EXTRACTED VERSION

4950th TEST GROUP (N) FINAL REPORT OPERATION PLUMBBOB

20 November 1957

AIR FORCE SPECIAL WEAPONS CENTER
KIRTLAND AFB, NEW MEXICO

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Director
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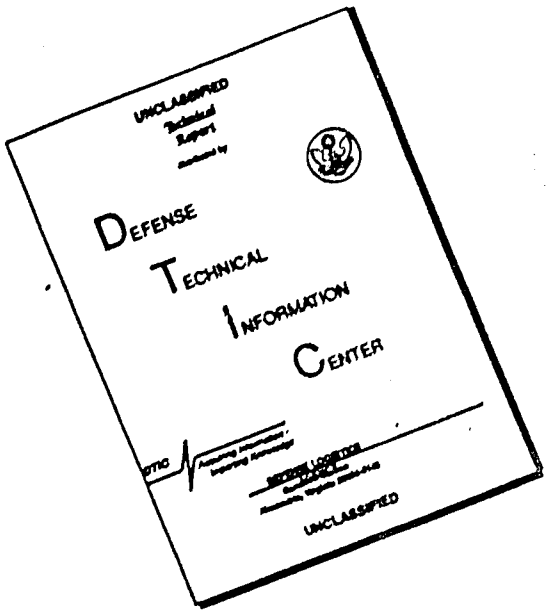

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UNCLASSIFIED

FOREWORD

This report has had classified material removed in order to make the information available on an unclassified, open publication basis, to any interested parties. This effort to declassify this report has been accomplished specifically to support the Department of Defense Nuclear Test Personnel Review (NTPR) Program. The objective is to facilitate studies of the low levels of radiation received by some individuals during the atmospheric nuclear test program by making as much information as possible available to all interested parties.

The material which has been deleted is all currently classified as Restricted Data or Formerly Restricted Data under the provision of the Atomic Energy Act of 1954, (as amended) or is National Security Information.

This report has been reproduced directly from available copies of the original material. The locations from which material has been deleted is generally obvious by the spacings and "holes" in the text. Thus the context of the material deleted is identified to assist the reader in the determination of whether the deleted information is germane to his study.

It is the belief of the individuals who have participated in preparing this report by deleting the classified material and of the Defense Nuclear Agency that the report accurately portrays the contents of the original and that the deleted material is of little or no significance to studies into the amounts or types of radiation received by any individuals during the atmospheric nuclear test program.

PREFACE

The task of planning and implementing United States Air Force participation in nuclear tests is a responsibility of the Air Force Special Weapons Center. Thus in late 1956, the 4950th Test Group (Nuclear) was activated to provide a permanent organization for carrying out those responsibilities.

This report is an attempt, in as few words as possible, to record the accomplishments and the problems of the 4950th Test Group in support of Operation PLUMBBOB, the 1957 continental nuclear test. Additional information on the role of this Group and of the other Special Weapons Center agencies that participated may be found in the unit histories.

I should like to express my deepest appreciation to all those persons, within and without the Group, who made air support of PLUMBBOB such a success.

PAUL R. WIGHALL
Colonel, USAF
Commander

Headquarters
AIR FORCE SPECIAL WEAPONS CENTER
Air Research and Development Command
United States Air Force
Kirtland Air Force Base, New Mexico

Office of the Commander 28 October 1957

Commander
4950th Test Group (Nuclear)
Kirtland AFB, New Mexico

It is a pleasure to forward this expression of appreciation for your work in "Operation PLUMBBOB". You and the members of the 4950th Test Group (Nuclear) under your command in "Operation PLUMBBOB" did a particularly fine job of providing the air support to an atomic test operation of major importance.

The efficiency of the accomplishment of your air tasks, and the quality of the results obtained, are a tribute to your leadership and reflect loyal support from individual participants in your organization. These accomplishments in turn operate to the credit of the Special Weapons Center and are a direct compliment both to this organization and to the Air Force.

I should like to add to the appreciation expressed by the Test Manager my personnel congratulations to you and to your fine organization. Will you convey my thanks and appreciation to those individuals who played such an important part in the accomplishment of the mission of this Center.

Sincerely,

/s/ W. M. Canterbury
/t/ W. M. CANTERBURY
Major General, USAF
Commander

1 Incl
Ltr fr Office of
Test Mgr dt 21 Oct 57

Attachment #1

P. O. Box 5400
Albuquerque, New Mexico

TM:JER

21 October 1957

Brigadier General W. M. Canterbury
Commander
Air Force Special Weapons Center
Kirtland Air Force Base, New Mexico

Dear Sir:

My sincere appreciation for the excellent services of the fine members of your staff who participated in "Operation Plumbbob".

The very commendable services of Colonel Paul R. Wignall and his support staff and the officers and men who furnished our air support and other technical functions were indeed vital to the successful and safe attainment of our test objectives. The AOC staff in particular performed exceptional service.

The 1957 nuclear weapons test series was both difficult and arduous. The extended length of the operation and long hours placed continuing demands upon your staff assigned to the Nevada Test Organization. Their response to these demands was admirable. I particularly appreciate the patience and skill demonstrated in the conduct of the operation, requiring long periods away from families and added hours on the job.

Although the contribution of any one member may have been greater than another in terms of their respective backgrounds, certainly there was little difference in the zeal and enthusiasm each brought to the Test Organization. The officers and men representing your command indeed warranted the expressed commendation and appreciation of the entire Nevada Test Organization. I would be grateful if this expression of my personal appreciation and that of the staff of the Nevada Test Organization were conveyed to those who served so commendably in "Operation Plumbbob".

Sincerely yours,

James E. Reeves, Test Manager
Nevada Test Organization

Attachment #2

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PART I

COMMAND

GENERAL:

1. Mission: The mission of the 4950th Test Group (Nuclear) for the period of this report was to plan and accomplish those aspects of Operation PLUMBBOB for which the Air Force Special Weapons Center (AFSWC) was responsible. Some of these responsibilities were: the exercise of operational control over aircraft participating in or supporting test programs; collection of particulate and gaseous samples from nuclear detonations; providing support for participating organizations aircraft through the 4935th Air Base Squadron, Indian Springs AFB and satisfying the air support requirements of the Test Organization at the Nevada Test Site (NTS).

2. 4950th Test Group Participation: The 4950th Test Group performed the following tasks in connection with Operation PLUMBBOB:

a. Headquarters 4950th Test Group normally stationed at Kirtland Air Force Base, New Mexico, was responsible for planning the air operations for Operation PLUMBBOB. Additionally it was given project responsibility for planning and carrying out the MB-1 project. During the on-site phase its staff provided command supervision for the Test Manager.

b. The 4926th Test Squadron (Sampling), normally stationed at Kirtland Air Force Base, New Mexico, performed the cloud sampling missions of PLUMBBOB. The Squadron transferred its aircraft and most of its personnel to Indian Springs Air Force Base, from which it staged the sampling missions of PLUMBBOB. Additionally, its personnel formed the nucleus of the Test Aircraft Unit headquarters. The Test Aircraft Unit exercised local operational control of those test organizations operating from Indian Springs AFB.

c. The 4935th Air Base Squadron, located at Indian Springs Air Force Base, Nevada, operated the air base and provided support to test and test support organizations and aircraft at their base during the buildup, operational and roll-up phases of PLUMBBOB.

d. The 4952nd Support Squadron provided augmentation personnel to Group Headquarters and the 4935th Air Base Squadron during the buildup, operational, and roll-up phases of PLUMBBOB.

3. Test Organization:

a. The responsibility for operational control of the test and support aircraft participating in Operation PLUMBBOB was vested in the Air Support Group (see attached organizational charts); its commander reported directly to the Test Manager, Mr. James E. Reeves. The Air Support Group Headquarters was in Command Post Building 1 at the Nevada Test Site and was organized into a command, operations and air operations center sections. Because of the extended duration of the test, an arrangement was made whereby manning of these sections could be accomplished by rotating personnel between the Nevada Test Site and the home base of the Group at Kirtland Air Force Base. The Operations section received

requirements for air support directly from the Test Director's Staff where they had been screened for priority. These requirements were reviewed by the Operations section and, when approved for operational feasibility, were passed to the proper agency for execution. This section also was responsible for coordinating all flight operations over the test site to insure that proper altitude and space separation was maintained, that conflicting requirements were resolved and that the supporting safety and rescue facilities were in operation. The Air Operations Center manned and operated the AN/USQ-12 air control system equipment which was used to provide a means of monitoring the flight path and communicating with the aircraft operating over the test site.

b. The majority of test and support aircraft operated from Indian Springs AFB. Command supervision of the organizations operating from this base was exercised by a Deputy Commander of the 4950th Test Group, Colonel Carl A. Ousley. He was responsible for supervising the activities of the 4935th Air Base Squadron and the Test Aircraft Unit. The 4935th Air Base Squadron provided billeting, work space, supply support, and limited personnel and maintenance support to the various organizations deployed to Indian Springs AFB to participate in the test. Its assigned aircraft were used to fly security sweeps, special support missions and to provide proficiency flying for the personnel attached for that purpose. The Test Aircraft Unit Headquarters was manned by personnel of the 4926th Test Squadron (Sampling). It was responsible for the operational control of all organizations and aircraft not permanently assigned at Indian Springs. Control of these units was effected by aircrew briefings, publishing of mission execution charts, scheduling of flying activities, monitoring personnel radiation exposures, operating fixed and mobile ground UHF radio equipment, and maintenance of a 24-hour Operations section which kept all Test Aircraft Unit elements informed of pertinent shot schedules. The 4926th Test Squadron (Sampling) deployed the majority of their personnel to Indian Springs AFB to accomplish the required cloud sampling, personal dosimetery and aircraft decontamination. During the test, pilots from the Strategic Air Command and the Air National Guard were indoctrinated the cloud sampling techniques. A Rear Echelon of the 4926th Test Squadron accomplished major maintenance and inspections of the Squadron's aircraft at Kirtland Air Force Base.

c. The Rear Echelon of the 4950th Test Group was responsible for the coordination of all operations in support of the test which were accomplished from Kirtland Air Force Base. This included passing schedule information, scheduling and briefing cloud tracker crews and monitoring the support being provided by the 4900th Air Base Group.

d. Many organizations participating in Operation PLUMBBOB operated from their home stations. Coordination of the activities of these units were accomplished by the Air Support Group. Among the agencies which participated in such operations and training projects were Tactical Air Command, Strategic Air Command, Air Training Command, Air National Guard and several Navy and Marine units.

e. Although the Air Support Group was not responsible for helicopter and liaison aircraft operations in connection with Army and Marine troop maneauvers, it was responsible for insuring that such operations were compatible to the test and test support missions.

4. Test Operations:

a. The organizational structure and the resources provided to the Air Support Group proved adequate to accomplish its intended purposes. Following this section of the report are letters received from the Test Manager and the Commander, AFSWC which expresses their opinions of the success' which was achieved by the Air Support Group in the performance of its mission. The procedure which required test participants to submit air support requirements through an Air Force officer assigned to the Test Director's staff proved to be advantageous. By this means any conflicts which arose in the use of the limited number of support aircraft were resolved by an individual in the best position to determine relative priority. Fortunately few such conflicts arose. The system also provided a means to insure that civilian test participants were properly authorized to fly in military aircraft.

b. The Air Operations Center functioned in an efficient manner throughout the test. In addition to controlling test and support aircraft over the site, it rendered valuable aid in the case of two aircraft crashes just outside the test site.

c. Fortunately the manning status of the 4950th Test Group permitted the assignment of a senior staff officer to Indian Springs to coordinate the activities of the Test Aircraft Unit and the 4935th Air Base Squadron. This capability insured that there was proper coordination between the needs of the test organizations and the resources of the base squadron providing the support.

d. Basing of certain units at Kirtland Air Force Base proved sound. By this means it was possible to apply the limited resources available at Indian Springs Air Force Base to the needs of those units which had to be assigned there for operational reasons. As a result of this procedure and the very diligent work on the part of the 4935th Air Base Squadron personnel, the support rendered at Indian Springs reached a new high in effectiveness.

e. Control of the units participating on an operational and training status was entirely adequate. All such units were requested to provide the 4950th Test Group with copies of their Operation Plans and the aircrew briefings to be used during the test. By this means most of the conflicts or misunderstandings which one might otherwise expect were prevented. In the case of Strategic Air Command, because of their close timing requirements it was requested that a Liaison Officer be on duty with the Air Support Group. This arrangement was mutually beneficial and it is recommended that any organization with stringent timing or positioning problems should have such a liaison officer on-site.

f. The effectiveness of the planning, the operational procedures and the flying safety measures is best illustrated by the fact that over 90% of the scheduled test missions were flown "as planned." Of the relatively few "aborts" the majority were due to failures of precise positioning equipment(not under the control of the Air Support Group) or malfunctions or aircraft or experimental equipment which could not be foreseen. There were few, if any, instances where such aborts were due to a malfunction of the Air Operations Center equipment or a lack of Base Supply support.

PART II

PERSONNEL

S.N. HAB:

1. Responsibility for personnel administration for Operation PLUMBBOB rested primarily with the Commander, 4950th Test Group (N). Personnel planning, procurement, and coordination with other participating organizations are included in the functions performed by the 4950th. The 4935th Air Base Squadron was responsible for assignment and administration of its own personnel and those of the 4952nd Support Squadron TDY at Indian Springs Air Force Base. In addition, the 4935th Air Base Squadron was responsible for handling pay matters for all airmen on duty at Indian Springs and processing of per diem and travel vouchers for all personnel located at Indian Springs.

2. The greatest problem at Indian Springs Air Force Base during operation PLUMBBOB was not enough people were available soon enough. Augmentation of the 4935th Air Base Squadron ran far behind scheduled arrival dates. Several skill areas, never reached needed manning levels. Other problems involved maintenance of personnel records, pay and per diem matters, and the loss of personnel during the test period.

3. Of all base functions at Indian Springs Air Force Base, only Base Supply received augmentation personnel in good time. In fact, Base Supply personnel arrived early, and for a short period the POL Section was overmanned. This was a result of early plans to PCS all personnel to Indian Springs Air Force Base. Base Supply personnel were already committed to travel before plans were changed to assign augmentation personnel TDY to Indian Springs Air Force Base. Other functions suffered from the late arrival of augmentation personnel, particularly IEO and Motor Vehicle Maintenance.

4. The reorganization which resulted in the activation of the 4950th Test Group (N) in the fall of 1956, the postponement of test starting date, and the decision that augmentation of the 4935th Air Base Squadron would be on a TDY basis, with augmentation personnel assigned to the 4952nd Support Squadron, all accentuated the personnel problems encountered during Operation PLUMBBOB.

PART III

SECURITY

GENERAL:

1. The mission of the security section, Headquarters, 4950th Test Group (Nuclear) for continental test operations is to plan for, establish and direct an effective Security Program necessary to accomplish the mission of this organization during the Continental Nuclear Tests. Provide guidance to Group units on security matters and related subjects. Obtain and disseminate, to all participating activities, security criteria published by Field Command Weapons Effects Tests division, Sandia Base, New Mexico as required by pertinent Atomic Energy Commission - Department of Defense directives.

2. The success of the 4950th Test Group (Nuclear) security mission is attested by the fact that no security violations or compromises occurred involving the Headquarters or any of its units, either at Kirtland AFB, New Mexico, Indian Springs AFB, Nevada or the Atomic Energy Commission's Nevada Test Site, Mercury, Nevada.

3. Security criteria made available during the planning stages of Operation PLUMBBOB were furnished all units. Guidance, in the form of directives, letters and teletype messages, was designed to provide maximum security for participating activities, yet not overload them with unnecessary security requirements.

4. Personal contact among the security offices of Field Command, Weapons Effects Test, Sandia Base, New Mexico, Albuquerque Operations Office of the Atomic Energy Commission, Provost Marshal, Air Force Special Weapons Center, 4935th Air Base Squadron Provost Marshal and Headquarters 4950th Test Group (Nuclear) aided materially in the maintenance of a well coordinated security program.

5. The decision of Colonel Wignall to operate Indian Springs Air Force Base during PLUMBBOB as an open installation, rather than as a restricted base, as was done during previous test operations, proved beneficial to the security program from personnel, financial and practical standpoints. Physical controls established by the Provost Marshal, Indian Springs Air Force Base, Nevada provided adequate security of the installation without incident. These and many other security duties performed by the 4935th Air Base Squadron Provost Marshal played a large part in the overall security mission and contributed greatly to its success.

6. Above all, the attitude of each individual to assume personally his security responsibilities and willingness to work as a team for a common goal, led to the ultimate high degree of security during Operation PLUMBBOB.

7. In summary, there were no real problem areas in the field of security. Routine problems were corrected with little or no difficulty.

8. It is recommended that the same or similar policies, as stated in the Security Annex to the 4950th Test Group (Nuclear) Operations Plan 1-57, be followed for any future Continental Nuclear Tests.

PART IV

OPERATIONS

GENERAL:

1. The activities of the Operations portion of PLUMBBOB fell within the following general categories:

a. Air Operations Center (AOC) Operations, included the control of all aircraft within the Nevada Test Site throughout the Operation and the control of test array aircraft on shot days. This was accomplished through use of a split utilization of the Operations Directorate personnel of the 4950th Test Group (Nuclear), Kirtland Air Force Base. Those present at the Nevada Test Site together with the Commander, 4950th Test Group (Nuclear) comprised the Air Support Group under the Test Manager, Atomic Energy Commission. Approximately every two weeks these personnel rotated with those remaining at Kirtland Air Force Base.

b. Indian Springs Air Force Base had, during the peak period, 46 aircraft of 16 types performing test and support missions. During June there were 2,756 landings and take-offs completed on a total of 647 local and 563 Military Flight Clearances.

c. Test aircraft missions included aircraft associated with scientific projects. These projects included the Naval Air Special Weapons Facility (NASWF) A3D, HSS-1, and FJ4 aircraft; the two (2) Wright Air Development Center (WADC) F-89 projects, and the Air Force Special Weapons Center (AFSWC) sponsored MB-1 delivery project.

d. Air Support missions, provided services to the organizations engaged in the Operation. This included the L-20 security sweep mission, helicopter support missions provided by the 21st Helicopter Squadron (Det 1), Tactical Air Command (TAC), cloud tracker aircraft operating from Indian Springs Air Force Base and Kirtland Air Force Base, Documentary Photography, the daily shuttle between Kirtland Air Force Base and Indian Springs Air Force Base, sampling and sample return missions.

e. Flying Safety, which is an activity of importance for all.

f. Communications, which included the fixed AEC communications, handwire communications, hot line circuits, teletype and radio communications and electronics necessary for aircraft control.

2. Planning for PLUMBBOB officially began with the activation of the 4950th Test Group (Nuclear) on 1 September 1956. The main effort in the Operations planning was directed toward producing guide lines for the participating organizations. Two major documents produced were the Planning Directive in November 1956 and the 4950th Test Group (Nuclear) Operations Plan 1-57 in April 1957. A detailed training section of the Operations Plan spelled out positioning criteria for participating units. The participating elements, as a result, were generally well trained prior to active participation. A total of

1237 practice missions were performed under AOC control by air participants throughout PLUMBBOB. The success of this program was reflected in the perfect flying safety record of all test, Operations and Training, and support aircraft under Air Support Group direction. The only mar to the flying safety record was an accident involving an Army helicopter operating from Camp Desert Rock on a troop movement exercise.

3. Throughout the test series, mission execution proceeded with only minor difficulties. 90 percent of effects aircraft scheduled made good their H-Hour position. Of the 7 aborts of effects aircraft, 4 were due to M-33 radar failure over which the Air Support Group had no control. Contribution to the success of these missions was the strict adherence to the Mission Execution Chart prepared by the Test Aircraft Unit, Indian Springs Air Force Base.

4. During PLUMBBOB the first airborne launch of a live air-to-air MB-1 rocket was accomplished. This project was AFSWC-sponsored with an Air Defense Command (ADC) aircrew delivering the live device.

