of military atmosphere present	☐	☐	☐	☐	☐
d.	Desirable eating companions	☐	☐	☐	☐	☐
e.	Expense	☐	☐	☐	☐	☐
f.	Hours of operation	☐	☐	☐	☐	☐
g.	Monotony of same facility	☐	☐	☐	☐	☐
h.	Quality of food	☐	☐	☐	☐	☐
i.	Quantity of food	☐	☐	☐	☐	☐
j.	Service by dining facility personnel	☐	☐	☐	☐	☐
k.	Variety of the regular meal food (weekday only)	☐	☐	☐	☐	☐
l.	Variety of the regular meal food (weekend only)	☐	☐	☐	☐	☐
m.	Variety of the short order food	☐	☐	☐	☐	☐
n.	Speed of service or lines	☐	☐	☐	☐	☐

24. For each of the same 14 general areas, indicate whether it is a major reason for your degree of NON-ATTENDANCE at the dining facility, a minor reason for your degree of non-attendance, or not related to your degree of non-attendance.

	Area or topic	Major reason for non- attendance	Minor reason for non- attendance	Not related to non- attendance
a.	Convenience of location	☐	☐	☐
b.	General dining facility environment	☐	☐	☐
c.	Degree of military atmosphere present	☐	☐	☐
d.	Desirable eating companions	☐	☐	☐
e.	Expense	☐	☐	☐
f.	Hours of operation	☐	☐	☐
g.	Monotony of same facility	☐	☐	☐
h.	Quality of food	☐	☐	☐
i.	Quantity of food	☐	☐	☐
j.	Service by dining facility personnel	☐	☐	☐
k.	Variety of the regular meal food (weekday only)	☐	☐	☐
l.	Variety of the regular meal food (weekend only)	☐	☐	☐
m.	Variety of the short order food	☐	☐	☐
n.	Speed of service or lines	☐	☐	☐
o.	Other (please specify _____)	☐	☐	☐

25. How would you rate this dining hall in comparison to other military dining halls in which you have eaten?
This dining hall is: (Darken the appropriate circle.)

At all times	Slightly Worse	No Better or Worse	Slightly Better	Much Better
☐	☐	☐	☐	☐

26. How many EARLY SCHEDULED ACTIVITY which keeps you from attending the dining facility
do you have per week? (Indicate how many meals per week you do not attend because of this activity. (Indicate
none if you have no such activity.)

1	2-4	5	6-7	8-10	More than 10
☐	☐	☐	☐	☐	☐

27. Concerning the degree of MILITARY ATMOSPHERE which you feel exists in your dining facility at the present time, indicate whether you feel there should be MORE or LESS military atmosphere in the future.

A Lot More ①	A Little More ②	About the Same ③	A Little Less ④	A Lot Less ⑤
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28. Indicate approximately how many minutes it takes you to travel from your:

	1-5 min	6-10 min	11-15 min	16-20 min	21-25 min	26-30 min	Over 30 min
a. Job site to dining facility	☐	☐	☐	☐	☐	☐	☐
b. Living area to dining facility	☐	☐	☐	☐	☐	☐	☐

29. Is your dining facility ever:

	Never	Sometimes	Often	Always
a. Too cold	☐	☐	☐	☐
b. Too warm	☐	☐	☐	☐
c. Stuffy	☐	☐	☐	☐
d. Smoky	☐	☐	☐	☐
e. Full of steam	☐	☐	☐	☐
f. Full of unpleasant food odors	☐	☐	☐	☐

30. How often do you find:

	Never	Sometimes	Often	Always
a. Inappropriate or missing silverware	☐	☐	☐	☐
b. Not enough condiments (ketchup, etc.)	☐	☐	☐	☐
c. Serving line has run out of items	☐	☐	☐	☐

31. For each pair of items below, please indicate your opinion of THE GENERAL CONDITION OF YOUR DINING FACILITY by darkening the circle which comes closest to describing your feelings.

		Extremely	Moderately	Neutral	Moderately	Extremely	
a.	Clean kitchen area	☐	☐	☐	☐	☐	Dirty kitchen area
b.	Insect infested	☐	☐	☐	☐	☐	Insect free
c.	Clean serving counters	☐	☐	☐	☐	☐	Dirty serving counters
d.	Dirty dispensing devices	☐	☐	☐	☐	☐	Clean dispensing devices
e.	Dirty silverware	☐	☐	☐	☐	☐	Clean silverware
f.	Clean trays	☐	☐	☐	☐	☐	Dirty trays
g.	Clean dishes and glasses	☐	☐	☐	☐	☐	Dirty dishes and glasses
h.	Dirty floors	☐	☐	☐	☐	☐	Clean floors
i.	Dirty tables and chairs	☐	☐	☐	☐	☐	Clean tables and chairs
j.	Brightly lighted	☐	☐	☐	☐	☐	Dimly lighted
k.	Sunny	☐	☐	☐	☐	☐	Lacking in sunlight
l.	Quiet	☐	☐	☐	☐	☐	Noisy
m.	Crowded	☐	☐	☐	☐	☐	Uncrowded
n.	Roomy	☐	☐	☐	☐	☐	Cramped
o.	Pleasant view	☐	☐	☐	☐	☐	Unpleasant view
p.	Low number of safety hazards	☐	☐	☐	☐	☐	High number of safety hazards
q.	Unpleasant exterior appearance	☐	☐	☐	☐	☐	Pleasant exterior appearance
r.	Unpleasant interior appearance	☐	☐	☐	☐	☐	Pleasant interior appearance
s.	Colorful	☐	☐	☐	☐	☐	Drab
t.	Beautiful	☐	☐	☐	☐	☐	Ugly
u.	Relaxed	☐	☐	☐	☐	☐	Tense

32. Indicate your opinions about CONVENIENCES WITHIN YOUR DINING FACILITY.

	Extremely	Moderately	Neutral	Moderately	Extremely	
a. Convenient to enter & leave	☐	☐	☐	☐	☐	Inconvenient to enter & leave
b. Far from washroom	☐	☐	☐	☐	☐	Close to washroom
c. Inadequate table size for size of trays	☐	☐	☐	☐	☐	Adequate table size for size of trays