5. Air Support missions varied from the daily Kirtland Air Force Base - Indian Springs Air Force Base shuttle by C-119 later replaced by C-123 aircraft to the short H-2k and K-20 intra-NTS hops.

6. The 4900th Air Base Group, Kirtland Air Force Base provided air support for PLUMBBOB by:

a. Providing aircraft for a daily shuttle service between Kirtland Air Force Base and Indian Springs Air Force Base.

b. Providing aircraft for sample return.

c. Providing aircraft for low altitude cloud tracking.

d. Providing aircraft for special missions.

7. The aircraft required to support the above missions were provided by various Major Commands and were from bases all over the United States. The aircraft supporting the shuttle service were four (4) C-119's, replaced by four (4) C-123's during the latter part of the operation, from Tactical Air Command (TAC). Four (4) C-47's for sample return were provided by Air Materiel Command (AMC), Air Defense Command (ADC), Tactical Air Command (TAC), Strategic Air Command (SAC) and Air Training Command (ATC) on a rotational basis. The ATC also furnished two (2) B-25's for low altitude cloud tracking.

8. One (1) B-29 and one (1) B-50 aircraft from Wright Air Development Center (WADC) and Air Force Cambridge Research Center (AFCRC) respectively, and staging from Kirtland Air Force Base, were used as

high altitude cloud trackers on all major events. The schedule for these aircraft was coordinated by the AOC and the 4950th Test Group (Nuclear) (Rear). Rapid communication between these agencies was necessary so that shot status changes could be transmitted. The "hot line" telephone from Kirtland Air Force Base to Camp Mercury, Nevada, proved very effective for this purpose.

9. The B-57 and F-84 sampling aircraft of the 4926th Test Squadron (Sampling) participated on all shots and flew a total of 161 sampling sorties.

10. The 4935th Air Base Squadron, Indian Springs Air Force Base, was most active in the air support mission. In addition to providing overall base support and airfield operations, 721 hours of proficiency flying (CRT) for approximately 30 pilots and navigators assigned to various test organizations were provided. This time was provided in C-45 and B-25 aircraft. The L-20 aircraft of the 4935th Air Base Squadron were active in the performance of security patrols and other AEC test support missions.

11. Much emphasis was placed on Flying Safety as aircraft came from different organizations and areas. The aspects of flying near atomic bursts, night take-off from an airfield surrounded by rugged terrain, and precision flying were continuously stressed. Though seldom used, the MA-1 barrier and the Navy Cross-Deck Pendant provided a boost to pilot morale in view of the relatively short and rough runways at Indian Springs Air Force Base.

12. Communications were entirely adequate and generally reliable. Special communications facilities provided by the USAF were:

a. Telephone

(1) A leased telephone circuit between Mercury and Kirtland AFB. This line was provided to control dispatch of aircraft staging out of Kirtland Air Force Base. As it was used to maximum extent by all agencies, a priority system was instituted early in Test Series which insured that Air Support Group Operational messages regarding aircraft schedules and shot status received top priority. Access to the line was also provided to Indian Springs AFB and Sandia Base.

(2) Three dial trunk lines between Mercury and Indian Springs AFB.

(3) A "hot line" connecting the AOC, Air Support Group (ASG) Operations, ISAFB Operations and the Test Aircraft Unit.

(4) Three tie lines between ISAFB and Nellis AFB for flight clearances and operational traffic.

(5) Hot lines connecting the AOC, MSQ-1 and M-33 radar control units.

(6) Hot lines connecting the AOC, helicopter pad #2 and Yucca air strip.

(7) Hot line connecting the AOC and Rad-Safe on-site operations.

b. Teletype

(1) M-19 TWX equipment connecting the 4950th Test Group Headquarters and Indian Springs AFB. The equipment at 4950th Headquarters at Kirtland AFB was not used to any great extent and was withdrawn in August.

(2) Weather teletype on the CAA circuit and weather facsimile service at Indian Springs AFB operations.

c. Radio

(1) Twelve channels UHF, four channels VHF and 4 HF channels in the AOC to provide air control facilities and point to point communications with Kirtland AFB.

(2) The crash/fire truck in the forward area had VHF-FM equipment channelized on the DOD net.

(3) The automobile assigned to the Air Support Group Commander was also equipped with VHF-FM on the DOD net.

d. Special Navigation Aids

(1) Low Frequency Homing beacons were installed at Lathrop Wells and at the North end of Yucca Flat.

(2) TACAN was installed and used by Navy and Marine Air units.

e. Control System

(1) AN/USQ-12 aircraft control system was used for primary control of participating aircraft.

(2) Three MSQ-1A radar sets used for positioning USAF effects aircraft.

(3) Three M-33 radar used to position Navy effects aircraft.

PART V

MATERIEL

GENERAL:

1. Upon the return of the Materiel staff from Eniwetok in August and September 1956, most personnel were granted annual leave. At this time the test operation experience level of the Materiel staff was seriously reduced by the transfer of the Supply Staff Officer, the Aircraft Maintenance Staff Officer, and the Transportation Staff Officer to other organizations on Kirtland Air Force Base. Of the Airmen with test experience only four (4) remained assigned to the Directorate of Materiel.

2. Throughout the period September 1956 through July 1957 difficulty was encountered in securing replacements, both officer and airmen. A new Aircraft Maintenance Staff Officer was assigned in November 1956, a Staff Transportation Officer was assigned in May 1957, and a Staff Supply Officer was assigned in July 1957. None of these officers had had previous test operation experience.

3. The assignment of replacement airmen was accomplished in a more timely manner than the replacement program for officers. This was extremely fortunate inasmuch as it was necessary to use NCOs as Group Staff Officers.

4. During the months of October 1956 through February 1957 requirements lists were received from the various elements scheduled to participate in PLUMBBOB. Although tentative requirements lists were received monthly throughout this period, it was not until January and February 1957 that action could be taken to consolidate requirements and forward them to Indian Springs Air Force Base for action.

5. In spite of the late submission, and revision of requirements lists, through the wholehearted support of the 4935th Air Base Squadron and AMC depots, all commitments were met in time to satisfy operational requirements.

PART VI

COMPTROLLER

GENERAL:

1. The Comptroller Section had no major problems arise during Operation PLUMBBOB. This was due to pre-operation planning by all participating organizations and the excellent cooperation which was received from these organizations during the operation.

2. Planning was aided by the experience of other personnel with previous tests, and to some extent, by miscellaneous information on previous operations available in the Comptroller Section files.

3. Fortunately all personnel but one assigned to this Section had previous assignments at Kirtland Air Force Base within the Comptroller organization there. This helped greatly in obtaining a smooth-running operation because personnel at each end were familiar with the personnel they were dealing with. The "hot line" between Indian Springs Air Force Base and Kirtland Air Force Base was a very valuable tool and was used almost daily. This saved writing many, many letters and gave rapid answers and decisions on individual questions and problem areas as they arose. The daily shuttle was also utilized exclusively for transmitting all written communications to organizations on Kirtland.

4. The majority of those problems which did arise during the test involved funding responsibilities and were readily revolved. These included the TDY payment of photographic personnel from Orlando Air Force Base, the procurement of "Project Genie" items from Ogden Air Force Depot, Utah, cross-servicing agreements between Army, Navy, Marine, and AEC organizations in the ground POL and messing areas, and fund citations for the movement of test vehicles and equipment during and after the operation.

5. No augmentation personnel were authorized the Comptroller Section for the operation even though the workload increased greatly. This section is also responsible for the operation of the base Education and Air Force Aid functions. The number of personnel helped by Air Force Aid during the operation was more than double the number aided during an interim period of equal length. Many TDY personnel were helped. Enrollment in ECI and USAFI courses also increased during test period. This section would have been better able to give educational assistance if the educational specialist position which this base is authorized had been filled. However, the Education function is of less importance during the test operation period than during the interim period because assigned and TDY personnel are more apt to be working extra hours and irregular shifts during test periods and have little time for off-duty education.

6. In summary, important factors in this operation and in planning future operations from the operational viewpoint of this section should include the following:

a. Assignment of personnel with previous experience working within the comptroller organization at Kirtland.

b. Knowledge of personnel dealt with at Kirtland, Nellis, and Mercury and command operational policies and procedures.

c. A sufficient period of overlap training for key personnel at the time of reassignment to allow for a thorough briefing and familiarization in all facets of the section's operations. For the CIC this should be a minimum of two weeks and longer if possible.

d. Thorough planning in budget and financial plan preparations to cover funding needs for all phases of the operation. Areas which should receive especially careful planning include TDY, POL (aviation and ground), commercial transportation, and petty cash and blanket purchases requirements.

e. Thorough familiarization with all operations plans to know how many and which organizations are participating in the operation, their missions and the number of their personnel. This information is necessary to plan adequate support requirements in such areas as finance (support from Nellis Air Force Base should be requested and monitored during planning), accounting, especially appropriation accounting, non-appropriated funds (an accurage daily average strength from the morning report is essential), and statistical reporting. Any reports required only for the test period must be anticipated in advance and coordinated with all agencies concerned.

CHAPTER II

TABLE OF CONTENTS

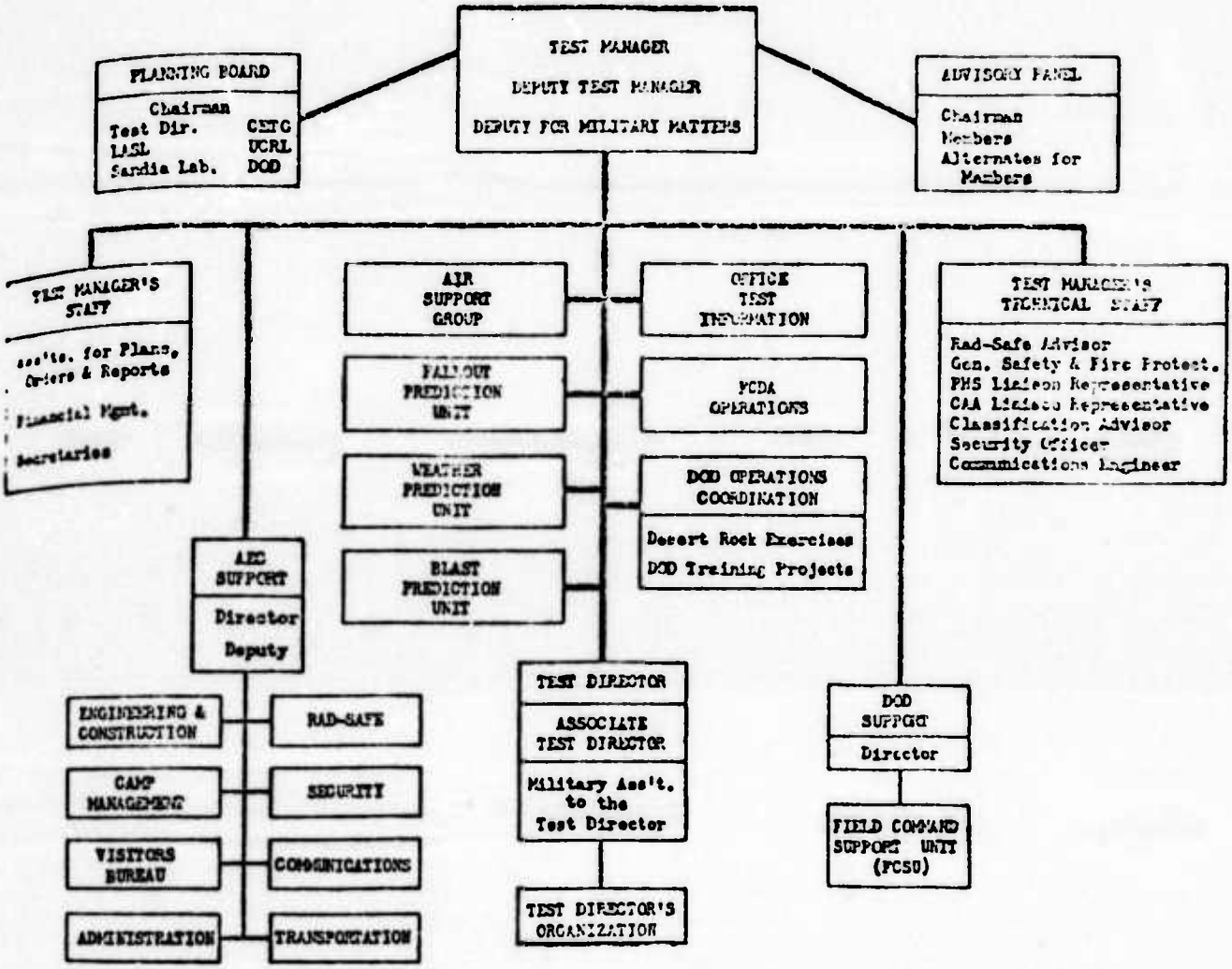
PARTICIPATING UNITS IN OPS PLUMBBOB

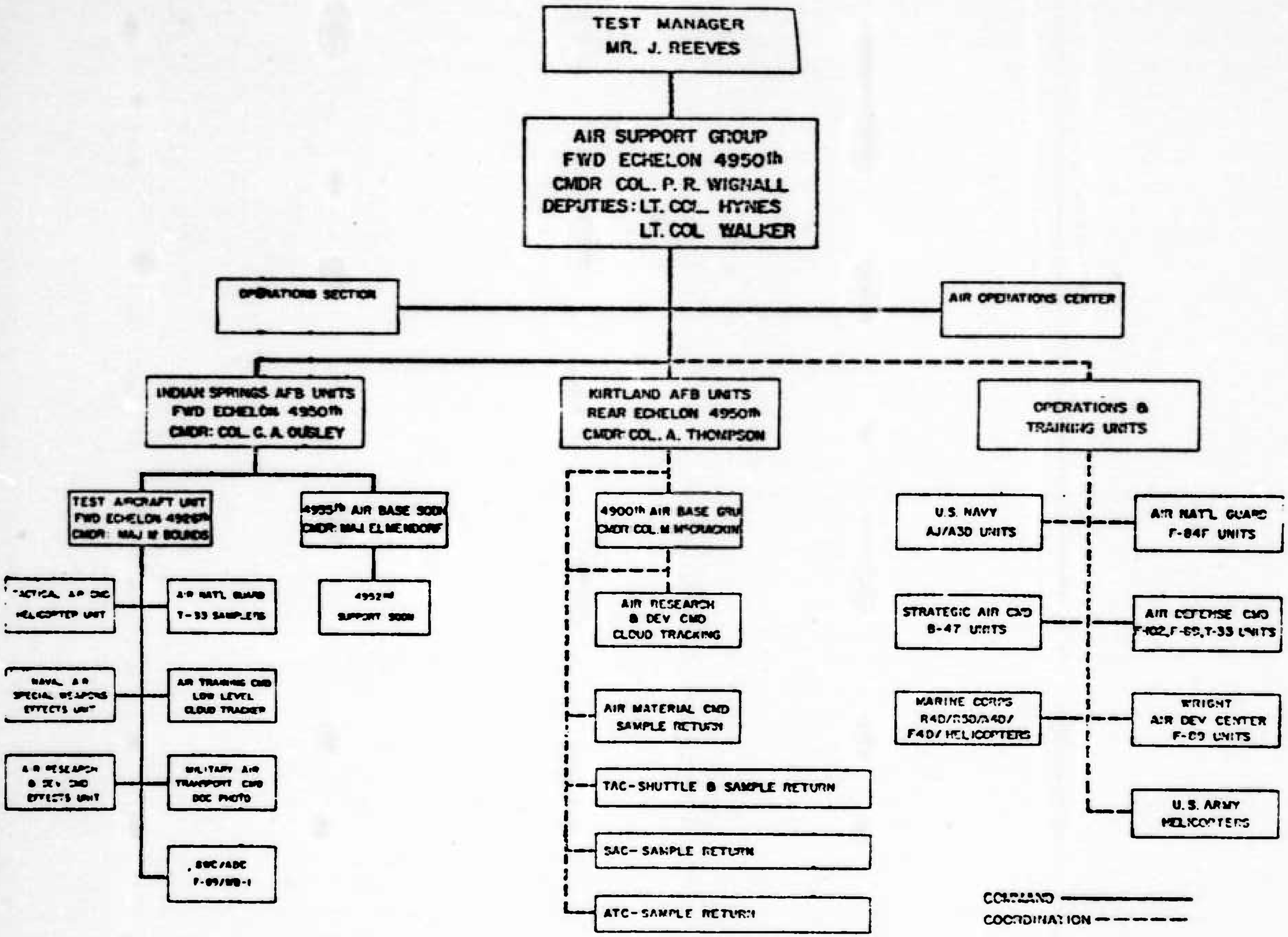
SAMPLE RETURN	
C-47 ARDC	1,6,10,12,15,20
C-47 CTAF/TTAF (ARC)	7,12,14
C-47 4th ADIV (SAC)	13
C-47, 4502nd SUP SQ (TAC)	18
CLOUD TRACKERS	
B-25, CTAF/TTAF (ARC)	7,12,14
B-29, WADC (ARDC)	15
B-50, AFCRC (ARDC)	16
SAMPLE RECOVERY-DAMAGE SURVEY RAD SAFE SURVEY	
H-21, 31st HELICOPTER SQ (TAC)	17
SHUTTLE AIRCRAFT	
C-119/C-123, 463rd TRP CARR WG (TAC)	11
DOC PHOTO	
C-47, APCS (MATS)	19
SECURITY SWEEP	
L-20/C-45, 4935th ABS, AFSWC (ARDC)	5
RADIO RELAY	
C-47, SAC	13

BASES OF ORIGIN

1	McCLELLAN AFB, CALIF.	11	ARDMORE AFB, OKLA.
2	EL TORRO MCAS, CALIF.	12	RANDOLPH AFB, KELLY AFB, [illegible]
3	SAN DIEGO NAS, CALIF.	13	BARKSDALE AFB, LA.
4	MARCH AFB, CALIF.	14	GULF PORT, MISS.
5	INDIAN SPRINGS AFB, NEV.	15	WRIGHT PATTERSON AFB, OHIO
6	HILL AFB, UTAH.	16	L.G. HANSCOM FIELD, MASS
7	LOWRY AFB, COLO.	17	DONALDSON AFB, S.C.
8	ENT AFB, COLO.	18	SHAW AFB, S.C.
9	KIRTLAND AFB, N.M.	19	ORLANDO AFB, FLA.
10	TINKER AFB, OKLA.	20	OLMSTED AFB, PENN.