33. Indicate the TABLE SIZE you prefer:

2 persons	4 persons	6 persons	8 persons	More than 8 persons
☐	☐	☐	☐	☐

34. Indicate your opinion about the following SOCIAL aspects of your dining facility.

	Never	Sometimes	Often	Always
The feeling of privacy is quite good in this dining hall	☐	☐	☐	☐
Room conditions are acceptable for relaxed conversation	☐	☐	☐	☐
There is a friendly social atmosphere in this dining hall	☐	☐	☐	☐

35. Do you have MUSIC in your dining facility now?

Yes	No
☐	☐

36. What is your reaction to having MUSIC in the dining facilities:

Very Acceptable	Mildly Acceptable	Neutral	Mildly Unacceptable	Very Unacceptable
☐	☐	☐	☐	☐

37. Indicate the THREE types of music you would most prefer in the dining facilities:

- ☐ Any type is fine
- ☐ Hard rock
- ☐ Soul
- ☐ Popular
- ☐ Rock and roll
- ☐ Jazz
- ☐ Instrumental
- ☐ Classical
- ☐ Country western
- ☐ Other (write it here) _____
- ☐ Do not want music

38. Does your dining facility use a SELF BUSSING system in which each person carries his own tray to the dishwashing area?

Yes No
☐ ☐

39. Indicate how you do or would feel about having SELF BUSSING in the dining facilities:

Very Mildly Mildly Very
Acceptable Acceptable Neutral Unacceptable Unacceptable
☐ ☐ ☐ ☐ ☐

40. WHAT HOURS WOULD YOU LIKE THE DINING FACILITY OPEN? For each type of meal darken TWO circles, one to indicate your feeling about the time the dining hall opens AND the other to indicate your feeling about the time the dining hall closes.

	1 Hour Earlier	Opening 1/2 Hour Earlier	OK as Is	1 Hour Later	Closing 1/2 Hour Later	OK as Is
Weekday Breakfast	☐	☐	☐	☐	☐	☐
Weekday Mid-day Meal	☐	☐	☐	☐	☐	☐
Weekday Evening Meal	☐	☐	☐	☐	☐	☐
Weekend Breakfast	☐	☐	☐	☐	☐	☐
Weekend Mid-day Meal	☐	☐	☐	☐	☐	☐
Weekend Evening Meal	☐	☐	☐	☐	☐	☐

41. Is the food in your mess hall ever:

	Never	Sometimes	Often	Always
a. Overcooked	☐	☐	☐	☐
b. Undercooked	☐	☐	☐	☐
c. Cold	☐	☐	☐	☐
d. Tasteless or bland	☐	☐	☐	☐
e. Burned	☐	☐	☐	☐
f. Dried out	☐	☐	☐	☐
g. Greasy	☐	☐	☐	☐
h. Tough	☐	☐	☐	☐
i. Too spicy	☐	☐	☐	☐
j. Raw	☐	☐	☐	☐
k. Still frozen	☐	☐	☐	☐
l. Too salty	☐	☐	☐	☐
m. Full of gristle	☐	☐	☐	☐
n. Spoiled	☐	☐	☐	☐
o. Stale	☐	☐	☐	☐
p. Fatty	☐	☐	☐	☐

42. Other than times of dieting, do you ever LEAVE your dining facility WITHOUT ENOUGH TO EAT?

NEVER SOMETIMES OFTEN ALWAYS
☐ ☐ ☐ ☐

43. Do you serve yourself or do the dining facility personnel serve you the following items?

	SELF-SERVICE	SERVED BY OTHERS
a. Short order items	☐	☐
b. Meat items	☐	☐
c. Starches (i.e., potatoes)	☐	☐
d. Vegetables	☐	☐
e. Salads	☐	☐
f. Beverages	☐	☐
g. Desserts	☐	☐

44. Are SECOND HELPINGS PERMITTED for the following items?

	Always	Sometimes	Never
a. Short order items	☐	☐	☐
b. Meat items	☐	☐	☐
c. Starches (i.e., potatoes)	☐	☐	☐
d. Vegetables	☐	☐	☐
e. Salads	☐	☐	☐
f. Beverages	☐	☐	☐
g. Desserts	☐	☐	☐

45. For each of the following foods, indicate your opinion of the AMOUNT GIVEN IN ONE SERVING. Darken the circle under NA (Not Appropriate) if you have self-service and/or second helpings are permitted.

	Much Too Small	Slightly Too Small	Just Right	Slightly Too Large	Much Too Large	NA
a. Meat	☐	☐	☐	☐	☐	☐
b. Starches	☐	☐	☐	☐	☐	☐
c. Vegetables	☐	☐	☐	☐	☐	☐
d. Dessert	☐	☐	☐	☐	☐	☐

46. For each pair of items below, please describe the FOOD SERVICE WORKERS on the serving line in your dining facility.

	Extremely	Moderately	Neutral	Moderately	Extremely	
Clean	☐	☐	☐	☐	☐	Dirty
Unpleasant	☐	☐	☐	☐	☐	Pleasant
Well Trained	☐	☐	☐	☐	☐	Poorly Trained
Hard Working	☐	☐	☐	☐	☐	Not Hard Working
Provide Slow Service	☐	☐	☐	☐	☐	Provide Fast Service

47. Indicate your opinion about the ATTITUDES of the dining facility WORKERS to make your meal as pleasant as possible.

Very Poor	Average	Excellent
☐	☐	☐

48. Indicate your opinion of the VARIETY of offerings at any particular WEEKDAY meal.

We need:		Much More Choice	Slightly More Choice	Choice Now Enough	Slightly Less Choice	Much Less Choice
a.	For short order foods:	☐	☐	☐	☐	☐
b.	For meats:	☐	☐	☐	☐	☐
c.	For starches:	☐	☐	☐	☐	☐
d.	For vegetables:	☐	☐	☐	☐	☐
e.	For salads:	☐	☐	☐	☐	☐
f.	For beverages:	☐	☐	☐	☐	☐
g.	For desserts:	☐	☐	☐	☐	☐

49. Indicate your opinion of the VARIETY of offerings at any particular WEEKEND meal.

We need:		Much More Choice	Slightly More Choice	Choice Now Enough	Slightly Less Choice	Much Less Choice
a.	For short order foods:	☐	☐	☐	☐	☐
b.	For meats:	☐	☐	☐	☐	☐
c.	For starches:	☐	☐	☐	☐	☐
d.	For vegetables:	☐	☐	☐	☐	☐
e.	For salads:	☐	☐	☐	☐	☐
f.	For beverages:	☐	☐	☐	☐	☐
g.	For desserts:	☐	☐	☐	☐	☐

50. Indicate your opinion of the VARIETY of foods offered in the menu during the course of a month or so.

We need:		Much More Choice	Slightly More Choice	Choice Now Enough	Slightly Less Choice	Much Less Choice
a.	For short order foods:	☐	☐	☐	☐	☐
b.	For meats:	☐	☐	☐	☐	☐
c.	For starches:	☐	☐	☐	☐	☐
d.	For vegetables:	☐	☐	☐	☐	☐
e.	For salads:	☐	☐	☐	☐	☐
f.	For beverages:	☐	☐	☐	☐	☐
g.	For desserts:	☐	☐	☐	☐	☐

51. Is CARRY OUT SERVICE available in your dining facility? (Disregard any flight feeding programs in this and the following two questions.)

Yes No
☐ ☐

Indicate how you do or would feel about CARRY OUT SERVICE being available from the dining facilities.

Extremely Neutral Extremely
opposed ☐ ☐ ☐ ☐ Enthusiastic
☐ ☐ ☐ ☐ ☐

52. How long do you USUALLY have to WAIT in line at the headcount station TO GET ADMITTED for a meal?

- ☐ I never have to wait in line.
- ☐ I wait between one and five minutes.
- ☐ I wait between five and ten minutes.
- ☐ I wait between ten and fifteen minutes.
- ☐ I wait longer than fifteen minutes.

53. How long do you USUALLY have to WAIT IN THE SERVING LINE after the headcount before you get your food?

- ☐ I never have to wait in line.
- ☐ I wait between one and five minutes.
- ☐ I wait between five and ten minutes.
- ☐ I wait between ten and fifteen minutes.
- ☐ I wait longer than fifteen minutes.

54. How long do you USUALLY have to WAIT AT THE DISH WASHING AREA when self-bussing?

- ☐ I never have to wait in line.
- ☐ I wait between one and five minutes.
- ☐ I wait between five and ten minutes.
- ☐ I wait between ten and fifteen minutes.
- ☐ I wait longer than fifteen minutes.
- ☐ Not applicable; no self bussing.

55. For each of the following RULES FOR BEHAVIOR darken TWO circles, one to indicate whether or not the rule exists in your dining facility AND the other to indicate whether you want the rule, do not want it, or have no opinion about it.

		Does Rule Exist?		Do You Want the Rule?		
		Yes	No	Yes	No	No Opinion
a.	Dress regulations	☐	☐	☐	☐	☐
b.	Not allowing civilian guests	☐	☐	☐	☐	☐
c.	Calling "at ease" when officer enters	☐	☐	☐	☐	☐
d.	No smoking	☐	☐	☐	☐	☐
e.	Officers and NCO's permitted to cut in line	☐	☐	☐	☐	☐
f.	Separation of officers and NCO's from enlisted men	☐	☐	☐	☐	☐

56. How important are the following factors in influencing what foods you choose to eat?

	Of Major Importance	Of Minor Importance	Unimportant
Food Appearance	☐	☐	☐
Food Variety	☐	☐	☐
Food Cost	☐	☐	☐
Familiarity With the Food	☐	☐	☐
Nutritional Value of the Food	☐	☐	☐
Number of Calories in the Food	☐	☐	☐
Your Liking of the Food	☐	☐	☐
How Well the Food Goes With Other Foods You Choose	☐	☐	☐

57. Are you currently on a diet?

Yes	No
☐	☐

APPENDIX B
INTERVIEW PROTOCOL FOR CONSUMER ATTITUDE SURVEY

PHASE 1 INTERVIEW PROTOCOL FOR TWENTYNINE PALMS MARINE BASE

(Enter Subject's survey I.D. number.)

DEMOGRAPHIC SECTION – For ALL respondents:

1. Are you currently receiving a subsistence allowance, or do you have a meal pass? (meal pass—0; subsistence allowance—1)
2. Unit (No numeric score) – Dining hall code
3. Age (How old are you, to the nearest year?).
4. Time in Service (How long have you been in the Marines, to the nearest year?).
 5. 0–10 years: Are you planning to make a career of the Marines? (no—0; yes—1; uncertain—2)

Over 10 years: (Automatically enter "1".)

6. Are you married and currently living with your spouse? (no—0; yes—1)

FOOD HABITS SECTION – For ALL respondents:

7. During each of the past seven days, where did you eat breakfast, lunch, and dinner, starting with (breakfast) (lunch) today and working backward for 21 meals?

– = skip	FI = fast food in
BA = bowling alley	FO = fast food out
BB = brown bag	HO = home (barracks)
BX = base exchange cafe	OH = friend's or relative's house
CL = club	SR = sit-down restaurant
DS = school dining hall	VM = vending machine
DC = consolidated dining hall	?? = can't recall

8. 0–4 meals in D.H.: Have you eaten at least 5 or more meals in either of the dining halls since you've been stationed here at 29 Palms? (no—0; yes—1)

5 or more meals in D.H.: (Automatically enter "1".)

9. DISCRETIONARY: I see that you seem to eat a lot of (meal) at (location). Why is that?

10. **DISCRETIONARY:** I see that you seem to have skipped (meal) a couple of times during the past week. Do you consistently skip that meal? (no-0; yes-1; sometimes-2)

1 or 2: 11. Why?

(If Question 9 is not asked, automatically enter "X" for Question 9.)

(If Question 10 is not asked, automatically enter "0" and "X" for Questions 10 and 11 respectively.)

12. Would you call the past seven days "typical" for you? (no-0; yes-1)

R.I.K.s ONLY:

13. If you were receiving a subsistence allowance, would you eat in the dining hall any more often or less often than you do now? (no-0; less-1; more-2)

1 or 2: 14. That must mean that you would eat somewhere else more (less) often. Where would that be?