EFFECTS	
HSS-1 NASWF, USN	9
ZSG NASWF, USN	9
FJ-4 NASWF, USN	9
A4D NASWF, USN	9
F-89D FTSC (ARDC)	15
FLASH BLINDNESS	
C-47 SCH OF AV/MED	12
CLOUD SAMPLERS	
FB4/B-57, 4926th SAMPLING SQ AFSWC, ARDC	9
T-33, ANG-SAMPLING FROM, MONT.,	
N.Y., ILL., KY., OHIO, TEXAS, NEB., ORE.,	
MAINE, CALIF., COLO., DEL., WISC.	
O&T	
R4D/R5C, 3rd MARINE A/C WG	2
A4D/F8D, 3rd MARINE A/C WG	2
B-47, MARCH AFB (SAC)	4
F-89 (ARDC)	15
AJ/A3D HVY ATCK WG (USN)	3
T-33, ADC	
F-86, ADC	
F-89, ADC	
F-102, ADC	
F-94, ADC	

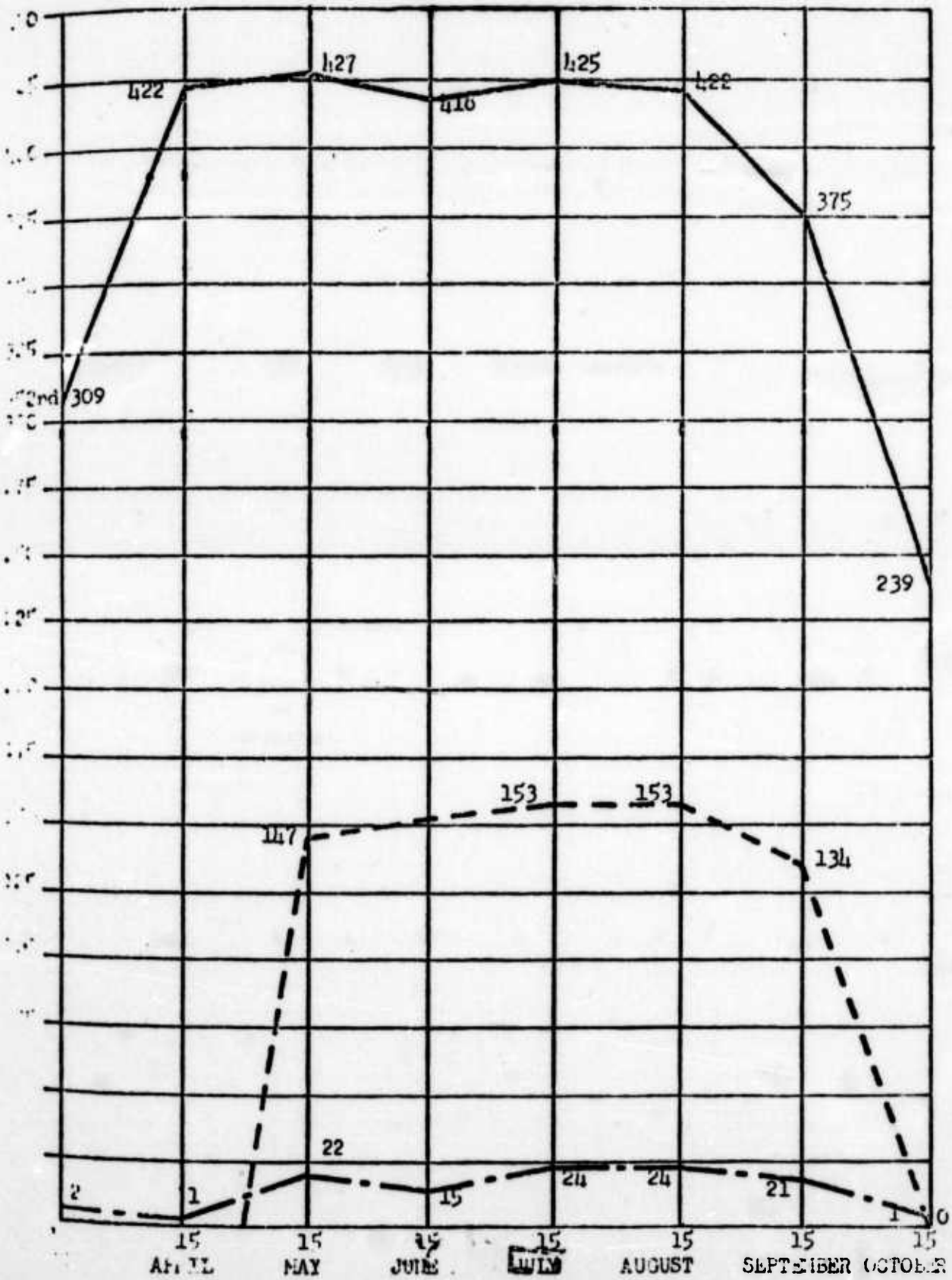

TEST MANAGER
DEPUTY TEST MANAGER
DEPUTY FOR MILITARY MATTERS
PLANNING BOARD
Chairman
Test Dir. CETG
LASL UCRL
Sandia Lab. DOD
ADVISORY PANEL
Chairman
Members
Alternates for Members
TEST MANAGER'S STAFF
Ass'ts. for Plans, Orders & Reports
Financial Mgmt.
Secretaries
AIR SUPPORT GROUP
FALLOUT PREDICTION UNIT
WEATHER PREDICTION UNIT
BLAST PREDICTION UNIT
OFFICE TEST INFORMATION
FCDA OPERATIONS
DOD OPERATIONS COORDINATION
Desert Rock Exercises
DOD Training Projects
TEST MANAGER'S TECHNICAL STAFF
Rad-Safe Advisor
Gen. Safety & Fire Protect.
PHS Liaison Representative
CAA Liaison Representative
Classification Advisor
Security Officer
Communications Engineer
AEC SUPPORT
Director
Deputy
ENGINEERING & CONSTRUCTION
CAMP MANAGEMENT
VISITORS BUREAU
ADMINISTRATION
RAD-SAFE
SECURITY
COMMUNICATIONS
TRANSPORTATION
TEST DIRECTOR
ASSOCIATE TEST DIRECTOR
Military Ass't. to the Test Director
TEST DIRECTOR'S ORGANIZATION
DOD SUPPORT
Director
FIELD COMMAND SUPPORT UNIT (FCSU)


TEST MANAGER
MR. J. REEVES
AIR SUPPORT GROUP
FWD ECHELON 4950th
CMDR COL. P. R. WIGNALL
DEPUTIES: LT. COL. HYNES
LT. COL WALKER
OPERATIONS SECTION
AIR OPERATIONS CENTER
INDIAN SPRINGS AFB UNITS
FWD ECHELON 4950th
CMDR: COL. C. A. OUSLEY
KIRTLAND AFB UNITS
REAR ECHELON 4950th
CMDR COL. A. THOMPSON
OPERATIONS & TRAINING UNITS
TEST AIRCRAFT UNIT
4935th AIR BASE SQDN
CMDR: MAJ ELMENDORF
4952nd SUPPORT SQDN
4900th AIR BASE GRU
AIR RESEARCH & DEV CMD
CLOUD TRACKING
AIR MATERIAL CMD
SAMPLE RETURN
TAC-SHUTTLE & SAMPLE RETURN
SAC-SAMPLE RETURN
ATC-SAMPLE RETURN
U.S. NAVY
AJ/A3D UNITS
AIR NAT'L GUARD
F-84F UNITS
STRATEGIC AIR CMD
B-47 UNITS
AIR DEFENSE CMD
MARINE CORPS
F4D/ HELICOPTERS
WRIGHT
AIR DEV CENTER
U.S. ARMY
HELICOPTERS
COMMAND
COORDINATION

PART II

PERSONNEL

4950TH TEST GROUP (T) PERSONNEL
BUILD-UP



PART III

OPERATIONS

CALENDAR OF EVENTS

MAY 1957

[illegible]	TUE	WED	THU	FRI	SAT
[illegible]		1	2	3	4
[illegible]	7	8	9	10	11
[illegible]	14	15	16	17 Boltzmann	18 B-1
[illegible]	21 [illegible]	22 B-1	23 B-2	24 B-1	25 B-[illegible]
[illegible]	28 [illegible] F-2	29 F-1	30 F-1	31 F-1	

JUNE 1957

SUN	MON	TUE	WED	THU	FRI	SAT
						1 F-1
2 Franklin	3 Lassen-2	4 L-1	5 Lassen	6	7	8
9	10 Wilson-2	11 W-3	12 W-2	13 W-1	14 W-1	15 W-2
16 W-2	17 W-1	18 Wilson	19	20	21	22 Priscilla-1
23 P-1	24 Priscilla	25	26 Diablo-2	27 D-1	28 D-P	29
30						

JULY 1957

[illegible]	TUE	WED	THU	FRI	SAT
[illegible]	2 Hood-2	3 H-2	4 H-1	5 Hood	6
[illegible]	9	10 Diablo-2	11 D-2	12 D-2	13 D-2
[illegible]	16 Owens-2	17 O-1	18 John-1	19 John	20 Owens-1
[illegible]	23 O-2 Kepler-1	24 Kepler O-1	25 Owens	26 Pascal-A	27 Shasta-2
[illegible]	30 S-2	31 S-2			

AUGUST 1957

SUN	MON	TUE	WED	THU	FRI	SAT
				1 S-2	2 S-2	3 S-2 / Stokes-1
4 S-2 / ST-2	5 S-2 / ST-2	6 S-2 / ST-1	7 S-2 / Stokes	8 S-2	9 S-2 / Saturn	10 S-2
11 S-2	12 S-1	13 S-1	14 S-2	15 S-2	16 S-1	17 S-1
18 Shasta / Doppler-1	19 D-2	20 D-2	21 D-2	22 D-1	23 Doppler	24
25	26	27 Pascal-B / Smoky-2	28 S-2	29 S-2 / Franklin-1	30 S-1 / Franklin Prime	31 Smoky

SEPTEMBER 1957

[illegible]	TUE	WED	TRU	FRI	SAT
[illegible]	3	4 Wheeler-2	5 Wheeler-1	6 Wheeler / Coulomb "A"	7 Laplace-1
[illegible]	10 Whitney-1	11 W-2 / Fizeau-2	12 W-2 / F-1	13 W-2 / F-1	14 W-2 / Fizeau
[illegible]	17 W-1 / Newton-2	18 W-2 / R-1	19 W-2 / Rainier	20 W-2	21 W-1
[illegible]	24 C-1	25 C-1	26 C-2	27 C-1	28 Charleston

OCTOBER 1957

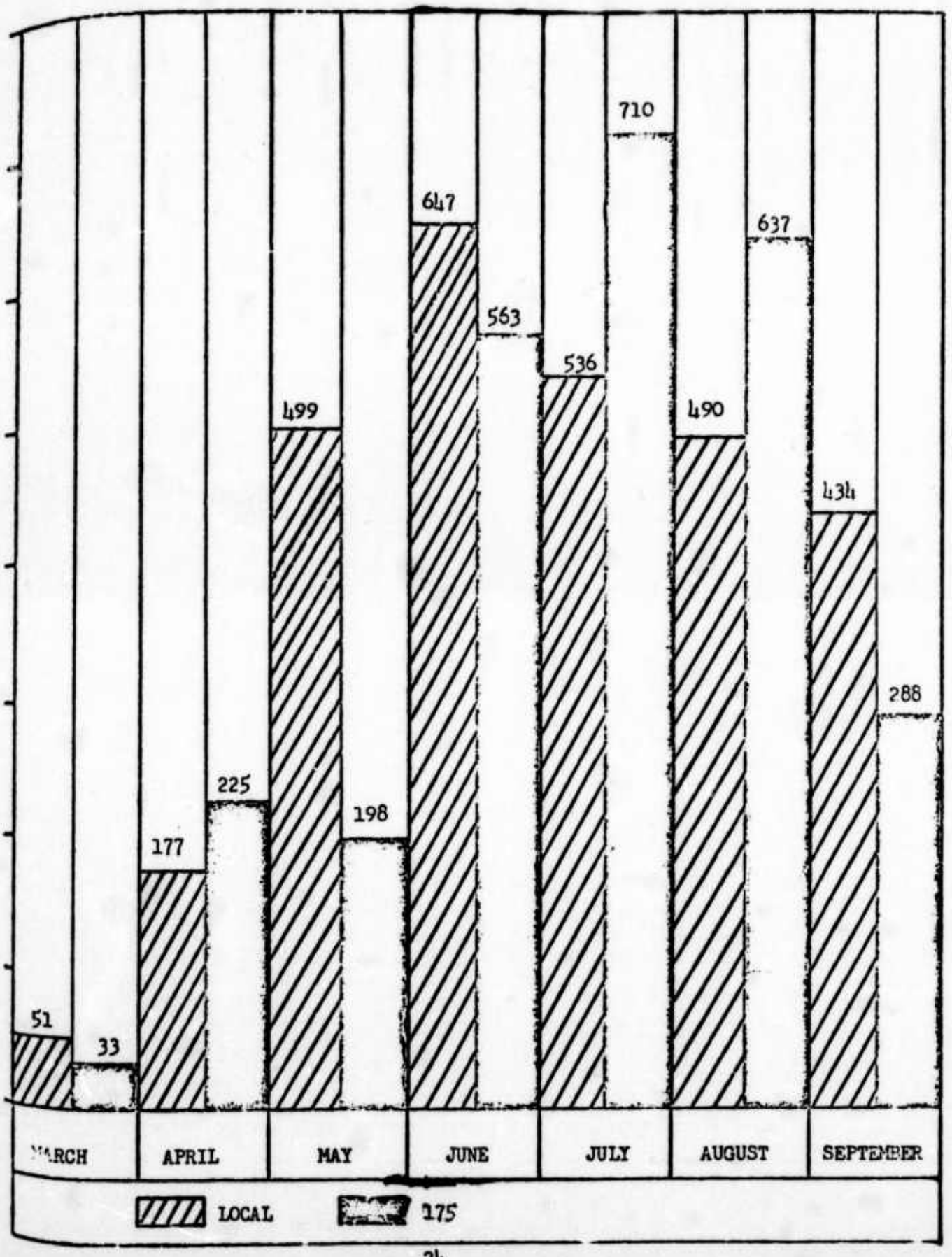
SUN	MON	TUE	WED	TRU	FRI	SAT
		1	2	3 Morgan-2	4 M-1	5 M-2
6 M-1	7 Morgan	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Aircraft Flying Time

Test Aircraft Unit	No. Acft	Av Mo Fly Time Per Acft	Total Fly Time Per Acft	Total Mission Time per Acft
Sampling & Docon				
L-17B	(6)	26	157	16
JT-6A	(11)	24	120	6
T-33	(2)	54	270	5
Navy Effects				
AJ1D	(2)	18	78	-
F9J4	(2)	23	101	-
F9F-1	(1)	38	171	-
AD5	(1)	58	261	-
AAC Effects				
F-89D	(2)	14	63	15
Gem-1 Project				
F-89J	(2)	22	43	2
Support Units				
Doc Photo				
RB-47	(1)	31	163	53
H-21	(8)	18	94	90
L-20	(2)	45	225	-
Cloud Tracker				
B-25	(2)	46	230	37
B-29	(1)	20	113[1]	113
B-50	(1)	21	117[1]	117
Sample Return				
C-47	(4)	31	185[1]	185
Shuttle				
C-119[2]	(4)	69	345	345
C-123[3]	(4)	128	256	256

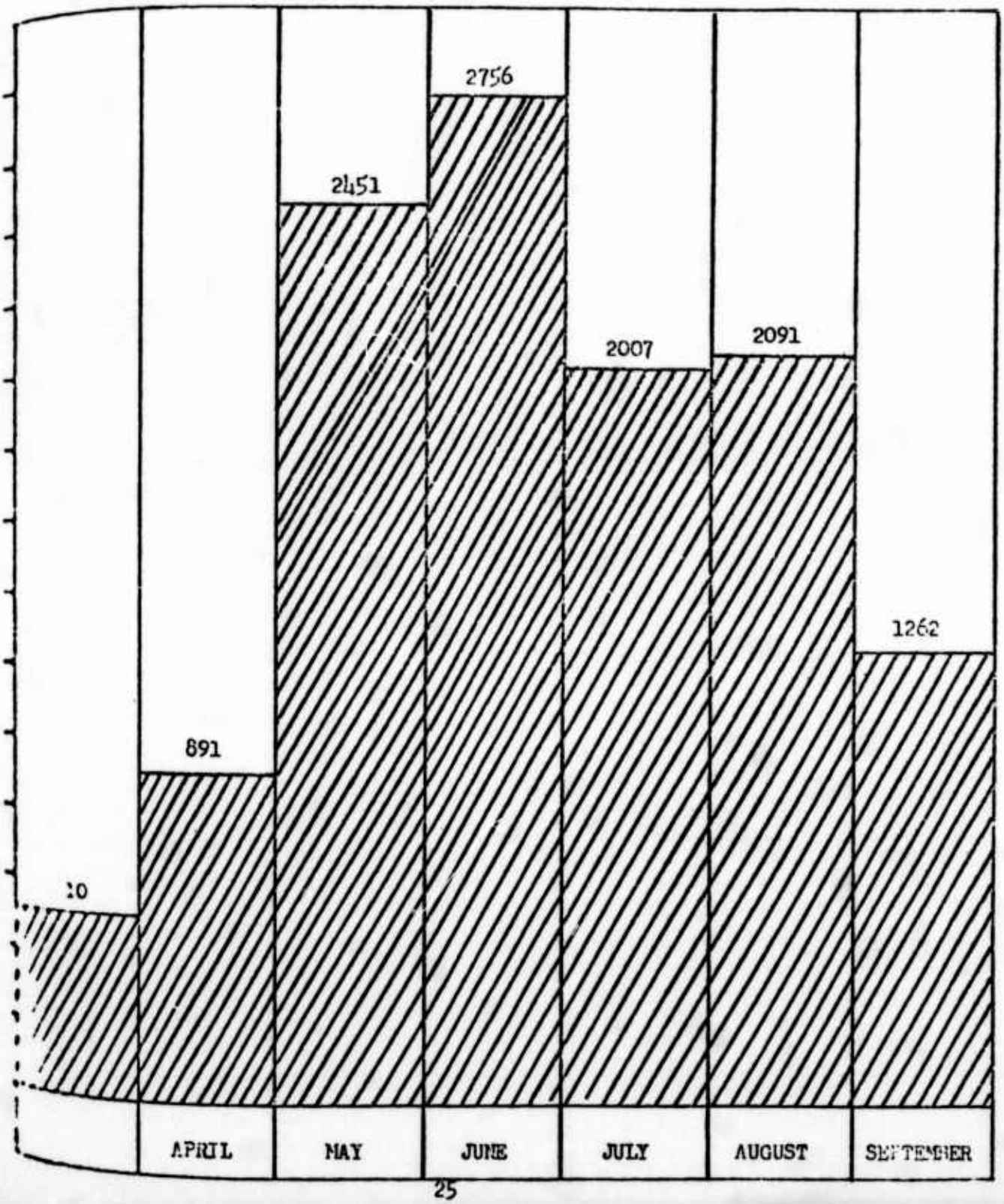
Note 1. Only mission time available.
Note 2. 15 April thru 30 August.
Note 3. 1 Sep thru 7 October.

MILITARY FLIGHT CLEARANCES, JSAFB



ISAFB AIRFIELD OPERATIONS 1957

TOTAL TAKE OFFS AND LANDINGS



AOC OPERATIONS

ALL FLIGHTS INTO NTS EXCLUDING AIRCRAFT SHOT PARTICIPATION

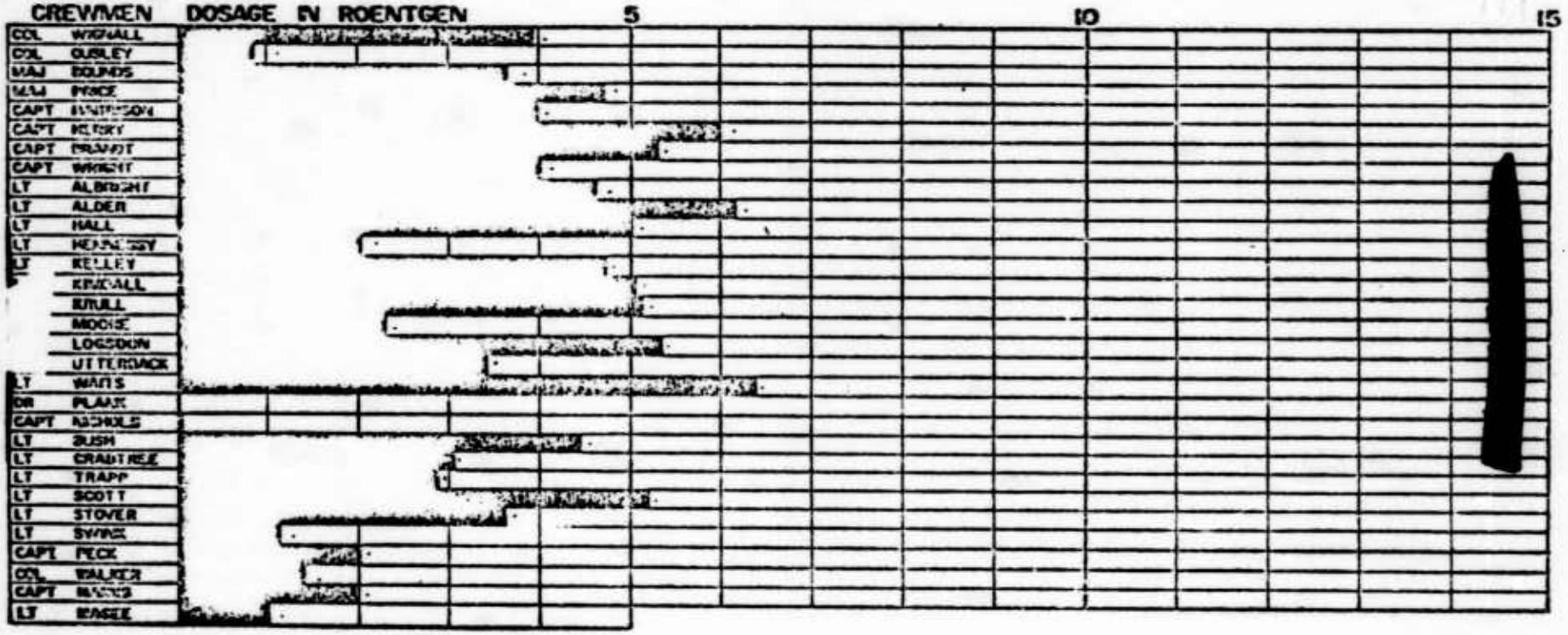
EFFECTS AIRCRAFT including all of Program 5 only.	378
OPERATIONS AND TRAINING including Program 9, Program 37 and Program 50 series aircraft.	859
SUPPORT MISSION AIRCRAFT including Samplers, Helicopters, security sweep, sample return and cloud trackers.	793
MISCELLANEOUS AIRCRAFT including E. G. & G. and CARCO transport, Watertown mission aircraft and other.	323
TOTAL	2353

PART III

SECTION A

TEST OPERATIONS

ACCUMULATIVE RADIATION DOSAGE TOTALS
SAMPLING AND DECON ELEMENT



EVENTS SCHEDULE

OPERATION PLUMBBOB

EVENT	DATE DETONATED	AIRCRAFT SCHEDULED	AIRCRAFT PARTICIPATED
BOLTZMAN	28 May 57	34	34
FRANKLIN	2 Jun 57	27	27
LASSEN	5 Jun 57	27	23
WILSON	18 Jun 57	39	35
PRISCILLA	24 Jun 57	45	40
COULOMB "A"	1 Jul 57	9	7
HOOD	5 Jul 57	130	124
DIABLO	15 Jul 57	49	43
JOHN	19 Jul 57	25	26
KEPLER	24 Jul 57	41	41
OWENS	25 Jul 57	28	28
PASCAL "A"	26 Jul 57	0	0
STOKES	7 Aug 57	33	29
SATURN	9 Aug 57	0	0
SHASTA	18 Aug 57	42	30
DOPPLER	23 Aug 57	38	26
PASCAL "B"	27 Aug 57	0	0
FRANKLIN PRIME	30 Aug 57	23	22
SMOKEY	31 Aug 57	87	84
GALILEO	2 Sep 57	22	22
WHEELER	6 Sep 57	21	15
COULOMB "B"	6 Sep 57	7	7

[illegible]PLACE	8 Sep 57	21	14
[illegible]IZEAU	14 Sep 57	25	23
[illegible]MTON	16 Sep 57	29	21
[illegible]NIER	19 Sep 57	8	8
[illegible]ITNEY	23 Sep 57	20	20
[illegible]NESTON	28 Sep 57	24	19
[illegible]AN	7 Oct 57	21	18

[illegible]o aircraft participation on these events.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: BOLTZMAN DATE: 28 MAY 57 H-HOUR: 0455

1. Aircraft scheduled: 34
2. Aircraft Participation: 34
3. Pre-take off cancellations: 0
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 16 (Indicate those out if any)
6. Total Effects Aircraft: 4 (Program 5 Aircraft)
7. Total O&T Aircraft: 8 (Program 50 Aircraft)
8. Total Support Aircraft: 22 (All Others)
9. Damaged Aircraft: 0 (All Others)
10. Total Shot Postponements: 12
11. Air Operations Center : Operated Normally

12. Communications: Some Communications difficulty. Back up equipment utilized. ADC and TAC ANG O&T Aircraft unable to receive countdown on guard channel. Countdown given by senior controller on another frequency.

13. Remarks: Ref Item 8: One F-86D O&T Aircraft recovered at ISAFB due to critical fuel. ANG T-33 sampler scheduled for participation returned to home station on 25 May. Inadequate altitude separation of commercial air traffic and high altitude cloud tracker over Good Springs Homer due to belief that Amber Two Airway would be closed in that vicinity prior to H Hour.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: FRANKLIN DATE: 2 JUN 57 H-HOUR: 0455

1. Aircraft scheduled: 27

2. Aircraft Participation: 27

3. Pre-take off cancellations: 0

4. Air Aborts: 0 (See Remarks)

5. Aircraft in H-Hour Position: ALL (Indicate those out if any)

6. Total Effects Aircraft: 2 (Program 5 Aircraft)

7. Total O&T Aircraft: 3 (Program 50 Aircraft)

8. Total Support Aircraft: 22 (All Others)

9. Damaged Aircraft: 0 (All Others)

10. Total Shot Postponements: 9

11. Air Operations Center: Operated Normally.

12. Communications: Operated Normally.

13. Remarks: High Altitude Cloud Trackers held on Ground at Kirtland AFB until after 0300 weather briefing.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: LASSEN DATE: 5 JUN 57 H-HOUR: 0445

1. Aircraft scheduled: 27

2. Aircraft Participation: 23

3. Pre-take off cancellations: 4

4. Air Aborts 1 (See Remarks)

5. Aircraft in H-Hour Position: 7 (Indicate those out if any)

6. Total Fleets Aircraft: 0 (Program 5 Aircraft)

7. Total CRT Aircraft: 3 (Program 50 Aircraft)

8. Total Support Aircraft: 19 (All Others)

9. Damaged Aircraft: 0 (All Others)

10. Total Shot Postponements: 1

11. Air Operations Center: The mission was completed as scheduled. All aircraft were identified and controlled as planned.

12. Communications: All channels of communications operated satisfactorily.

13. Remarks: TIGER THREE aborted due to tip tank malfunction. DULL TOOL THREE participated in cloud tracking for only thirty minutes while DULL TOOL FOUR performed a photographic mission rather than cloud tracking.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: WILSON DATE: 18 JUN 57 H-HOUR: 0445

1. Aircraft scheduled: 39
2. Aircraft Participation 35
3. Pre-take off cancellations: 4
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: ALL (Indicate those out if any)
6. Total Effects Aircraft: 2 (Program 5 Aircraft)
7. Total O&T Aircraft: 10 (Program 50 Aircraft)
8. Total Support Aircraft: 23 (All Others)
9. Damaged Aircraft: 1 (See Remarks)
10. Total Shot Postponements: 5
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: The Air Support Group is publishing Addendums to Participation Charts shown in Operations Plan 1-57 which will show actual participation by Project and aircraft.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: PRISCILLA DATE: 24 JUN 57 H-HOUR: 0630

Aircraft scheduled: 45

Aircraft Participation: 40

Pre-take off cancellations: 5

Air Aborts: 2 (See Remarks)

Aircraft in H-Hour Position: 17 (Indicate those out if any)

Total Effects Aircraft: 3 (Program 5 Aircraft)

Total O&T Aircraft: 9 (Program 50 Aircraft)

Total Support Aircraft: 28 (All Others)

Damaged Aircraft: 0 (See Remarks)

Total Shot Postponements: 1

Air Operations Center: Operated normally until shockwave interrupted normal power. AOC automatically shifted to emergency power and continued operations.

Communications: All communications normal except as noted under remarks.

Remarks: Reference Item 3: Four ADC O&T T-33 and One Photo TV-2.
Reference Item 4: Project 5.3 FJ4 aborted due to failure of computer in M-33 positioning; ground radar. Project 51.3 AJ2 aborted due to no radio contact on primary or secondary frequencies.

Dust and ground haze in the Frenchman Flat area delayed or cancelled a majority of the helicopter sorties scheduled.

AIR SUPPORT GROUP
Post Office Box "P"
Camp Mercury, Nevada

... [illegible] SUMMARY REPORT FOR: COULOMB "A" DATE: 1 JUL 57 H-HOUR: 1030

2. Aircraft scheduled: 9

3. Aircraft Participation: 7

4. Pre-take off cancellations: 0

5. Air Aborts: 0 (See Remarks)

6. Aircraft in H-Hour Position: 4 (Indicate those out if any)

7. Total Effects Aircraft: 0 (Program 5 Aircraft)

8. Total Off Aircraft: 1 (Program 50 Aircraft)

9. Total Support Aircraft: 8 (All others)

9. Damaged Aircraft: 0 (See Remarks)

10. Total Shot Postponements: 0

11. Air Operations Center: Operated normally.

12. Communications: Excellent all channels.

13. Remarks: Two B-21's mission cancelled after H-Hour.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: HOOD DATE: 5 JUL 57 H-HOUR: 0440

1. Aircraft Scheduled: 130
2. Aircraft Participation: 124
3. Pre-take off cancellations: 1
4. Air Aborts: 5 (See Remarks)
5. Aircraft in H-Hour Position: 31 (Indicate those out if any)
6. Total Effects Aircraft: 6 (Program 5 Aircraft)
7. Total O&T Aircraft: 94 (Program 50 Aircraft)
8. Total Support Aircraft: 24 (All Others)
9. Damaged Aircraft: 0 (See Remarks)
10. Total Shot Postponements: 2
11. Air Operations Center: The AOC controlled all aircraft as planned without difficulty.

12. Communications: Transmitters were off the air for 30 seconds due to power failure at shock arrival time. Communications were generally excellent throughout the mission.

13. Remarks: ROCK WOOL 2, Project 5.4, aborted due to aircraft communications malfunction. PUSSY CAT RED 1, Project 53.1, T-33 aircraft aborted due to non-feeding tip tank. TEE SQUARE, Project 51.3, A3D aircraft aborted due to aircraft communications failure prior to entry into the NTS. RAT TAIL RED 1-4, Project 52.3, Helicopter, aborted due to engine trouble. Project 53.1 cancelled one A3D, TEE SQUARE, on 4 July 1957.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

OPERATION SUMMARY REPORT FOR: DIABLO DATE: 15 JUL 57 H-HOUR: 0445

1. Aircraft scheduled: 49
2. Aircraft Participation: 43
3. Pre-take off cancellations: 7
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 12 (Indicate those out if any)
6. Total Effects Aircraft: 5 (Program 5 Aircraft)
7. Total O&T Aircraft: 11 (Program 50 Aircraft)
8. Total Support Aircraft: 27 (All Others)
9. Damaged Aircraft: 0 (See Remarks)
10. Total Shot Postponements: 3
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Six F-89D aircraft cancelled participation on 14 July 1957. One NASWF A4D cancelled due to hydraulic boost failure. Four cloud trackers utilized instead of three scheduled. Eleven samplers utilized in support of Program 21 sampling.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SHOT SUMMARY REPORT FOR: JOHN DATE: 19 JUL 57 H-HOUR: 0700

1. Aircraft scheduled: 25
2. Aircraft Participation: 26
3. Pre-take off cancellations: 0
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 15 (Indicate those out if any)
6. Total Effects Aircraft: 3 (Program 5 Aircraft)
7. Total O&T Aircraft: 10 (Program 50 Aircraft)
8. Total Support Aircraft: 13 (All Others)
9. Damaged Aircraft: 0 (See Remarks)
10. Total Shot Postponements: 0
11. Air Operations Center: Operated normally as did MSQ-1 Radar controlling delivery aircraft.

12. Communications: Operated normally.

13. Remarks: Four ADC T-33 aircraft instead of three participated for O&T purposes. Support aircraft include five sampling aircraft for Program 11. One sampler B-57 aborted prior to takeoff and was replaced by spare aircraft.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: KEPLER DATE: 24 JUL 57 H-HOUR: 0510

1. Aircraft scheduled: 41

2. Aircraft Participation: 41

3. Pre-take off cancellations: 0

4. Air Aborts: 1 (See Remarks)

5. Aircraft in H-Hour Position: 21 (Indicate those out if any)

6. Total Effects Aircraft: 6 (Program 5 Aircraft)

7. Total O&T Aircraft: 18 (Program 50 Aircraft)

8. Total Support Aircraft: 17 (All Others)

9. Damaged Aircraft: 0 (See Remarks)

10. Total Shot Postponements: 0

11. Air Operations Center: Experienced moderate to heavy interference on USQ-12 from H-5 minutes until after H-Hour from unknown source.

12. Communications: Operated normally.

13. Remarks: Reference Item 4: NASWF A4D aborted at H-5 minutes due to interference experienced by M-33 positioning radar.
Reference Item 6: Includes FJ4 airborne spare plus TV2 photo aircraft.
Reference Item 7: Includes 4 ANG T-33 samplers
Reference Item 8: Includes 7 sampling aircraft for Program 11.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: OMENS DATE: 25 JUL 57 H-HOUR: 0630

1. Aircraft scheduled: 28
2. Aircraft Participation: 28
3. Pre-take off cancellations: 0
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 15 (Indicated those out if any)
6. Total Effects Aircraft: 4 (Program 5 Aircraft)
7. Total O&T Aircraft: 8 (Program 50 Aircraft)
8. Total Support Aircraft: 16 (All Others)
9. Damaged Aircraft: 0 (See Remarks)
10. Total Shot Postponements: 4
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Reference Item 6: This includes FJ4 and TV-2 aircraft on photo mission. Reference Item 8: Includes seven sampling aircraft for Program 21.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: PASCAL "A" DATE: 26 JUL 57 H-HOUR: 0100

1. Aircraft scheduled: 0
2. Aircraft Participation: 0
3. Pre-take off cancellations: _____
4. Air Alert: _____ (See Remarks)
5. Aircraft in H-Hour Position: _____ (Indicate those out if any)
6. Total Effects Aircraft: _____ (Program 5 Aircraft)
7. Total O&T Aircraft: _____ (Program 50 Aircraft)
8. Total Support Aircraft: _____ (All Others)
9. Damaged Aircraft: _____ (See Remarks)
10. Total Shot Postponements: _____
11. Air Operations Center:

12. Communications:

13. Remarks: No aircraft scheduled for this event other than normal airlift support.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUMMARY REPORT FOR: STOKES DATE: 7 AUG 57 H-HOUR: 0525

1. Aircraft scheduled: 33
2. Aircraft Participation: 29
3. Pre-take off cancellations: 1
4. Air Aborts: 3 (See Remarks)
5. Aircraft in H-Hour Position: 9 (Indicate those out if any)
6. Total Effects Aircraft: 4 (Program 5 Aircraft)
7. Total O&T Aircraft: 7 (Program 50 Aircraft)
8. Total Support Aircraft: 18 (All others)
9. Damaged Aircraft: 0 (See Remarks)
10. Total Shot Postponements: 2
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Reference Item 3: F-89D AOCP on D-1 thru H-Hour.
Reference Item 4: Two FJ4 and one A4D aborted due to difficulty experienced by M-33 positioning radar.
Reference Item 6: Includes one (1) FJ4 and one (1) TV-2 on Photo Mission.
Reference Item 8: Includes seven (7) sampling aircraft for Program 11.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: SATURN DATE: 9 AUG 57 H-HOUR: 1800

Aircraft scheduled: 0

Aircraft Participation; 0

Pre-take off cancellations: _____

Air Aborts: _____ (See Remarks)

Aircraft in H-Hour Position: _____ (Indicate those out if any)

Total Effects Aircraft: _____ (Program 5 Aircraft)

Total CAT Aircraft: _____ (Program 50 Aircraft)

Total Support Aircraft: _____ (All Others)

Damaged Aircraft: _____ (All Others)

Total Shot Postponements: _____

Air Operations Center:

Communications:

Remarks: No aircraft scheduled for this event other than normal airlift support.

AIR SUPPORT GROUP
Post Office Box "3"
Camp Mercury, Nevada

. SION SUMMARY REPORT FOR: SHASTA DATE: 18 AUG 57 H-HOUR: 0500

1. Aircraft scheduled: 42

2. Aircraft Participation: 30

3. Pre-take off cancellations: 12

4. Air Aborts: 0 (See Remarks)

5. Aircraft in H-Hour Position: 6 (Indicate those out if any)

6. Total Effects Aircraft: 4 (Program 5 Aircraft)

7. Total OMT Aircraft: 6 (Program 50 Aircraft)

8. Total Support Aircraft: 20 (All Others)

9. Damaged Aircraft: 0 (All Others)

10. Total Shot Postponements: 20

11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Reference Item 3: SHASTA went from a firm minus 2 after the 1600 weather briefing to a minus one at 2200 hours, 17 Aug 57. Crews were dispersed and unavailable in time to complete their missions. This accounts for the large number of pre-take off cancellations. Reference Item 8: This includes 9 sampling aircraft from Program 21.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

OPERATION SUMMARY REPORT FOR: DOPPLER DATE: 23 AUG 57 H-HOUR: 0530

1. Aircraft scheduled: 38

2. Aircraft Participation: 26

3. Pre-take off cancellations: 11

4. Air Aborts: 1 (See Remarks)

5. Aircraft in H-Hour Position: 11 (Indicate those out if any)

6. Total Effects Aircraft: 5 (Program 5 Aircraft)

7. Total ORT Aircraft: 5 (Program 50 Aircraft)

8. Total Support Aircraft: 16 (All Others)

9. Damaged Aircraft: 0 (All Others)

10. Total Shot Postponements: 4

11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Reference Item 4: B-50 cloud tracker aborted due to loss of engine. Reference Item 8: This includes seven sampling aircraft for Program 21.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUPPLEMENTAL REPORT FOR: PASCAL "B" DATE: 27 AUG 57 H-HOUR: 1535

1. Aircraft scheduled: 0
2. Aircraft Participation: 0
3. Pre-take off cancellations: _____
4. Air Aborts: _____ (See Remarks)
5. Aircraft in H-Hour Position: _____ (Indicate those out if any)
6. Total Effects Aircraft: _____ (Program 5 Aircraft)
7. Total O&T Aircraft: _____ (Program 50 Aircraft)
8. Total Support Aircraft: _____ (All Others)
9. Damaged Aircraft: _____ (All Others)
10. Total Shot Postponements: _____
11. Air Operations Center:

12. Communications:

13. Remarks: No aircraft participation for this event other than normal airlift support.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

1. SUMMARY REPORT FOR: FRANKLIN PRIME DATE: 30 AUG 57 H-HOUR: 0540

2. Aircraft scheduled: 23

3. Aircraft Participation: 22

4. Pre-take off cancellations: 0

5. Air Aborts: 1 (See Remarks)

6. Aircraft in H-Hour Position: 11 (Indicate those cut if any)

7. Total Effects Aircraft: 1 (Program 5 Aircraft)

8. Total OMT Aircraft: 9 (Program 50 Aircraft)

9. Total Support Aircraft: 12 (All Others)

10. Damaged Aircraft: 0 (All Others)

11. Total Shot Postponements: 0

12. Air Operations Center: Operated normally.

13. Communications: Operated normally.

14. Remarks: Reference Item 4: F-84 Sampler was aborted due to communications difficulty. Reference Item 8: This includes seven sampling aircraft for Program 21. This event was viewed by Assistant Secretary of the Air Force, Richard E. Horner.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: SMOKEY DATE: 31 AUG 57 H-HOUR: 0530

1. Aircraft scheduled: 87
2. Aircraft Participation: 84
3. Pre-take off cancellations: 1
4. Air Aborts: 2 (See Remarks)
5. Aircraft in H-Hour Position: 15 (Indicate those out if any)
6. Total Effects Aircraft: 4 (Program 5 Aircraft)
7. Total OMT Aircraft: 61 (Program 50 Aircraft)
8. Total Support Aircraft: 19 (All Others)
9. Damaged Aircraft: 0 (All Others)
10. Total Shot Postponements: 3
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Reference Item 4: STOVEBOLT ONE aborted due to failure of M-33 Radar control equipment. DULL TOOL ONE aborted due to engine failure. Reference Item 8: This includes seven sampling aircraft for Program 21.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: GALILEO DATE: 2 SEP 57 H-HOUR: 0520

1. Aircraft scheduled: 22
2. Aircraft Participation: 22
3. Pre-take off cancellations: 0
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 4 (Indicate these out if any)
6. Total Effects Aircraft: 0 (Program 5 Aircraft)
7. Total O&T Aircraft: 2 (Program 50 Aircraft)
8. Total Support Aircraft: 20 (All Others)
9. Damaged Aircraft: 0 (See Remarks)
10. Total Shot Postponements: 0
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: None

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

MISSION SUPPORT REPORT FOR: WHEELER DATE: 6 SEP 57 H-HOUR: 0515

2. Aircraft scheduled: 15

3. Aircraft Participation: 15

4. Pre-take off cancellations: 0

5. Air Aborts: 0 (See Remarks)

6. Aircraft in H-Hour Position: 3 (Indicate those out if any)

7. Total Effects Aircraft: 0 (Program 5 Aircraft)

8. Total CAT Aircraft: 2 (Program 50 Aircraft)

9. Total Support Aircraft: 13 (All Others)

10. Damaged Aircraft: 0 (See Remarks)

11. Total Shot Postponements: 0

12. Air Operations Center: Operated normally.

13. Communications: Operated normally.

14. Remarks: None

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: COULOMB "B" DATE: 6 SEP 57 H-HOUR: 1305

7. Aircraft scheduled: 7

8. Aircraft Participation: 7

9. Pre-take off cancellations: 0

10. Air Aborts: 0 (See Remarks)

11. Aircraft in H-Hour Position: 3 (Indicate those out if any)

12. Total Effects Aircraft: 0 (Program 5 Aircraft)

13. Total O&T Aircraft: 0 (Program 50 Aircraft)

14. Total Support Aircraft: 7 (All Others)

15. Damaged Aircraft: 0 (All Others)

16. Total Shot Postponements: 0

17. Air Operations Center:

18. Communications: Minor communications difficulty was experienced due to intervening mountains and low altitude of participating aircraft.