CRITIQUE (BITCH) SECTION – For ALL respondents:

15. What is the main reason that you don't eat in the dining hall more often than you do? (If none, enter a "Z".)

16. If this were changed, would you eat in the dining hall more often? (no-0; yes-1)

17. Are there any other things that could be done or changed to get you to eat more meals in the dining hall? (If none, enter a "Z".)

18. How far away (in yards) would you estimate that the nearest dining hall on this base is located from your particular work site?
living site?

19. Do you consider that location convenient or inconvenient to your work site? living site? Please use this scale to answer. (Scale A)

20. How long do you typically have to wait (in minutes) from the time that you enter the dining hall until the time that you sit down at a table?
-

PREFERENCE SECTION — For ALL respondents:

21. Would you prefer any of the following specialty menus to the general menu currently served: Please use this scale to answer. (Scale B)

- A. Steak House
- B. Spaghetti Factory
- C. Deli-service
- D. Seafood
- E. Mexican
- F. Any other? Please specify.

COMPARISON SECTION— If answer to Question 8 was "NO," STOP; interview is now finished.

22. In general, how would you rate your dining hall in comparison to other military dining halls in which you've eaten, all things considered? Please use this scale to answer. (Scale C)

Using this same scale, how does your dining hall compare to other military dining halls in which you've eaten with respect to:

- 23. the number of different foods available at a given meal?
 - 24. the variety of foods offered day after day?
 - 25. the quality of the raw food (meat, vegetables, etc.) used?
 - 26. the preparation and presentation of the food?
27. Sometimes in a dining hall, a food that you are expecting to be available is not. In comparison to other dining halls in which you've eaten, how often has this been happening? Please use this scale to answer. (Scale D)
-

Note: An "X" should be entered any time a question is not asked for any reason. If a question is asked and, for whatever reason, not answered, a "Z" should be entered.

APPENDIX C
STATISTICAL ANALYSES OF FOOD SERVICE WORKER SURVEY

FOOD SERVICE WORKER SURVEY

STATISTICAL ANALYSES

- a) * $X^2 = 6.34$, $p < 0.05$, 2df
- b) $X^2 = 11.40$, $p < 0.01$, 2df
- c) $X^2 = 25.20$, $p < 0.01$, 3df
- d) $X^2 = 22.75$, $p < 0.01$, 2df
- e) $X^2 = 11.46$, $p < 0.05$, 4df
- f) $X^2 = 12.55$, $p < 0.01$, 2df
- g) $X^2 = 35.44$, $p < 0.01$, 2df
- h) $X^2 = 18.70$, $p < 0.01$, 2df
- i) $X^2 = 8.91$, $p < 0.05$, 3df
- j) $X^2 = 9.06$, $p < 0.05$, 2df
- k) $X^2 = 11.62$, $p < 0.01$, 1df
- l) sign test; $X = 0$, $N = 5$, $p < 0.03$
- m) $X^2 = 4.30$, $p < 0.05$, 1df
- n) $X^2 = 11.08$, $p < 0.01$, 2df
- o) $X^2 = 6.95$, $p < 0.01$, 1df
- p) $X^2 = 9.78$, $p < 0.01$, 1df

*letters are referenced in Food Service Worker Attitude Section.

APPENDIX D
INTERVIEW PROTOCOL FOR FOOD SERVICE WORKER SURVEY

TWENTYNINE PALMS — FOOD SERVICE WORKER INTERVIEW

1. What is your rank?
2. (Show card) Using this card, indicate how much you like or dislike military service.
3. What do you do in your present job?
4. How long have you been in food service in your Marine career?
5. Have you worked at any other dining facility besides this one?
If so, how many? (If not, go to Question 6B)
- 6.A. (Show card) Using this card, indicate how this dining facility compares with others in which you have worked. Why?
- B. What (other) good things are there about this system as it is now?
- C. What (other) bad things are there about this system as it is now?
- D. What changes could be made to make this system better?
7. (Show card) How would you rate the attitude of the consumers in this dining facility?
- 8.A. Which would you prefer — for a person to be assigned to mess duty....
(1) for one month, once a year, (2) for one week, four times a year, or (3) for two or three days each month? Which would you least prefer?
- B. Why?
- C. What (other) good things are there about having a person assigned for one month?
- D. What (other) bad things are there about having a person assigned for one month?
- 9.A. How many hours is your duty day?
- B. (Number of productive hours)
- C. On the average, how many hours a week do you have to spend on military duties other than your food service duties?
- D. What specifically are those other military duties?

TWENTYNINE PALMS FOOD SERVICE WORKER INTERVIEW

1. Rank _____

2. Military service:

dislike	dislike	dislike	neutral	like	like	like
very much	moderately	slightly		slightly	moderately	very much

3. Present job _____ 4. Years _____ 5. Number _____

6. A. This dining hall is:

much	moderately	slightly	same	slightly	moderately	much
better	better	better		worse	worse	worse

B. Good things _____

C. Bad things _____

D. Changes _____

7. Consumer attitude is:

very	moderately	slightly	neutral	slightly	moderately	very
bad	bad	bad		good	good	good

8. A. Rank Order (1 = most preferred)

One month _____ One week _____ One or two days _____

B. Why? _____

C. Good things _____

D. Bad things _____

9. Hours: A. Duty Day _____ B. Productive _____ C. Mil. Duties _____

D. Other military duties _____

TWENTYNINE PALMS — FOOD SERVICE OFFICE INTERVIEW

- 1—4 See Food Service Worker Interview.
5. Have you worked in any other food service system besides this one?
If so, how many? (If not, go to Question 6B)
- 6.A. (Show card) Using this card, indicate how the food service system at 29 Palms compares with others in which you have worked. Why?
- B. What (other) good things are there about the system as it is now?
- C. What (other) bad things are there about the system as it is now?
- D. What changes could be made to make this system better?
7. (Show card) How would you rate the attitude of the consumers toward food service at this base?
- 8.A. Which would you prefer — for a person to be assigned to mess duty....
(1) for one month, once a year, (2) for one week, four times a year, or (3) for two or three days each month? Which would you least prefer?
- B. Why?
- C. What (other) good things are there about having a person assigned for one month?
- D. What (other) bad things are there about having a person assigned for one month?
- 9.A. How many hours is the worker's duty day?
- B. (Number of productive hours)
- C. On the average, how many hours a week does the worker have to spend on military duties other than food service duties?
- D. What specifically are those other military duties?

TWENTYNINE PALMS – MESSMAN INTERVIEW

1. How long have you been at 29 Palms?
2. How long have you been on mess duty?
3. When was the last time you were assigned to mess duty at 29 Palms?
- 4.A. Which would you most prefer – to be assigned to mess duty....

(1) for one month, once a year, (2) for one week, four times a year, or (3) for two or three days each month? Which would you least prefer?

B. Why?

C. What (other) good things are there about being assigned for one month?

D. What (other) bad things are there about being assigned for one month?
- 5.A. How many hours is your duty day?

B. (Number of productive hours)

C. On the average, how many hours a week do you have to spend on military duties other than your food service duties?

D. What specifically are those other military duties?

TWENTYNINE PALMS - MESSMAN INTERVIEW

1. Months at 29 Palms _____
2. Weeks on mess duty _____
3. Last mess duty assignment (month, year) _____
- 4.A. Rank order (1 = most preferred)
 - One month _____
 - One week _____
 - One or two days _____
- B. Why? _____

- C. Good things _____

- D. Bad things _____

- 5.A. Number of hours in duty day _____
- B. Number of productive hours _____
- C. Number of hours spent on other military duties _____
- D. Other military duties _____

APPENDIX E

**DEFINITIONS, PROCEDURES, WORK SCHEDULES, STATISTICAL DATA, AND
TABLES FOR WORK SAMPLING ANALYSIS**

DATA COLLECTION PROCEDURE FOR WORK SAMPLING

As the number of workers to be monitored was too large to remember each person by sight, each person was assigned a badge with a number. Every job category was assigned a color and a unique set of numbers was assigned to each watch. For example, supervisors' badges were red and numbered 1-10 for the first watch and 10-20 for the second watch, e.g., if a person had a red badge with the number 18, it would indicate a supervisor on the second shift. The same scheme held true for the other three job categories. As each person entered the dining facility he would pick up the appropriate badge and turn it in at the end of his shift.

The form shown in Figure E-1 was used to record data. Before the beginning of each observation period, the observer recorded the dining facility number, date and day of the week. He also noted the badge number of each person working during the period at the head of each column. The time of each observation round was recorded in the left hand column (a 24-hour clock was used). The interval between observations was 15 minutes (or 4 observations per hour). Since the number of messcooks to be monitored in each dining facility was more than a single observer could monitor in an observation cycle it was decided to monitor a sample of 20 messcooks on a random basis.

Each major task listed in the definitions Table E-2 was assigned a one-digit code (e.g., food preparation - 1, serving - 3, sanitation - 4). Thus, for each observation, two digits were recorded in the appropriate boxes. The first digit signifying the person being observed, the second representing the function being performed at that time. The data sheets were subsequently keypunched onto cards for analysis by computer.

(g)	(5-7)	(11)
-----	-------	------

[illegible]

	J	A							
TITLE OF DAY (7-10)	J A	12	13						
	J A	15	16						
	J A	18	19						
	J A	21	22						
	J A	24	25						
	J A	27	28						
J A	30	31							
J A	33	34							
J A	36	37							
J A	39	40							
J A	42	43							
J A	45	46							
J A	48	49							
J A	51	52							
J A	54	55							
J A	57	58							
J A	60	61							
J A	63	64							
J A	66	67							
J A	69	70							

FIGURE E-1: WORK SAMPLING DATA COLLECTION FORM

Table E-1

JOB DEFINITIONS

1. Dining Hall Supervisors — A MS-1 military supervisor in charge of some phase of dining hall operations (Galley supervisor or Watch Captain).
2. Military Cook — A rated military person who performs cooking, or storeroom functions.
3. Baker — A rated military person who does baking functions.
4. Military Mess Men — A non-rated military person who performs clean up and utility functions.

Table E-2

TASK DEFINITIONS

1. Nonproductive

- a. **Designated Rest Break:** Consists of those times that are for employee coffee breaks or other assigned rest periods.
- b. **Idle:** Consists of all nonproductive activities not defined elsewhere.
- c. **Absent:** Employee previously accounted for is not to be found on premises.
- d. **Walking:** Employee is walking from one area to another, or within an area without any apparent purpose.
- e. **Conversing:** Conversation between cooks on subjects of undetermined nature.

2. Food Preparation

a. **Prepares Meats and Vegetables for Cooking:** Obtains ingredients. Opens food cans, boxes, and/or bags. Places raw or precooked items into appropriate cooking, heating or serving containers. Cuts meats and vegetables. Mixes ingredients as required.

b. **Cooks Food in Kitchen:** Selects proper temperature settings, monitors food being cooked or reconstituted, and seasons food as required. Includes preparing eggs, hot cakes, french toast, meats, and other items on the serving line grill. Removes ready food from cooking utensils and places in serving or replenishing containers.

Prepares Soups and Gravies, Salads and Fruits, Desserts, and Bakery Products: Includes all productive time required to prepare soups and gravies, salads, and fruits, desserts and bakery products and to transport to serving line or tables.

c. **Prepares Soups and Gravies:** Obtains ingredients, opens soup containers and mixes ingredients for soups. Cooks, seasons, and pours into serving containers or individual portions.

d. **Prepares and Assembles Salads and Fruits:** Obtains ingredients. Cuts and cleans lettuce, cabbage, tomatoes, onions, and other salad ingredients. Mixes all salads and/or places salads in bulk or individual portions.

e. **Prepare Bakery Products or Desserts:** Obtains ingredients. Slices serving portions of cakes, pies, or other desserts. Includes preparing bulk or individual portions of puddings, custards.

f. Prepares Cooking Utensils: Includes all productive time required for obtaining and prelocating pots, pans, spatulas, and other cooking implements in preparation for cooking.

g. Prepares Flight Meals, Picnic Meals or Bag Lunches: Includes all functions performed in the Flight Galley.