19. Remarks: Two additional sampler aircraft and one cloud tracker aircraft were scheduled after the detonation due to a greater yield and height of cloud than expected.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

AIR SUMMARY REPORT FOR: LAPLACE DATE: 8 SEP 57 H-HOUR: 0600

Aircraft scheduled: 21

Aircraft Participation: 14

Pre-take off cancellations: 3

Air Aborts: 0 (See Remarks)

Aircraft in H-Hour Position: 3 (Indicate those out if any)

Total Effects Aircraft: 0 (Program 5 Aircraft)

Total O&T Aircraft: 1 (Program 50 Aircraft)

Total Support Aircraft: 13 (All Others)

Damaged Aircraft: 0 (All Others)

Total Shot Postponements: 0

Air Operations Center: Operated normally.

Communications: Operated normally.

Remarks: DULL TOOL ONE, B-50 cancelled prior to take-off by Test Managers Organization. CROSS CUT ONE and TWO, F-84F Aircraft, did not arrive as scheduled - Reason unknown. Four HANDRAIL (H-21) aircraft cancelled, post shot rad-safe surveys not required.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

JOINT SUMMARY REPORT FOR: FIZEAU DATE: 14 SEP 57 Z-HOUR: 0945

. Aircraft scheduled: 25

. Aircraft Participation: 23

. Pre-take off cancellations: 2

. Air Aborts: 0 (See Remarks)

. Aircraft in Z-Hour Position: 10 (Indicate those out if any)

. Total Effects Aircraft: 0 (Program 5 Aircraft)

. Total Off Aircraft: 6 (Program 50 Aircraft)

. Total Support Aircraft: 17 (All Others)

. Damaged Aircraft: 0 (All Others)

. Total Shot Postponements: 4

. Air Operations Center: Operated normally.

. Communications: Operated normally.

. Remarks: One radio relay C-47 and one photo rad-safe mission were cancelled prior to take-off due to lack of requirement.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

1. SHOT SUMMARY REPORT FOR: NEWTON DATE: 16 SEP 57 H-HOUR: 0540

2. Aircraft scheduled: 29

3. Aircraft Participation: 21

4. Pre-take off cancellations: 8

5. Air Aborts: 0 (See Remarks)

6. Aircraft in H-Hour Position: 9 (Indicate those out if any)

7. Total Effects Aircraft: 0 (Program 5 Aircraft)

8. Total C&T Aircraft: 5 (Program 50 Aircraft)

9. Total Support Aircraft: 16 (All Others)

10. Damaged Aircraft: 0 (See Remarks)

11. Total Shot Postponements: 0

12. Air Operations Center: Operated normally.

13. Communications: Operated normally.

14. Remarks: Reference Item 3: 6 A&D aircraft did not arrive as scheduled. 2 cloud trackers, a B-29 and B-25 were cancelled prior to take-off due to lack of requirement. Reference Item 8: This includes 5 sampling aircraft for Program 11.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

OPERATION SUMMARY REPORT FOR: RAINIER DATE: 19 SEP 57 H-HOUR: 1000

1. Aircraft scheduled: 8
2. Aircraft Participation: 8
3. Pre-take off cancellations: 0
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 5 (Indicate those out if any)
6. Total Effects Aircraft: 0 (Program 5 Aircraft)
7. Total C&T Aircraft: 1 (Program 50 Aircraft)
8. Total Support Aircraft: 7 (All Others)
9. Damaged Aircraft: 0 (All Others)
10. Total Shot Postponements: 0
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Three sampler aircraft from Program 21 participated.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

OPERATIONAL SUMMARY REPORT FOR: MITTHEY DATE: 23 SEP 57 H-HOUR: 0530

1. Aircraft scheduled: 20
2. Aircraft Participation: 20
3. Pre-take off cancellations: 1
4. Air Aborts: 0 (See Remarks)
5. Aircraft in H-Hour Position: 5 (Indicate those out if any)
6. Total Effects Aircraft: 0 (Program 5 Aircraft)
7. Total O&T Aircraft: 2 (Program 50 Aircraft)
8. Total Support Aircraft: 18 (All Others)
9. Damaged Aircraft: 0 (All Others)
10. Total Shot Postponements: 10
11. Air Operations Center: IFF went out for approximately 5 minutes after shock arrival; otherwise operated normally.

12. Communications: Operated normally.

13. Remarks: B-29, High altitude cloud tracker cancelled by Test Manager prior to take-off. Replaced by second B-25, low cloud tracker.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: CHARLESTON DATE: 28 SEP 57H-HOUR: 0600

Aircraft scheduled: 24

Aircraft Participation: 19

Pre-take off cancellations: 5

Air Aborts: 0 (See Remarks)

Aircraft in H-Hour Position: 6 (Indicate those out if any)

Total Effects Aircraft: 0 (Program 5 Aircraft)

Total O&T Aircraft: 2 (Program 50 Aircraft)

Total Support Aircraft: 17 (See Remarks)

Damaged Aircraft: 0 (All Others)

Total Shot Postponements: 3

Air Operations Center: Operated normally.

Communications: Operated normally.

Remarks: Reference Item 8: Includes seven sampling aircraft for Program 21. Reference Item 3: Two F-100 O&T aircraft were cancelled. Reason unknown. One L-20 and two H-21 survey aircraft cancelled due to lack of requirement.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SUMMARY REPORT FOR: CHARLESTON DATE: 28 SEP 57 H-HOUR: 0600

. Aircraft scheduled: 24

. Aircraft Participation: 19

. Pre-take off cancellations: 5

. Air Aborts: 0 (See Remarks)

. Aircraft in H-Hour Position: 6 (Indicate those out if any)

. Total Effects Aircraft: 0 (Program 5 Aircraft)

. Total O&T Aircraft: 2 (Program 50 Aircraft)

. Total Support Aircraft: 17 (See Remarks)

. Damaged Aircraft: 0 (All Others)

. Total Shot Postponements: 3

. Air Operations Center: Operated normally.

. Communications: Operated normally.

. Remarks: Reference Item 8: Includes seven sampling aircraft for Program 21. Reference Item 3: Two F-100 O&T aircraft were cancelled. Reason unknown. One L-20 and two H-21 survey aircraft cancelled due to lack of requirement.

AIR SUPPORT GROUP
Post Office Box "B"
Camp Mercury, Nevada

SHOT SUMMARY REPORT FOR: MORGAN DATE: 7 OCT 57 H-HOUR: 0500

1. Aircraft scheduled: 21
2. Aircraft Participation: 18
3. Pre-take off cancellations: 3
4. Air Aborts: 1 (See Remarks)
5. Aircraft in H-Hour Position: 4 (Indicate those out if any)
6. Total Effects Aircraft: 0 (Program 5 Aircraft)
7. Total O&T Aircraft: 0 (Program 50 Aircraft)
8. Total Support Aircraft: 18 (All Others)
9. Damaged Aircraft: 0 (All Others)
10. Total Shot Postponements: 3
11. Air Operations Center: Operated normally.

12. Communications: Operated normally.

13. Remarks: Two F-100 aircraft from Nellis AFB cancelled prior to take-off. One B-25 cloud tracker aborted post H-Hour; radio receiver out.

CALL SIGN	CREW	TYPE	ACFT NO	START ENGINES	TAXI	TAKE OFF (1)	AREA (2)	ORBIT (3)	ORBIT (4)	AREA (5)	(6)		
MONKEY WRENCH		C-47		0320	0325	0330	0350	0400		0530	0545		
STOVEBOLT 1	Montunnas	FJ-4	467	0355	0400	0405		0416			0515	0440	1/00
STOVEBOLT 2	Mackay	FJ-4	310	0356	0401	0406		0417			0515	0440	1/00
KEY HOLE	Shawler Waters	F-89D	412	0400	0405	0410	0425	0436	0501	0520	0532	0430	/52
ROCKWOOL 1	Miears	A4D-1	831	0411	0416	0421		0429			0516	0445	/30
ROCKWOOL 2	Wynn	A4D-1	827	0412	0417	0422	Stndby Ins 16,000				0516	0445	/30
SORE THUMB	Taliaferro Bednar	F-89D	411	0420	0425	0430	0435	0435	0501	0502	0507	0445	/15
ROUNDUP	Harrison Goeckerman	B-57B		0435	0440	0445	0450	0455			0940	0500	/20
PUSSY CAT RED	Atkinson Koch	T-33	955	0445	0450	0455	0500	0620	0630	0635	0641		
PUSSY CAT RED 2	Floyd Luce	T-33	586	0445	0450	0455	0500	0620	0630	0635	0641		
DUMPTRUCK 3	Stoupe	B-25	228	0510	0515	052[illegible]	As directed						
HOT SHOT 1	Bounds Martin	B-57B		0605	0610	0615	0620	0630	0640	0645	0650		
TIGER 1	Krull	F-84G		0615	0620	0625	0630	0640	0650	0700	0705		
TIGER 2	Moore	F-84G		0620	0625	0630	0635	Abort	Abort	Abort	Abort		
HOT SHOT 2	Alder SAC	B-57B		0630	0635	0640	0645	0700	0710	0710	0725	0730	
HOT SHOT 3	Logsdon Peck	B-57B		0710	0715	0720	0725	0740	0755	0810	0815		
PUSSY CAT WHITE 1	Moffett McElroy	T-33	747	0730	0735	0740	0745	0800	0815	0825	0830		

60

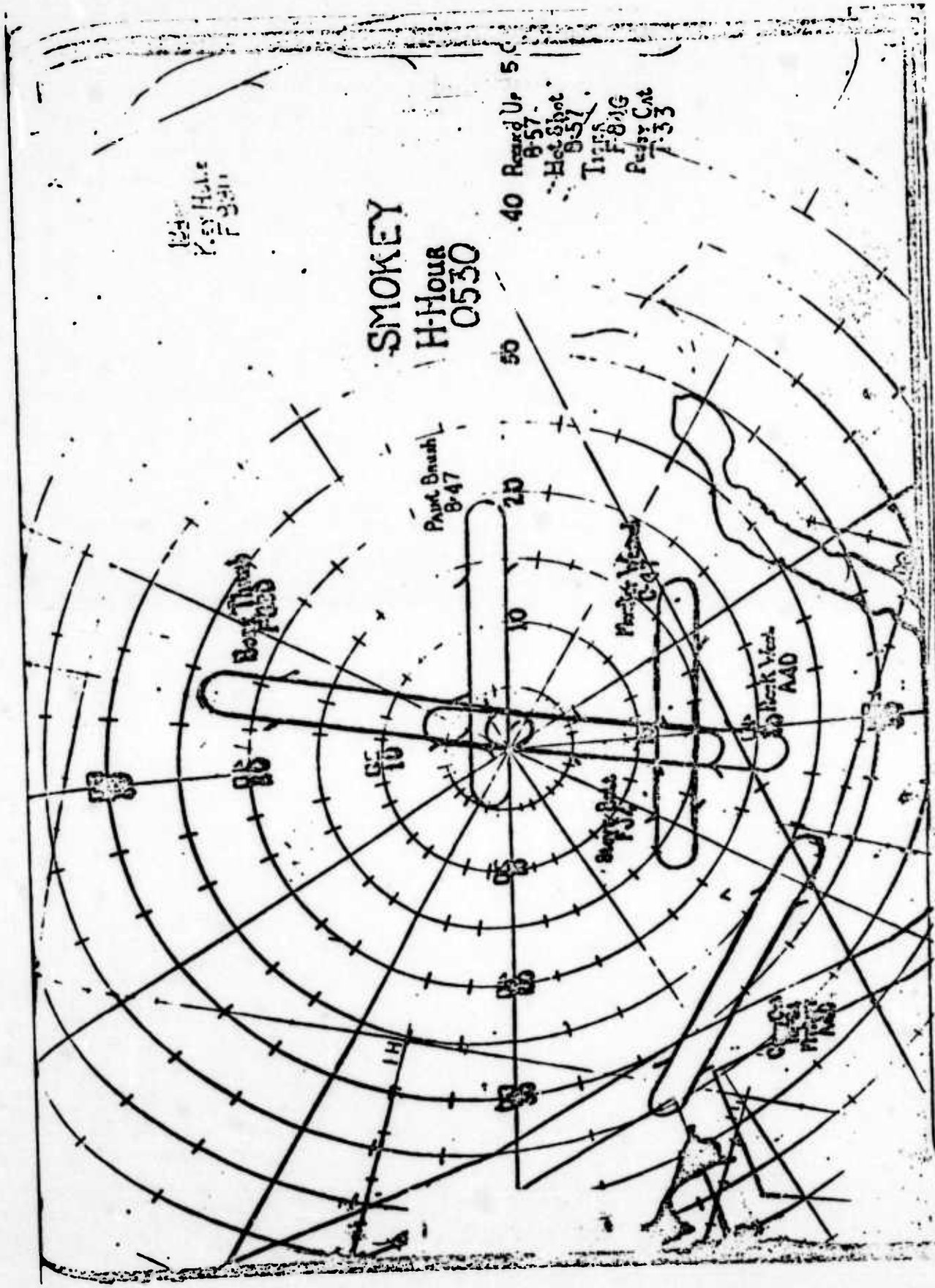
CALL SIGN	CREW	TYPE	ACFT NO	START ENGINES	TAXI	TAKE OFF (1)	ENTER AREA (2)	ORBIT (3)	OFF ORBIT (4)	EXIT AREA (5)	LAND (6)		
FUSSY CAT WHITE 2	Matera Poley	T-33	944	0730	0735	0740	0745	0800	0815	0825	0830		
HOTSHOT 4	Price Scott	B-57B		Cancelled									
TIGER SPARE1	Merry	F-84G		In Place of Tiger 2			0717	0728		0745			
TIGER SPARE2	Albright	F-84G		Stdn By	0600 to 0900								
TIGER SPARE3	Waite	F-84G		Stdn By	0600 to 0900								
TIGER SPARE4	Kelley	F-84G		Stdn By	0600 to 0900								
DULL TOOL 1		B-50					0600	0600					
DULL TOOL 2		B-29					0445	0455		0955			
CROSSCUT1&2		RF-84F					0445	0450		0532			
TAPEJET 1-5		T-33(5)					Cancelled						
BIG PHOTO		B-57					Cancelled						
BUCK SAW		B-26					0305	0320		0546			
MYSTERY		RF (6)					0500	0510		0538			

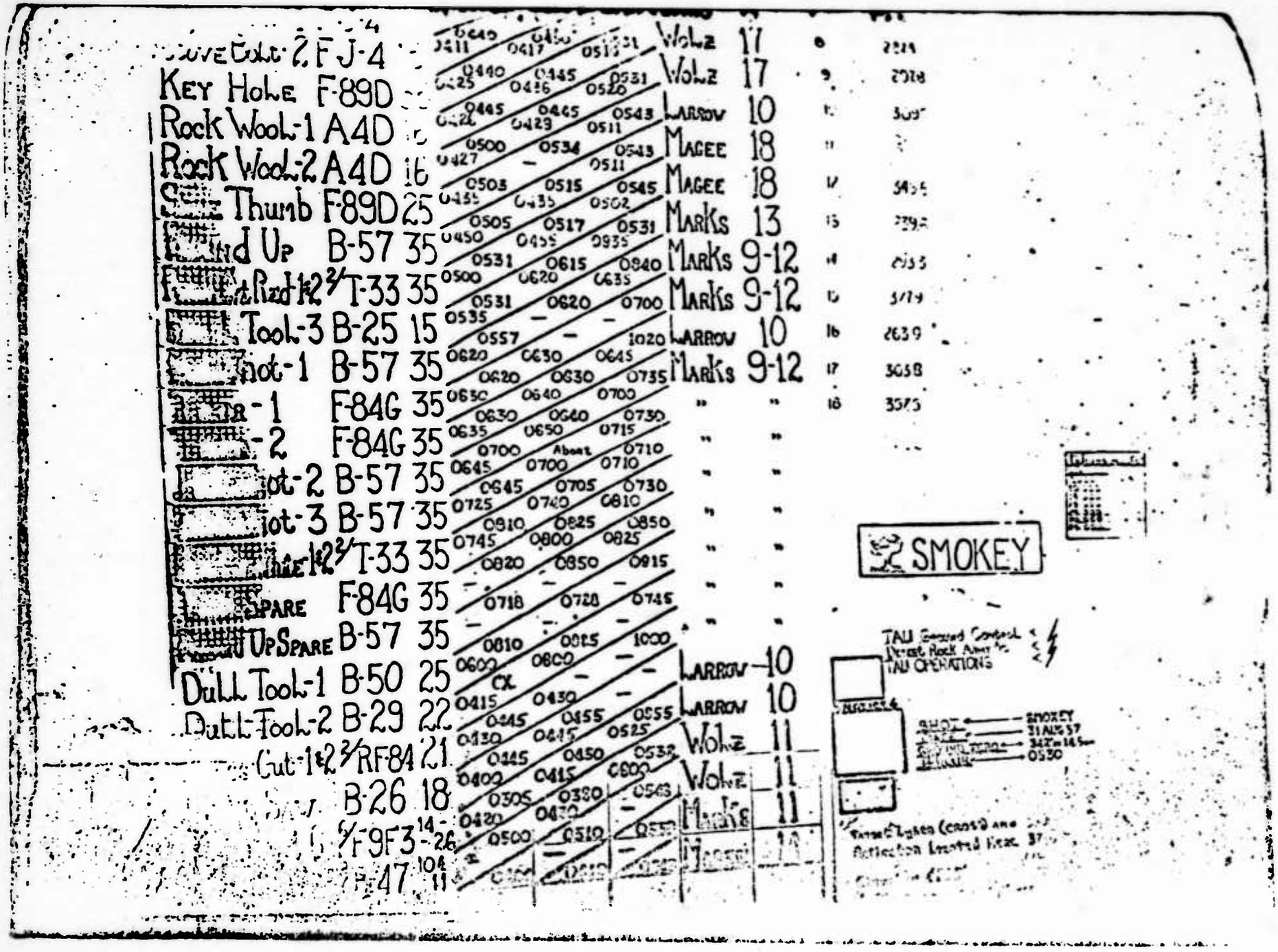
All times Daylight Saving Time.

Duty Officer: 1630 to 2400 Lt Albright
2400 to end Lt Crabtree

Operations Duty Officer: Capt Wright

PAINT BRUSH		B-47 (2)					0400	0410		0543			
ROUND UP (SPARE)		B-57		In Place of Hotshot 4			0810	0825		1000			





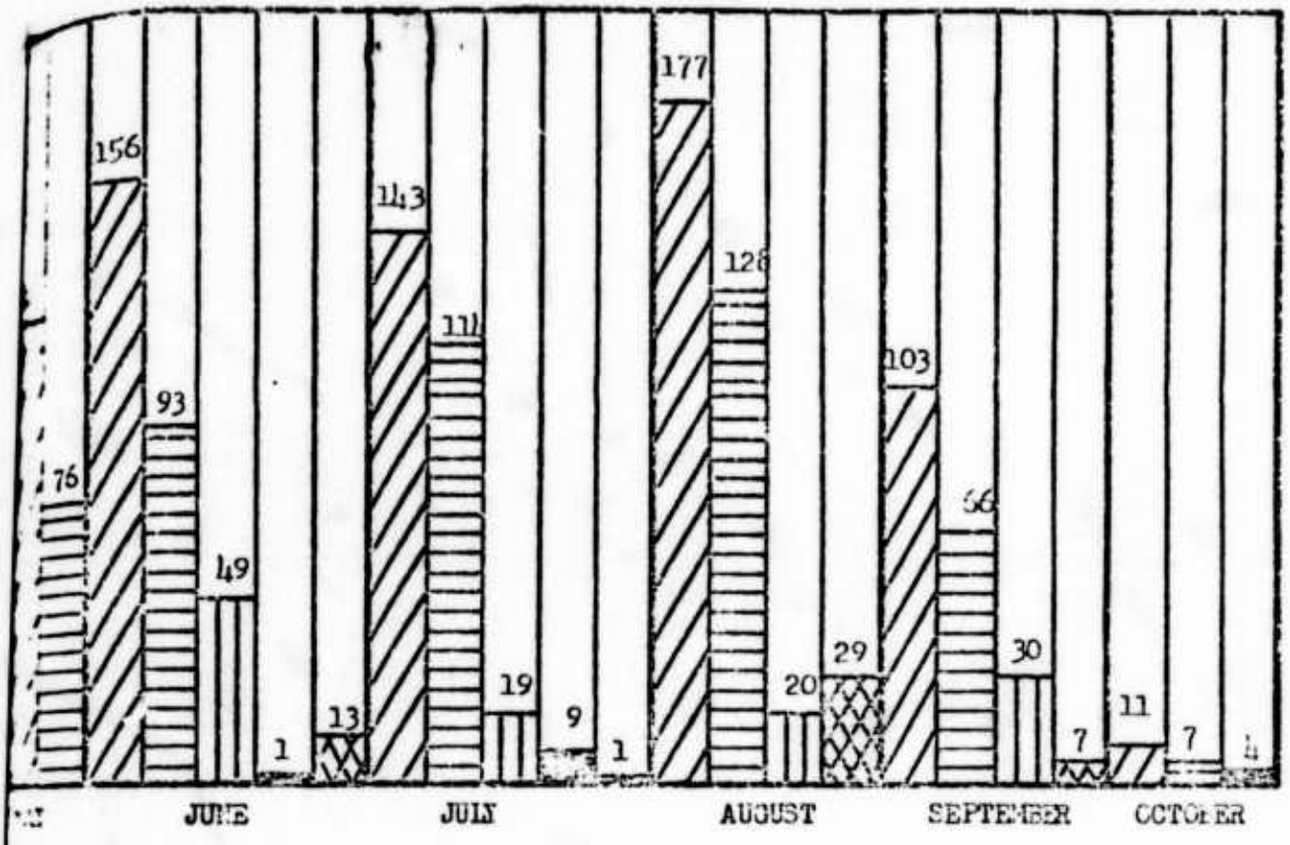
PART III

SECTION B

SUPPORT OPERATIONS

H-21 OPERATIONS AT ISAFB
1 May thru 7 October

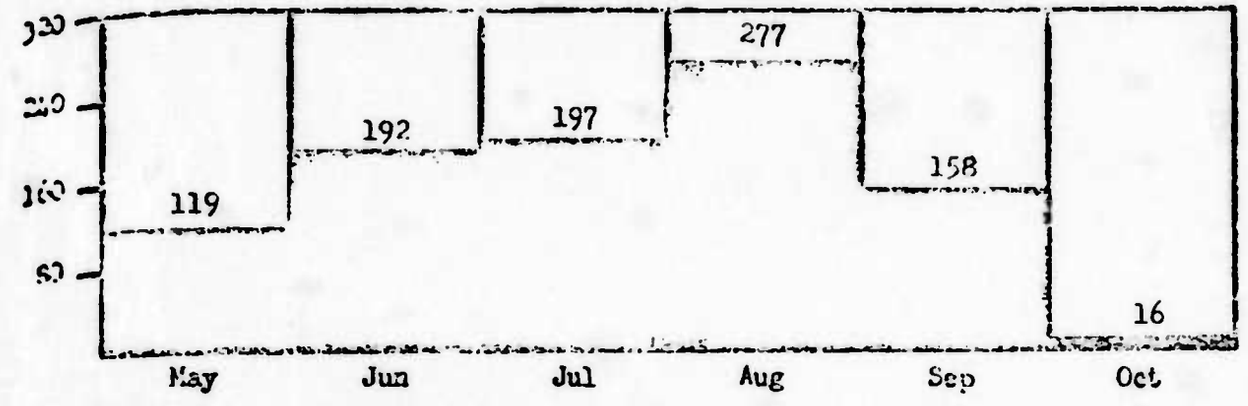
AIRCRAFT UTILIZATION



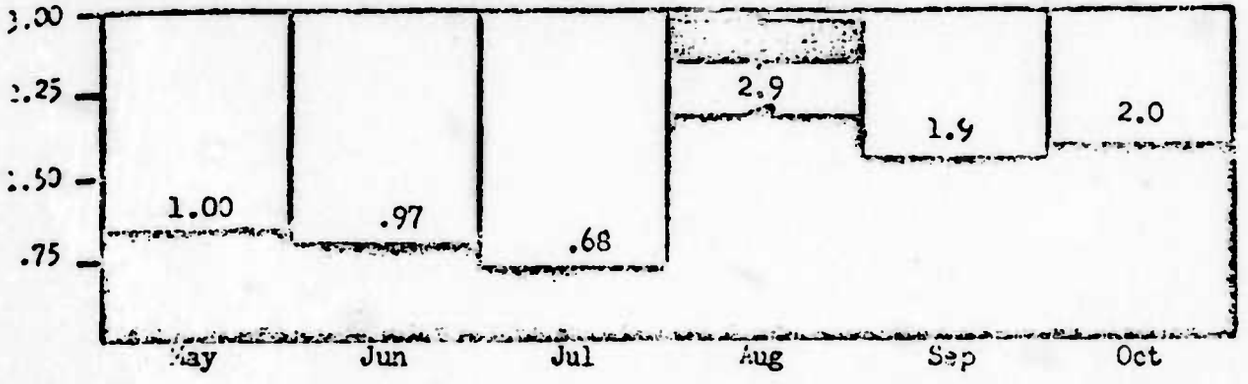
	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
TOTAL HOURS FLOWN	123:50	156:35	142:40	177:06	103:20	10:35
AVERAGE A/C ASSIGNED	6	6	6	8	8	8
HOURS FLOWN PER AIRCRAFT ASSIGNED	20:18	26:06	23:46	22:08	12:55	1:19

H-21 Operations (Cont')
1 May Thru 7 October

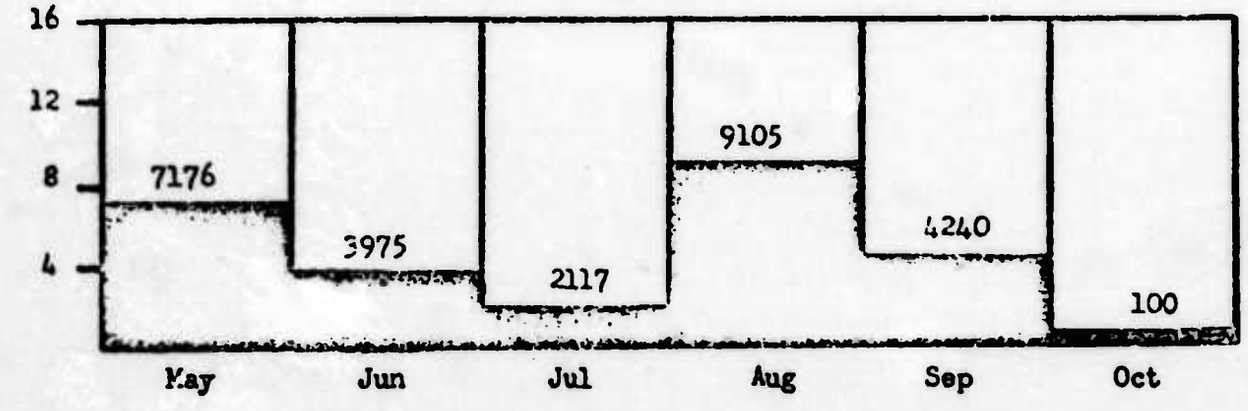
TOTAL PASSENGERS



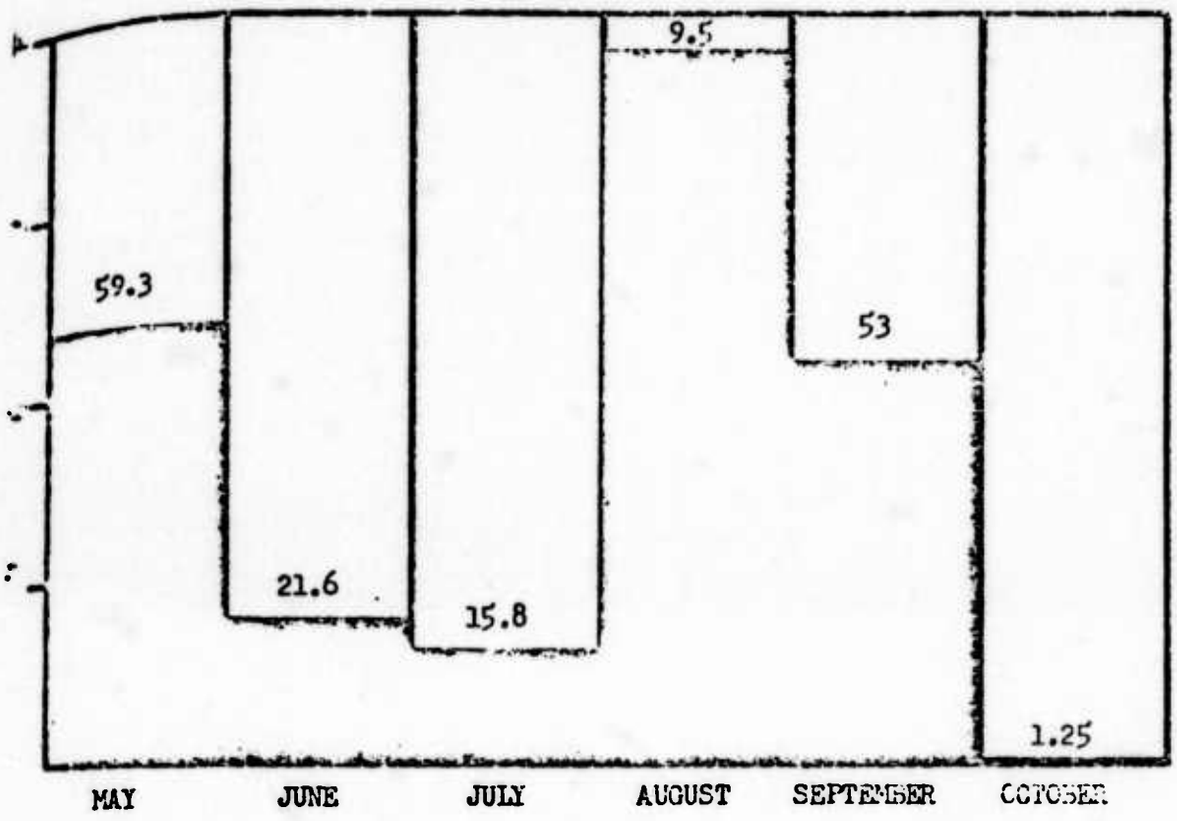
AVERAGE PASSENGERS PER FLIGHT



TOTAL CARGO



AVERAGE CARGO PER LOAD

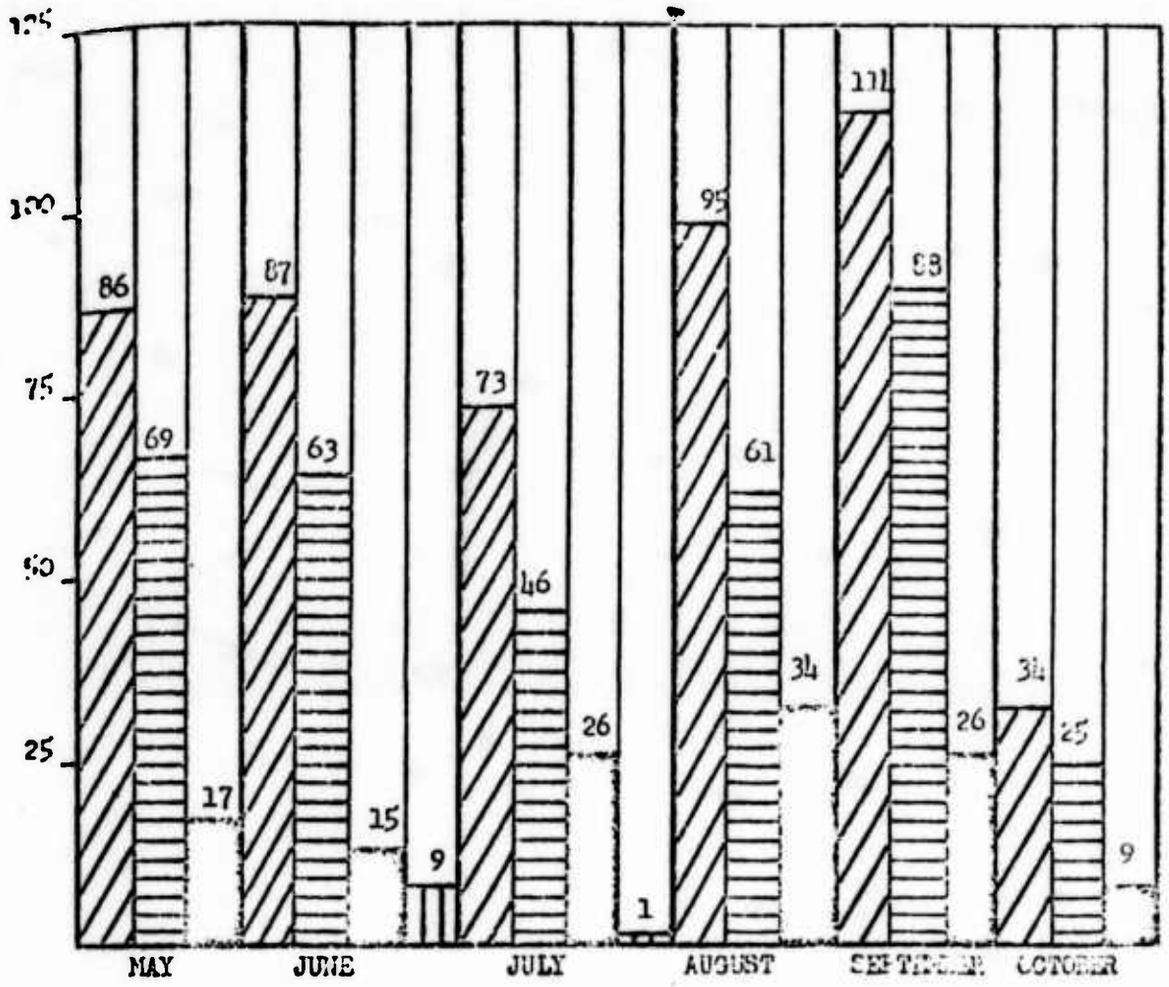


LANDINGS

	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTALS
[illegible]	199	228	108	198	104	7	646
[illegible]	4	3		1			8
[illegible] 1	12	25	28	22	10	6	103
[illegible] 2	60	95	102	94	85	6	442
[illegible] 3		3					3
[illegible]ER	32	28	14	[illegible]	30	3	150
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	229	22	1352

L-20 OPERATIONS AT [redacted]
1 May thru 7 October

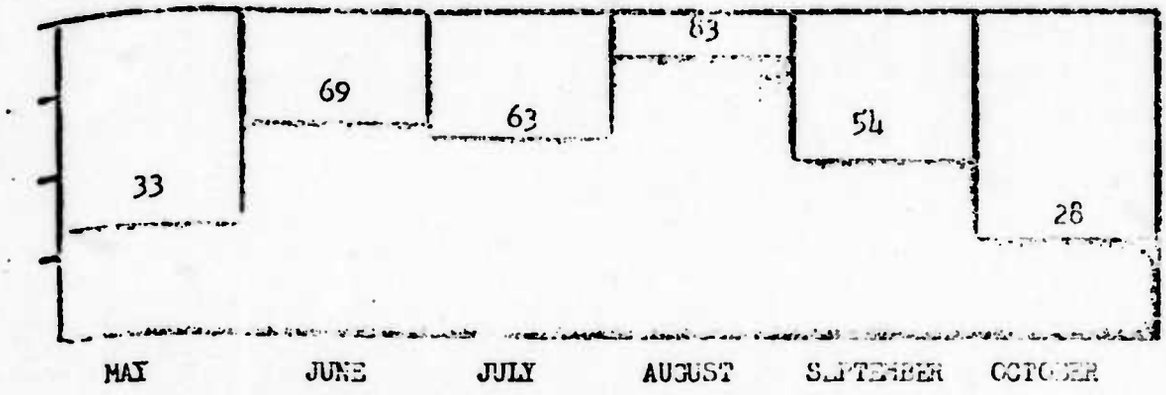
AIRCRAFT UTILIZATION



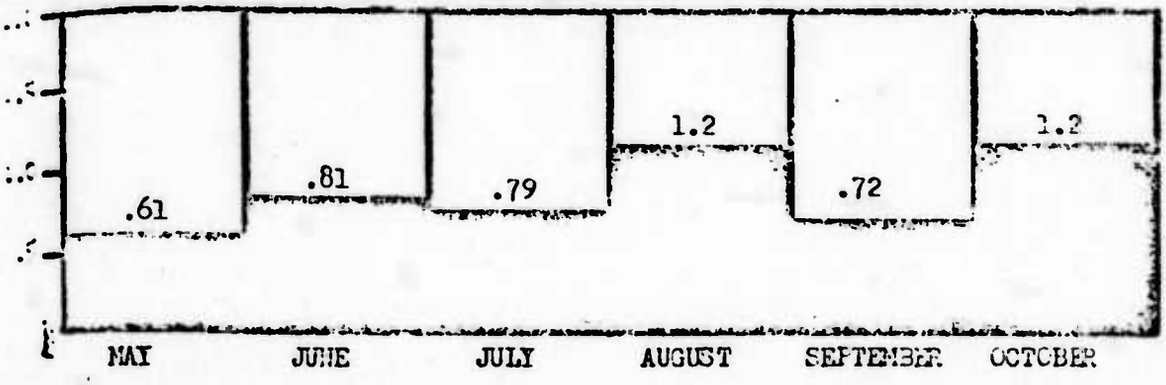
	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
TOTAL HOURS FLOWN	83:10	87:10	71:50	95:30	113:40	34:15
AVERAGE A/C ASSIGNED	2	2	2	2	2	2
HRS FLOWN PER AIRCRAFT ASSIGNED	41:35	43:35	35:55	47:35	56:40	17:08