3. Serving Food

a. Serves Food: Cuts individual portions of meat on serving line. Serves patrons in line. Serves eggs, hot cakes, french toast, steaks, hamburgers, hot dogs, and other items directly from the serving line grill.

b. Sets Up, Replenishes, and Tears Down Serving Line: Includes all time required to place, replenish, and remove food from the serving line. Prepares utensils for serving line. Makes beverages. Refills milk coolers and beverage dispensers.

c. Prepares and Assembles Cold Sandwiches: Prepares cold sandwiches to order for customers.

d. Cooks Food to Order on Serving Line: Cooks items such as eggs, hamburgers, hot dogs, to customer order. (Note: when items are prepared on the line grill and placed in a serving container prior to being given to the customer, the task will be recorded in the preparation category.)

4. Sanitation

a. Cleans Utensils and Pots: Washes pots, pans, and other cooking utensils. Returns pots, pans, and utensils to proper locations or receptacles.

b. Cleans Equipment: Cleans ranges, preparation tables, steam kettles, grills, mixers, deep fryers, ovens, vegetable and meat cutting machines, and other equipment.

c. Cleans Kitchen: Sweeps and mops kitchen floor. Cleans refrigerator, freezer, and dry goods storage room. Empties garbage, cleans garbage cans, and garbage area.

d. Personal Hygiene: Engaging in any activity that would comprise good sanitation practice, such as washing hands after preparing raw meat, fish, poultry.

5. Supplies

a. Receives Supplies: Unloads all incoming supplies at the dock. Transports supplies to storage area. Uncrates, unpacks, and stores supplies in appropriate location. (Non-perishable/condiments in storeroom, and perishable items in refrigerator/chill room.) Maintains inventories and receipts for incoming food and expendable supplies.

b. **Maintains Supplies:** Repositions stored supplies to insure that longest stored items are used first. Inventories supplies after each meal, and when directed by food service supervisory personnel. Maintains supply records.

c. **Issues Supplies:** Issues food supplies to senior cooks and records issues. Receives returned unused issues not used by cooks and annotates records indicating return. Buys out-of-stock items from other dining halls for immediate use.

6. Administrative

a. **Prepares Correspondence, Records or Reports:** Drafts and types correspondence. Prepares various food control records. Maintains civilian employees personnel and pay records.

b. **Telephone:** Answers telephone and pages personnel.

c. **Menu Boards:** Changes menu boards for upcoming meals.

7. Supervisory

a. **Monitors OJT Program:** Monitors the preparation of required forms by senior cooks and shift leaders. Gives and monitors OJT.

b. **Inspects:** Inspects dining hall to assure cleanliness and maintenance of good sanitation practices.

c. **Receives or Gives Supervision:** A Dining Hall Supervisor or Civilian Shift Leader gives instructions to another Dining Hall employee (other than OJT) or an employee receives instructions from a Dining Hall Supervisor or Civilian Shift Leader.

8. Training

All Training not received at the Dining Hall Site:

9. Other

a. **All other Activities not designated above:** All productive time devoted to areas that have not been mentioned.

b. **Cash Transaction:** Issue change funds to cashiers and receives monies collected during meal or collects cash for meals from customers on COMRATS.

c. **Signature Headcount Monitoring:** Monitors signatures as men arrive in Dining Hall.

PRODUCTIVITY INDEX

The average number of meals served in each dining facility based on the three month period January — March 1977 are given below.

Average Number of Meals Per Day

Dining Facility 2	2481
Dining Facility 5	1434

The total manhours expended per day was calculated as follows:

(1) Manhours for supervisors, cooks, and bakers were calculated by taking the total number of observations for each worker category (Appendix E Table E-8) and dividing by four, since four observations were taken per hour, and then dividing by seven, since the data represents 7 workdays, to obtain a daily average.

(2) The total messcook manhours per day was set equal to the total number of messcooks assigned, times the number of hours worked each day for the seven days, (Note: A different number of hours is worked on weekdays versus weekends) divided by seven for a daily average, i.e.,:

Dining Facility 2: $5 (40) (15) + 2 (40) (12) = 565.7$ hours per day

Dining Facility 5: $5 (25) (14.5) + 2 (25) (11) = 338.0$ hours per day

The difference in calculation approach relates to the fact that observations were made on only a sample of the messcooks, calculations of meals per manhour were made with and without messcooks and are presented in text table 13.

TABLE E-3

Observation Schedule

Observation Period	14 M	15 T	16 W	17 T	18 F	19 S	20 S	22 T	23 W	24 T	25 F	26 S	27 S	28 M
0400-0500		2 5	2 5		2 5					2 5				2 5
0500-0600		2 5	2 5		2 5					2 5				2 5
0600-0700		2 5	2 5		2 5	2				2 5			2	2 5
0700-0800		2 5	2 5		2 5	2 5				2 5			2 5	2 5
0800-0900		2 5	2 5		2 5	2 5				2 5			2 5	2 5
0900-1000		2 5	2 5		2 5	2 5				2 5			2 5	2 5
1000-1100		2 5	2 5		2 5	2 5				2 5			2 5	2 5
1100-1200				2 5		2 5		2 5	2 5		2 5	2 5	2 5	2 5
1200-1300				2 5			2 5	2 5	2 5		2 5	2 5		2 5
1300-1400	2 5			2 5			2 5	2 5	2 5		2 5	2 5		
1400-1500	2 5			2 5			2 5	2 5	2 5		2 5	2 5		
1500-1600	2 5			2 5			2 5	2 5	2 5		2 5	2 5		
1600-1700	2 5			2 5			2 5	2 5	2 5		2 5	2 5		
1700-1800	2 5			2 5			2 5	2 5	2 5		2 5	2 5		
1800-1900	2 5			2 5				2 5	2 5		2 5			

TABLE E-4

Manhours By Day of the Week

Dining Hall 2

	S	M	T	W	T	F	S
Supervisors	19.25	62.75	65.5	70.5	91.50	65.00	30.00
Cooks	143.25	271.00	281.25	266.5	270.25	304.50	11.25
Bakers	22.25	48.00	40.00	35.0	29.00	28.00	16.00
Messmen	440.00	600.00	600.00	600.00	600.00	600.00	600.00