L-20 OPERATIONS
1 May thru 7 October

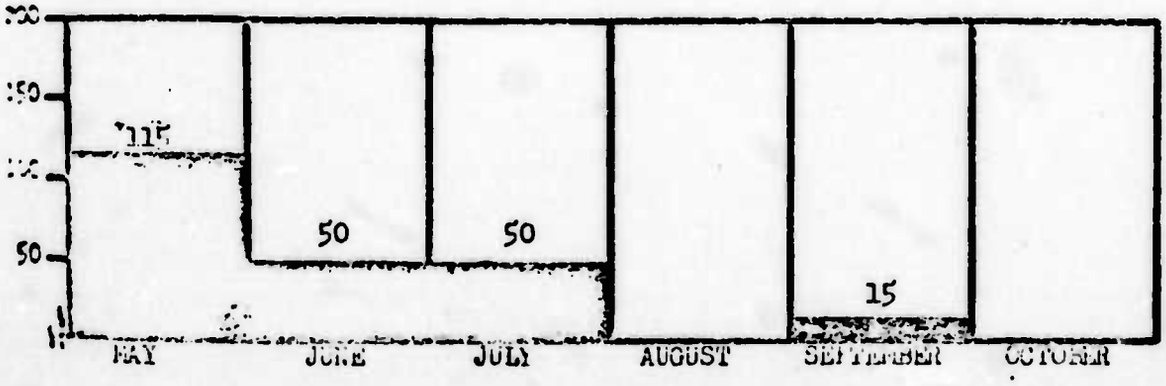
TOTAL PASSENGERS



AVERAGE PASSENGER PER FLIGHT



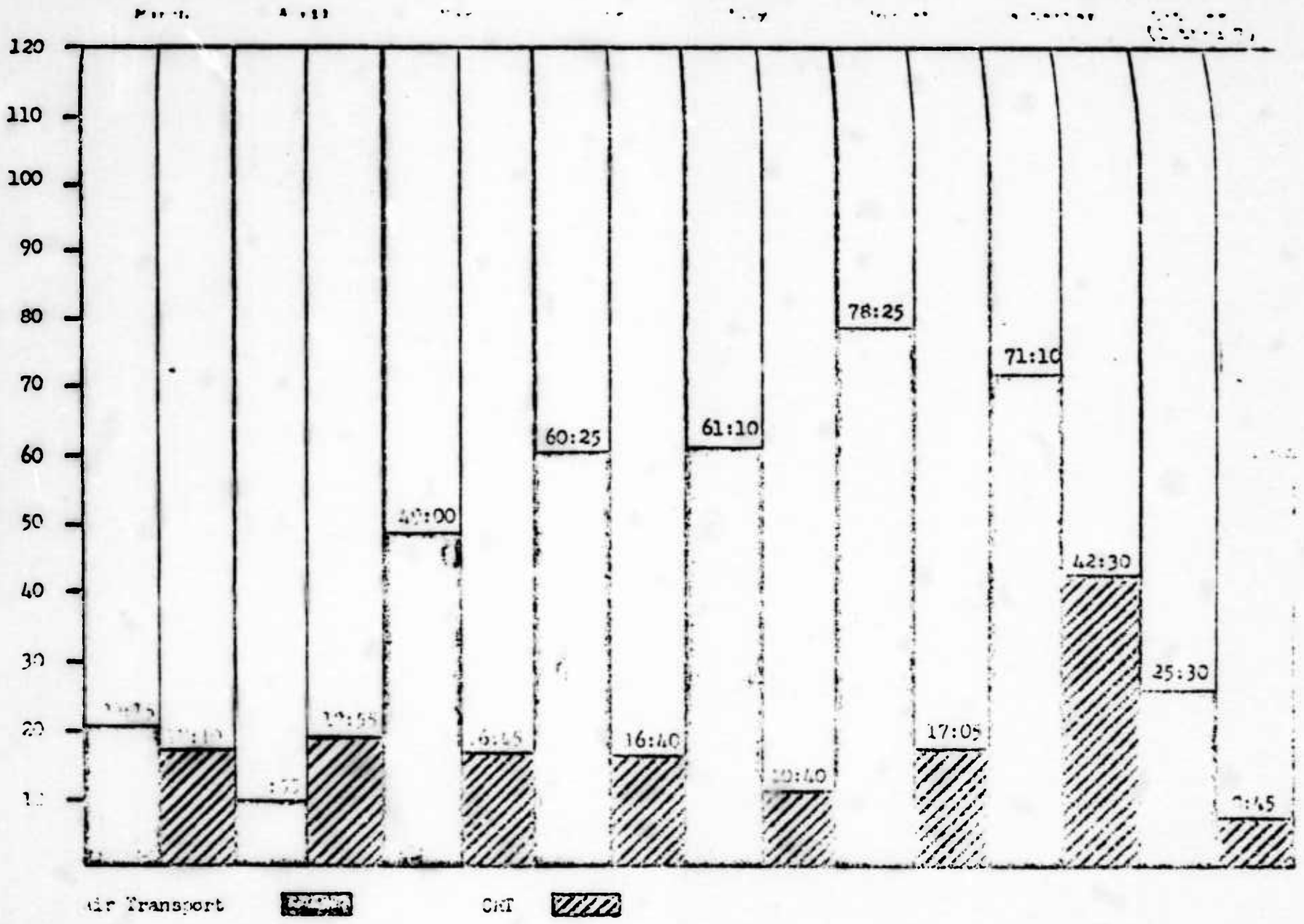
TOTAL CARGO



L-20 OPERATIONS
1 May thru 7 October

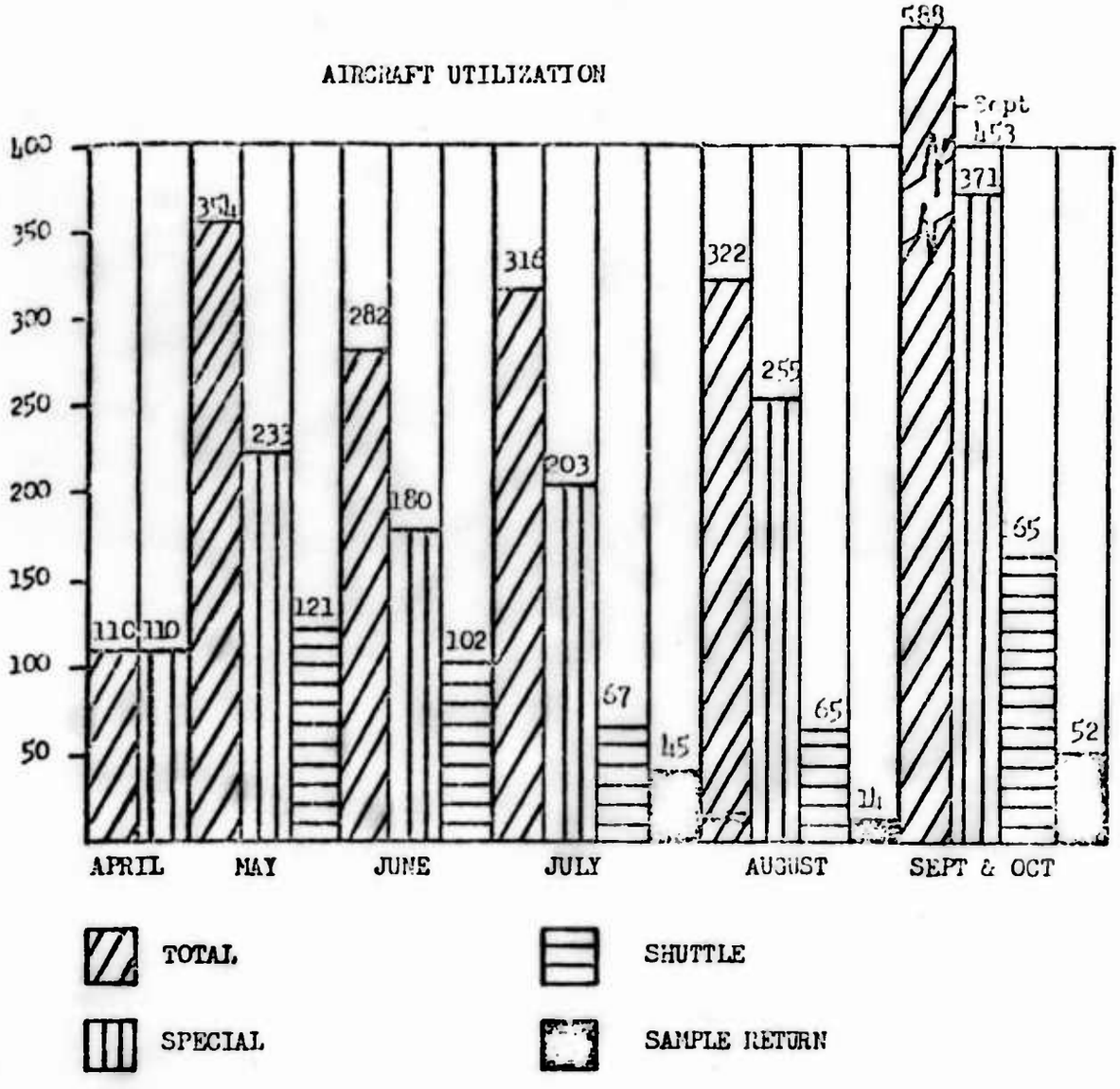
LANDINGS

	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
[illegible]	97	73	57	213	278	63	781
[illegible]	2	11	15	13	4	2	47
[illegible]	24	23	13	10	28	9	107
TOTAL	123	107	85	236	310	74	935


120
110
100
90
80
70
60
50
40
30
20
78:25
71:10
60:25
61:10
42:30
25:30
16:40
17:05
Air Transport
CNT

C-119, C-123 SHUTTLE
KIRTLAND AFB TO INDIAN SPRINGS AFB

15 April thru 7 October

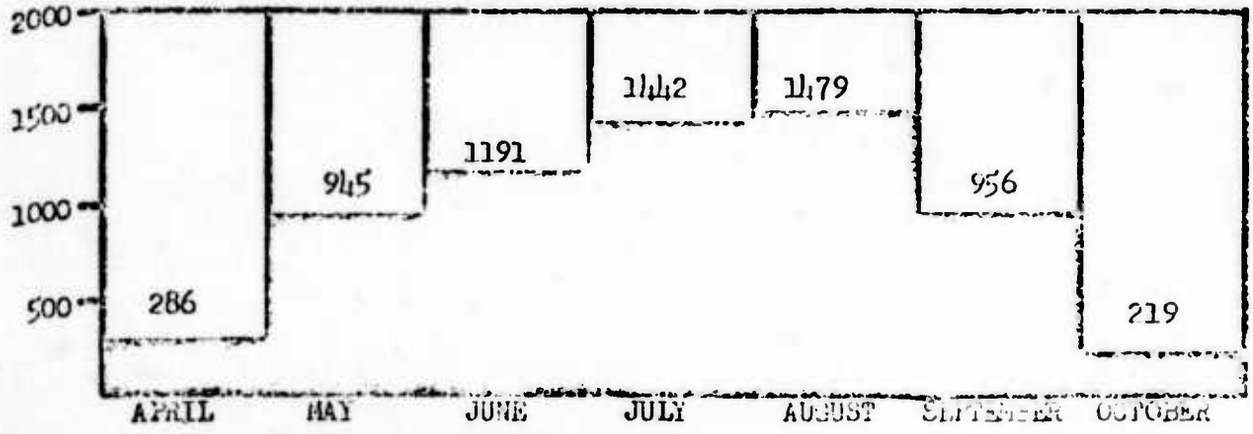


	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
TOTAL HOURS FLOWN	110:30	354:15	281:30	316:10	321:45	453:20	134:50
AVERAGE A/C ASSIGNED	4	4	4	4	4	4	4
HOURS FLOWN PER A/C ASSIGNED	27:37	88:34	70:22	79:02	80:26	113:20	33:42