Dining Hall 5

	S	M	T	W	T	F	S
Supervisors	11.00	24.75	32.5	30.5	25.75	26.50	11.0
Cooks	110.00	226.75	215.75	252.75	244.5	211.00	120.00
Bakers	10.00	40.25	43.25	27.25	35.75	25.50	22.00
Messmen	275.00	362.50	362.5	362.5	362.5	362.5	275.00

TABLE E-5

Number of Meals Served, Manhours Worked, and Meals Per Manhour

Dining Hall 2	S	M	T	W	T	F	S
Total No. of Meals	1,483	3,089	2,979	2,800	2,809	2,696	1,347
Total Manhours	664.75	981.75	986.75	972	990.75	997.5	638.25
Meal/Manhour	2.23	3.14	3.02	2.88	2.83	2.7	2.11
Dining Hall 5	S	M	T	W	T	F	S
Total No. of Meals	950	1,570	1,479	1,471	1,528	1,356	809
Total Manhours	406	654.25	654.00	673	668.51	625.5	438
Meals/Manhour	2.34	2.40	2.26	2.18	2.29	2.17	1.85

Table E-6

Degree of Accuracy
(± %) With 95% Confidence

	Dining Hall Supervisors	Military Cook	Military Baker	Messcook	Total
Dining 2	6.30	3.42	7.16	3.16	1.62
Dining 5	10.70	3.08	7.63	2.64	1.80
Total All D.H.	5.43	2.30	5.22	2.14	1.21

$$S = \sqrt{\frac{4 P (1 - P)}{N}} \times 100$$

where S = degree of accuracy (%)
N = sample size
P = largest % time spent in 1 category

Table E-7

SAMPLE SIZE

	Supervisors	Cook	Bakers	Messcooks	Total
Dining Hall 2	1,626	6,596	873	8,048	17,143
Dining Hall 5	648	5,523	816	7,600	14,587
Total	2,274	12,119	1,689	15,648	31,730

TABLE E-8

All Days
Percent Time Observed At Work Functions

	Supervisor			Cook			Baker			Mess Man			Combined Average
	2	5	Avg	2	5	Avg	2	5	Avg	2	5	Avg	
	Weekday Only												
Productive	36.84	31.64	35.36	34.16	43.36	38.35	35.97	36.03	36.00	28.89	42.96	35.72	36.72
Preparation	4.43	2.62	3.91	23.67	19.57	21.80	47.19	45.71	46.48	9.47	7.41	8.47	15.20
Serving	1.05	1.54	1.19	6.52	7.70	7.06	1.49	.49	1.01	17.71	10.63	14.27	9.87
Sanitation	.12	.00	.09	4.67	6.08	5.31	4.81	3.92	4.38	33.15	30.24	31.74	17.92
Supply	.74	.15	.57	4.64	3.66	4.19	2.86	1.84	2.37	.99	1.33	1.16	2.34
Administrative	12.55	27.47	16.80	3.73	4.98	4.30	2.06	9.80	5.80	2.32	2.36	2.34	4.31
Supervision	38.25	35.03	37.34	5.09	5.03	5.07	4.47	1.96	3.26	4.44	2.50	3.50	6.51
Other	6.03	1.54	4.75	.96	1.07	1.01	1.15	.25	.71	3.03	2.58	2.81	2.15
Training	.00	.00	.00	16.57	8.55	12.91	.00	.00	.00	.00	.00	.00	4.92

	Supervisor			Cook			Baker			Mess Man			Combined Average
	2	5	Avg	2	5	Avg	2	5	Avg	2	5	Avg	
Productive	36.11	31.61	34.84	30.53	41.58	35.53	31.94	36.92	34.38	26.09	40.59	33.22	34.33
Preparation	3.50	.71	2.71	24.18	19.83	22.22	49.58	45.35	47.51	10.62	8.14	9.30	16.05
Serving	1.19	.36	.96	5.90	6.15	6.01	1.39	.29	.85	17.66	10.60	14.19	9.19
Sanitation	.07	.00	.05	4.49	6.24	5.28	5.28	3.78	4.55	34.70	31.69	33.22	18.01
Supply	.84	.18	.65	4.79	4.00	4.43	3.47	2.03	2.77	1.12	1.44	1.28	2.56
Administrative	12.67	28.04	16.99	3.66	5.37	4.43	1.94	9.16	5.47	2.52	2.72	2.62	4.61
Supervision	38.77	37.50	38.41	5.71	5.54	5.63	5.42	2.18	3.84	4.54	2.43	3.50	7.07
Other	6.86	1.61	5.38	1.13	1.04	1.09	.97	.29	.64	2.75	2.38	2.57	2.09
Training	.00	.00	.00	19.61	10.25	15.38	.00	.00	.00	.00	.00	.00	6.09

	Supervisor			Cook			Baker			Mess Man			Combined Average
	2	5	Avg	2	5	Avg	2	5	Avg	2	5	Avg	
	Weekend Only												
Productive	42.13	31.82	38.95	53.91	52.28	53.14	54.90	31.25	44.13	37.97	51.59	44.28	46.87
Preparation	11.17	14.77	12.28	20.84	18.26	19.62	35.95	47.66	41.28	5.74	4.76	5.28	11.89
Serving	.00	9.09	2.81	9.88	15.43	12.51	1.96	1.56	1.78	17.85	10.73	14.55	12.75
Sanitation	.51	.00	.35	5.68	5.33	5.51	2.61	4.69	3.56	28.12	24.94	26.65	17.55
Supply	.00	.00	.00	3.82	1.96	2.94	.00	.78	.36	.58	.91	.73	1.39
Administrative	11.68	23.86	15.44	4.11	3.04	3.60	2.61	13.28	7.47	1.69	1.04	1.38	3.04
Supervision	34.52	19.32	29.82	1.76	2.50	2.11	.00	.78	.36	4.11	2.74	3.48	4.13
Other	.00	1.14	.35	.00	1.20	.57	1.96	.00	1.07	3.95	3.29	3.65	2.38
Training	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

APPENDIX F
Details of Subsystem Cost Estimates

DERIVATION OF COST ESTIMATES

Dining Hall 2

Food Cost:	Jan	70,791	
	Feb	59,674	
	Mar	<u>80,522</u>	
		210,987	x = 843,948

January

Labor:

3381	1 E8, 1 E7	2,719
3371	1 E7, 1 E6, 2 E5, 4 E4, 6 E3, 5 E2/1	14,790
3311	1 E5, 2 E3	2,314
3061	1 E4	787
3300	15 E2/1	<u>9,960</u>
		30,570

February

3381	1 E8, 1 E7	2,719
3371	1 E7, 1 E6, 2 E5, 8 E4, 4 E3, 22 E2/1	27,780
3311	1 E5, 2 E3, 3 E2/1	4,306
3061	1 E4	787
3300	2 E2/1	<u>1,328</u>
		36,920

March

3381	1 E8, 1 E7	2,719
3371	1 E7, 1 E6, 2 E5, 9 E4, 6 E3, 6 E2/1	19,377
3311	1 E5, 2 E3, 3 E2/1	4,306
3061	1 E4	787
3300	16 E2/1	<u>10,624</u>
		37,813

Jan 30,570

Feb 36,920

Mar 37,813

105,303 x 4 = 421,212

Messcook Labor:

January

Messcooks	40 E2/1	26,560
Chief Messcooks	2 E3	<u>1,404</u>
		27,964

February

Messcooks	40 E2/1	26,560
Chief Messcooks	2 E3	<u>1,404</u>
		27,964

March

Messcooks	40 E2/1	26,560
Chief Messcooks	2 E3	<u>1,404</u>
		27,964

Jan 27,964

Feb 27,964

Mar 27,964

83,892 x 4 = 335,568

Utilities:

Jan 4,975

Feb 4,796

Mar 4,692

14,463 x 4 = 57,852

Maintenance:

Jan 1,200

Feb 1,150

Mar 1,650

14,463 x 4 = 57,852

Supplies:

Jan 2,604

Feb 2,485

Mar 2,424

$$7,513 \times 4 = 30,052$$

Contract: Jan-Mar = 6,338 $\times$ 4 = 25,353 for entire system

Dining Hall 2 = 56% of all personnel in dining halls

$$d \ .56 (25,353) = 14,198$$

Supplies and Contract — 44,250 which is equal to the entry for Supplies

Commissary Support: (DSSC) Total Space 72,000 sq. ft.

Space utilized by both dining halls 14,378 sq. ft.

% utilized by both dining halls .20

Total Cost 102,140 (.20) = 20,428

$$20,428/2 = 10,214$$

Dining Hall 5

Food Cost: Jan 40,345

Feb 41,995

Mar 45,120

$$127,460 \times 4 = 509,840$$

January

Labor:

3381	1 E7	1,251
3371	3 E6, 3 E5, 4 E4, 4 E3, 7 E2/1	16,492
3311	1 E5, 1 E3, 2 E2/1	2,939
3300	10 E2/1	<u>6,620</u>
		27,302

February

3381	1 E7	1,251
3371	4 E6, 3 E5, 2 E4, 6 E3, 6 E2/1	16,727
3311	1 E5, 1 E4, 2 E3, 6 E2/1	7,085
3300	9 E2/1	<u>5,958</u>
		31,021

March

3381	1 E7	1,251
3371	2 E6, 3 E5, 3 E4, 2 E3, 10 E2/1	15,226
3061	1 E2/1	664
3311	1 E5, 1 E4, 2 E3, 8 E2/1	8,413
3300	7 E2/1	<u>4,634</u>
		30,188

Jan 27,302

Feb 31,021

Mar 30,188

88,511 x 4 = 354,044

Messcook Labor:

January

Messcooks 25 E2/1 16,600

Chief Messcooks 2 E3 1,404

18,004

Jan 18,004

Feb 18,004

Mar 18,004

54,012 x 4 = 216,048

Utilities:

Jan 4,697

Feb 4,526

Mar 4,427

13,650 x 4 = 54,600

Maintenance:

Jan 1,150

Feb 1,250

Mar 1,950

4,350 x 4 = 17,400

Supplies:

Jan 1,958

Feb 1,555

Mar 1,429

$$4,942 \times 4 = 19,768$$

Contract:

Jan 2,069

Feb 2,069

Mar 2,200

$$6,338 \times 4 = 25,353$$

$$44\% \text{ of all personnel in dining halls} - .44(25,353) = 11,155$$

Supplies and Contract = 30,923, which is equal to entry for Supplies

(DSSC) Total Space 72,000 sq. ft.

Space utilized by both dining halls 14,378 sq. ft.

% utilized by dining halls .20

$$\text{Total cost } 102,140 (.20) = 20,428$$

$$20,428/2 = 10,214$$

Food Service Office

Labor:

January

3311	1 E4, 1 E2/1	1,451
3061	1 E7, 2 E2/1	2,579
3302	1 03	1,879
3381	1 E8	1,468
3051	1 E3	703
Civilians GS2-4	1	602
WG-6-5	1	<u>1,231</u>
		9,913

February

3311	1 E4	787
3061	1 E7, 2 E2/1	2,579
3302	1 03	1,879
3381	1 E8	1,468
3051	1 E3	703
Civilians GS2-4	1	602
WG-6-5	1	<u>1,231</u>
		9,249

March

3311	1 E4	787
3061	1 E7, 2 E2/1	2,579
3302	1 03	1,879
3381	1 E8	1,468
3051	1 E4	787
Civilians		
GS2-4	1	602
WG-6-5	1	<u>1,231</u>
		9,333

28,495 x 4 = 113,980

TABLE F-1

Manpower Allocation*

MOS	Title	DH 2			DH 5			FSO		
		Jan	Feb	Mar	Jan	Feb	Mar	Jan	Feb	Mar
3371	Cook	21	40	26	23	23	22			
3311	Baker	3	6	5	4	10	12	2	1	1
3061	Subsistence (Supply)	1	2	2			1	3	3	3
3300	Basic Food Service	15	2	16	10	9	7			
3302	Food Service Officer							1	1	1
3381	Food Tech	2	2	2	1	1		1	1	1
3051	Warehouseman							1	1	1
	Total	42	52	51	38	43	42	8	7	7

*All numbers in this table came from Section Strength Report MCB-1080/1, which was provided by the Food Service Office at MCB 29 Palms.

HEADQUARTERS
CENTRAL COMMAND

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD-314