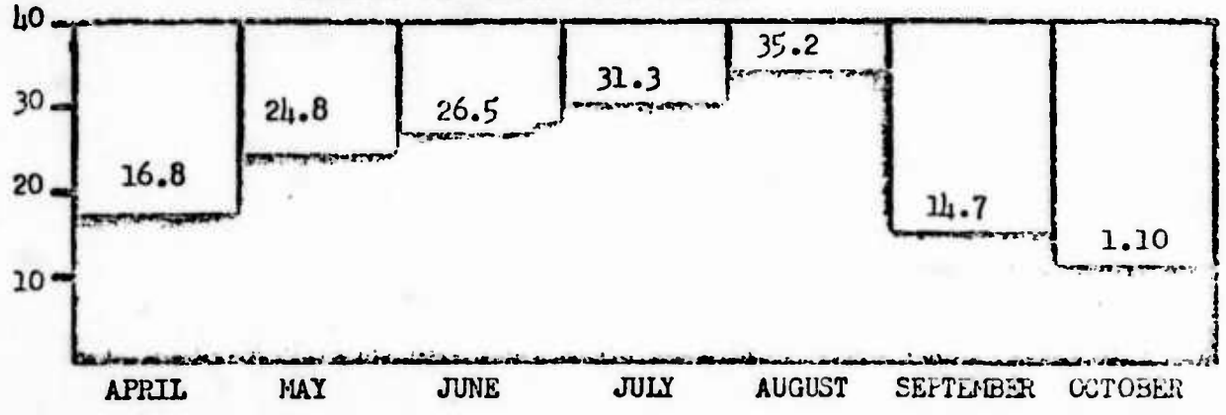
C-119 C-123

C-119, C-123 SHUTTLE
KIRTLAND AFB TO INDIAN SPRINGS AFB
15 April thru 7 October

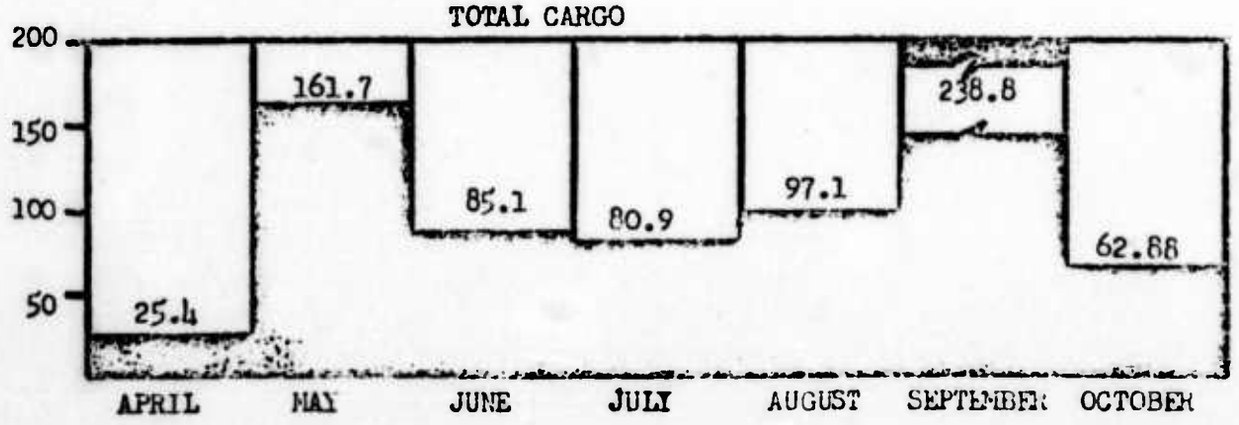
PASSENGERS



AVERAGE PASSENGERS PER FLIGHT

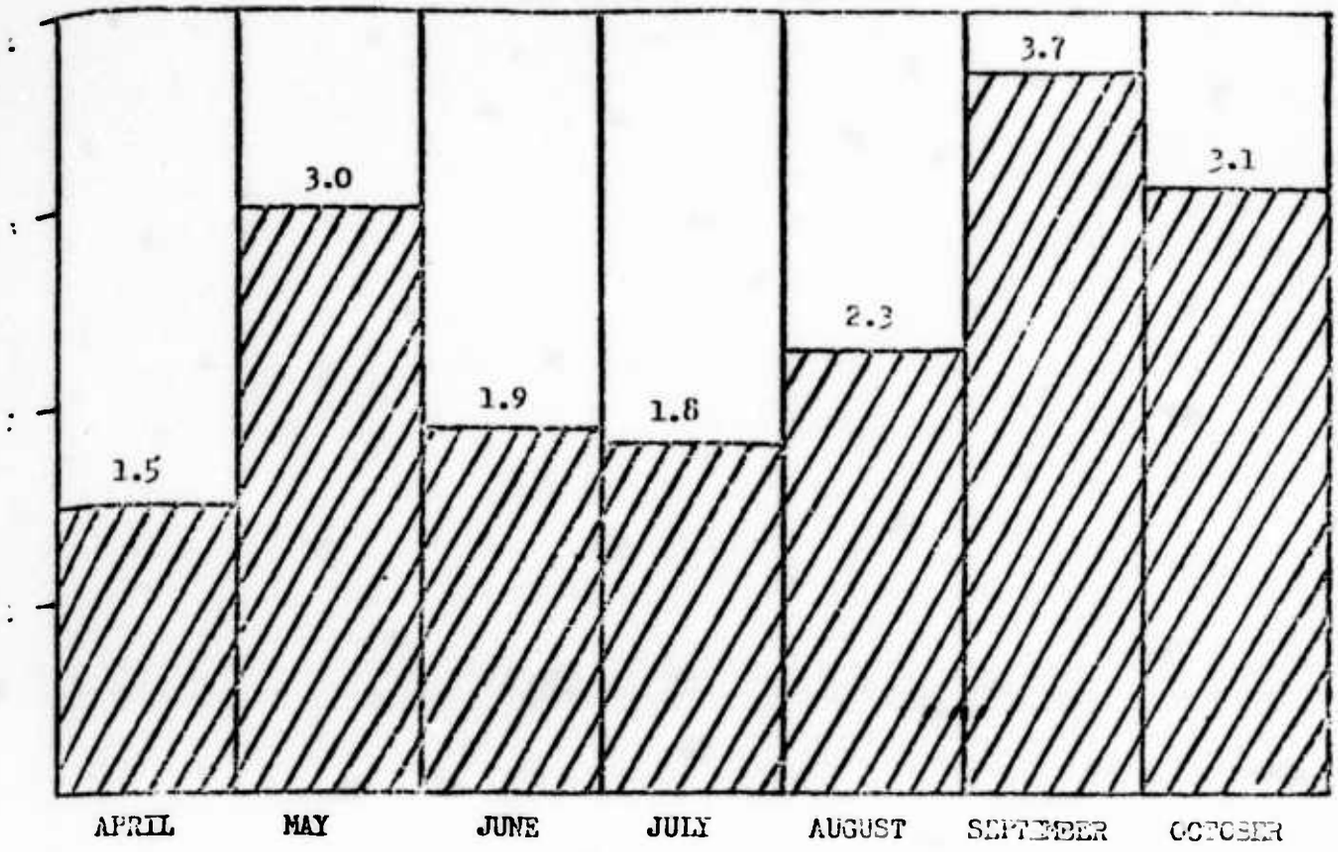


TOTAL CARGO



C-119, C-123 SHUTTLE
KIRTLAND AFB TO INDIAN SPRINGS AFB
15 April thru 7 October

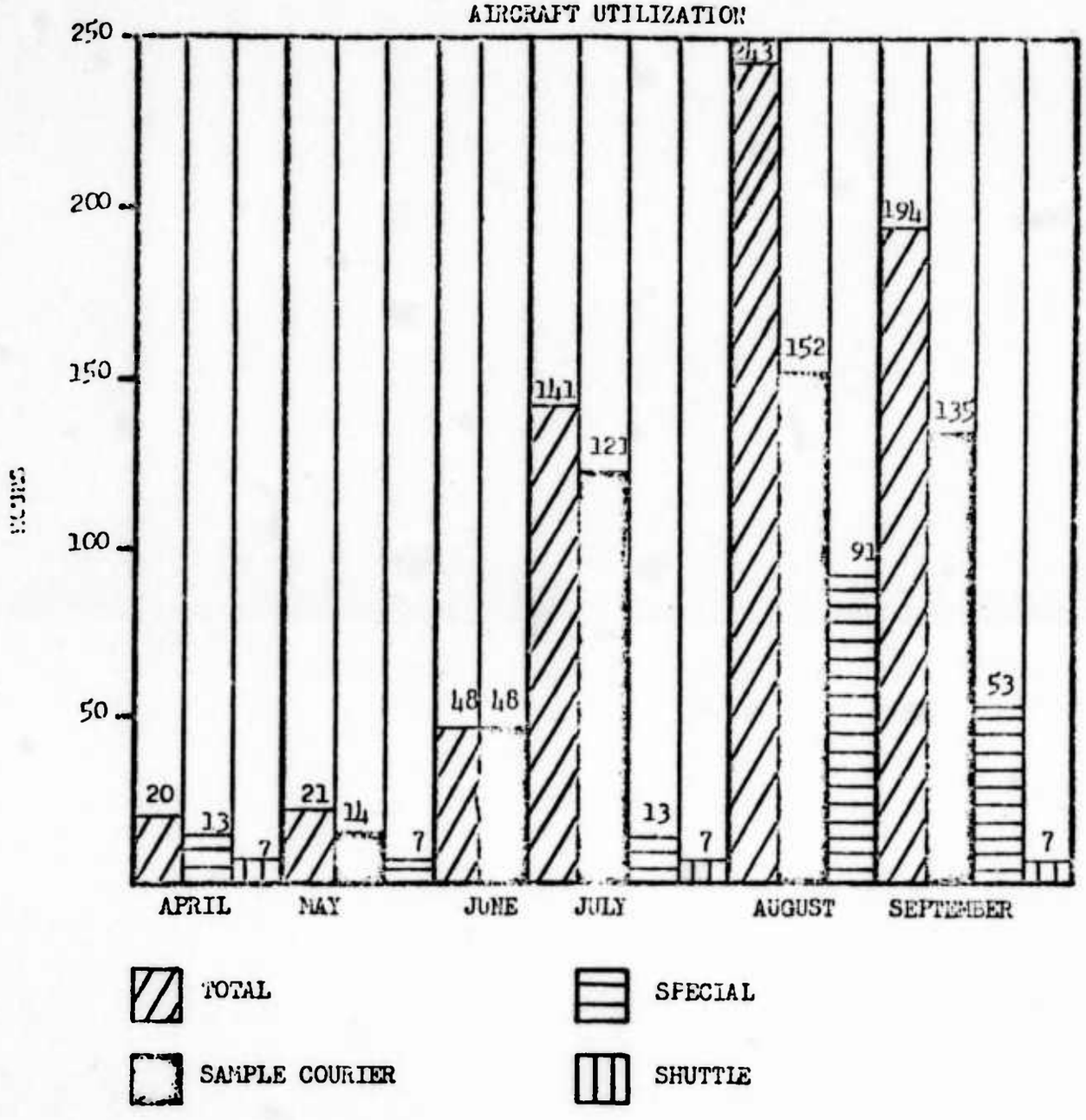
AVERAGE CARGO PER TRIP



LANDINGS

APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
17	38	36	43	43	66	20	263
17	54	45	49	49	66	19	299
4	20	28	21	11	33	6	123
38	112	109	113	103	165	45	685

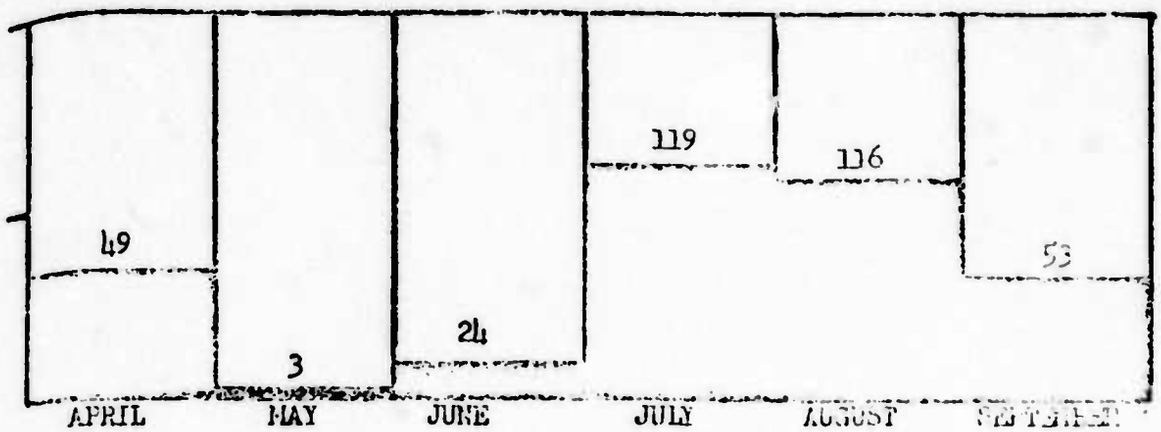
C-47 SAMPLE COURIER
1 April thru 30 September



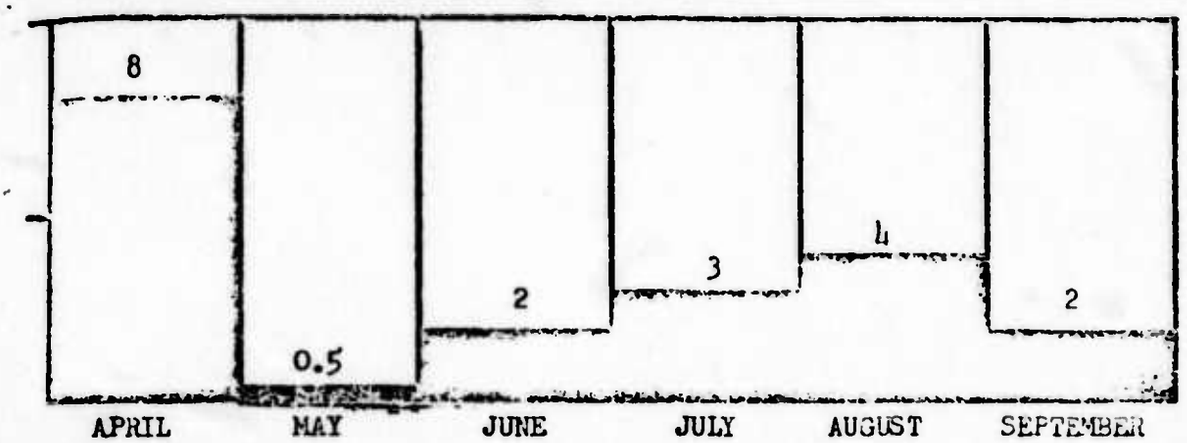
	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
TOTAL HOURS FLOWN	20	21	48	141	243:20	193:40
AVERAGE A/C ASSIGNED	4	4	4	4	4	4
HOURS FLOWN PER A/C ASSIGNED	5:00	5:15	12:00	35:15	60:50	48:25

C-47 SAMPLE COURIER
1 April thru 30 September

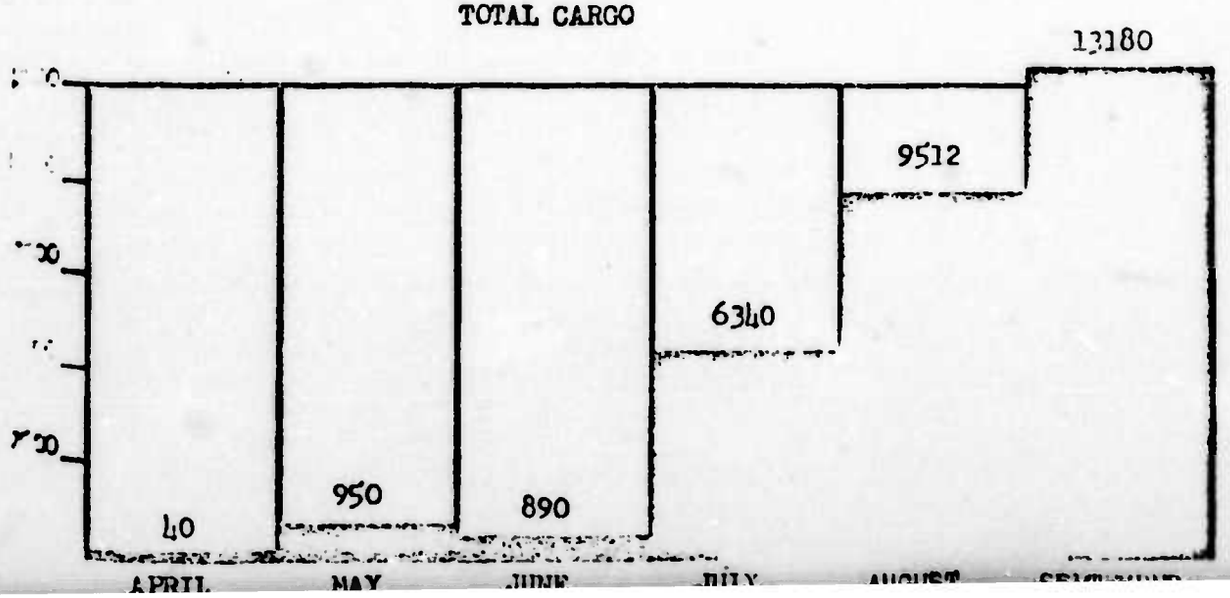
PASSENGERS



AVERAGE PASSENGER PER FLIGHT

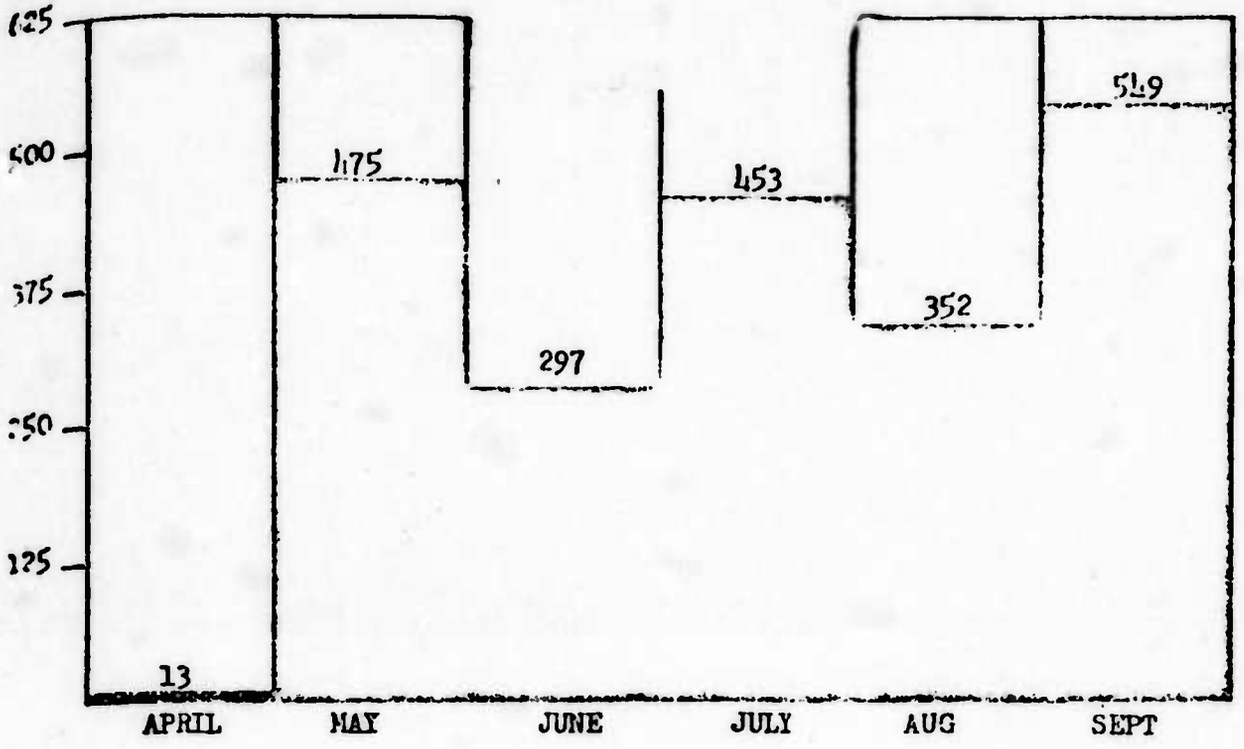


TOTAL CARGO



C-47 SAMPLE COURIER
1 April through 30 Sept

AVERAGE CARGO PER MISSION



LANDINGS

	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
ISAFB	3	1	3	15	21	21	64
KAFB	3	1	3	14	25	23	69
OTHER		2	5	11	36	20	74
TOTAL	6	4	11	40	82	64	207

CLOUD TRACKER AIRCRAFT

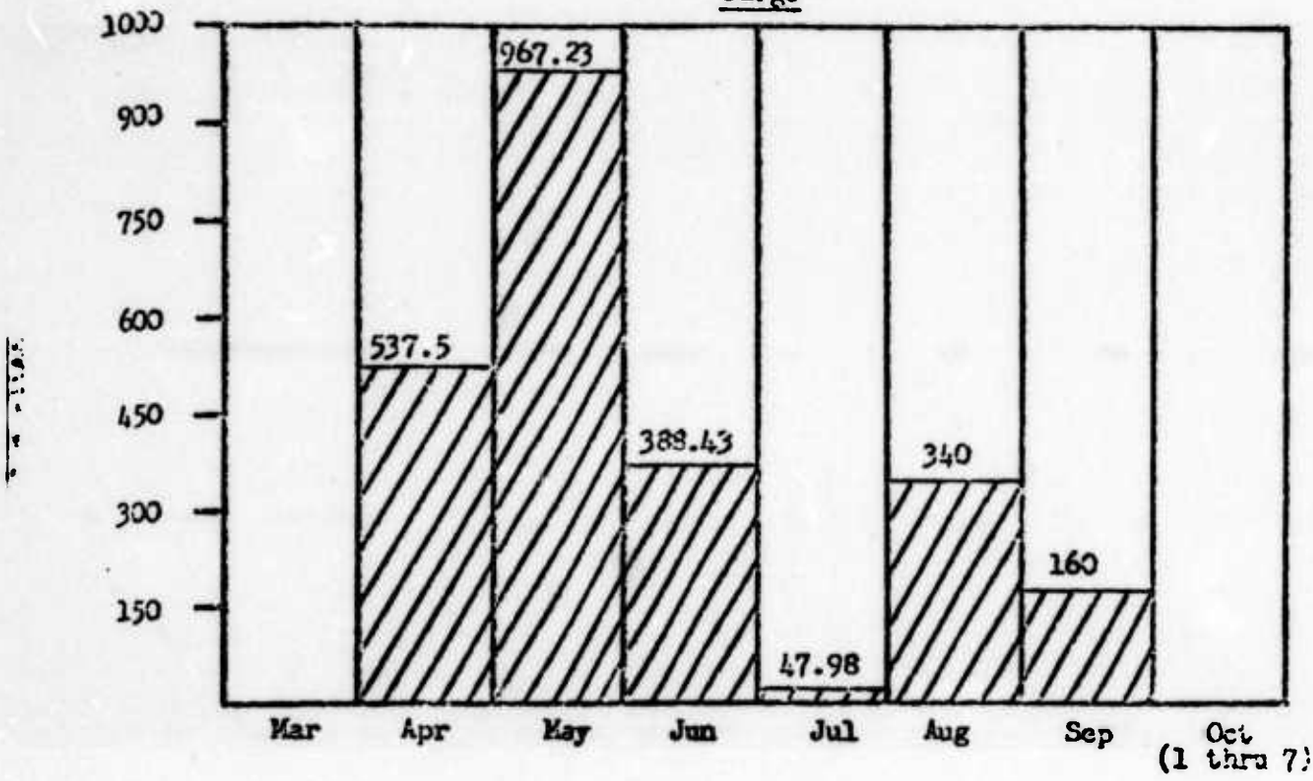
STATISTICAL SUMMARY

	Sorties	Mission Sorties	Total Time	Mission Time	Other Sorties	T.O. & Landings
-25 (2) Level)	199	14	504:25	78:10	175	241
-29 (1) Level)	23	15	*113:20	102:10	8	23
-50 (1) Level)	22	17	*117:00	108:25	5	22

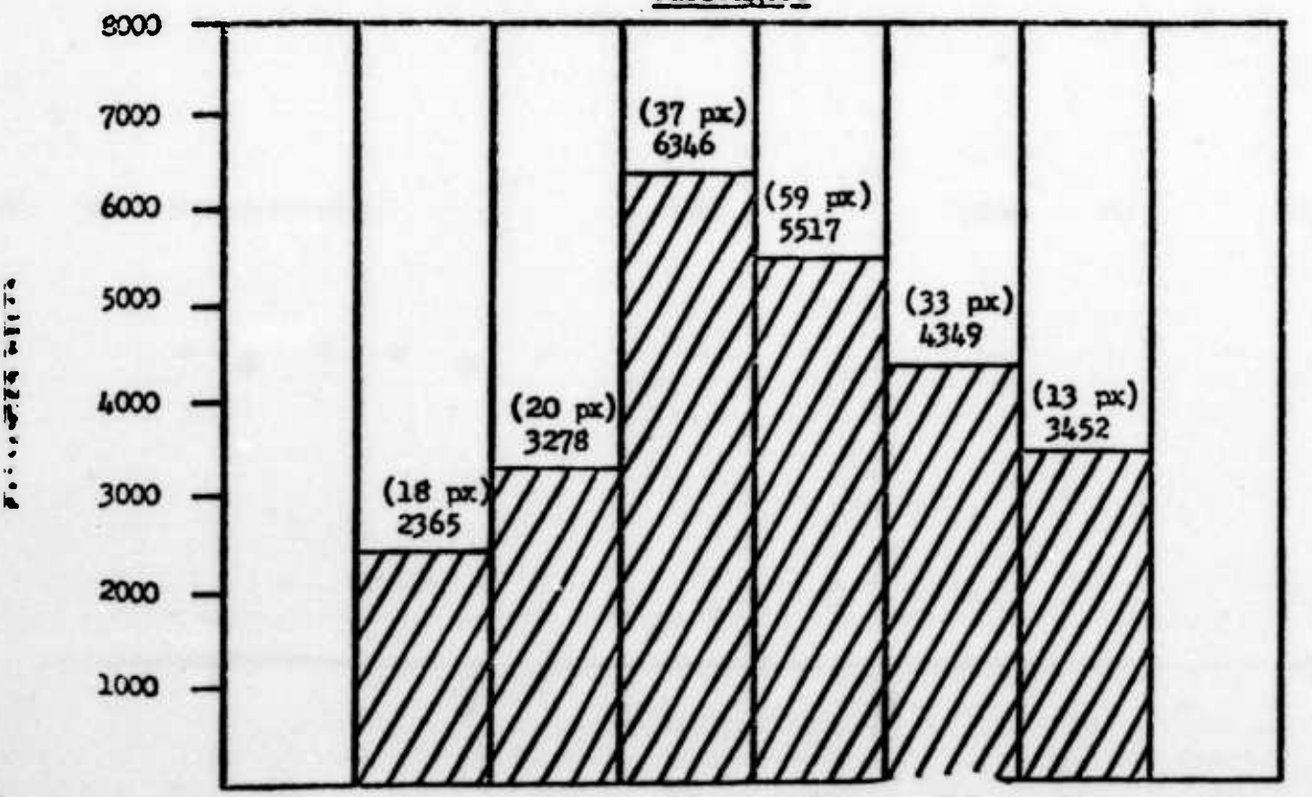
*Includes only time on missions and missions aborted due to shot cancellation etc. Total aircraft time not available.

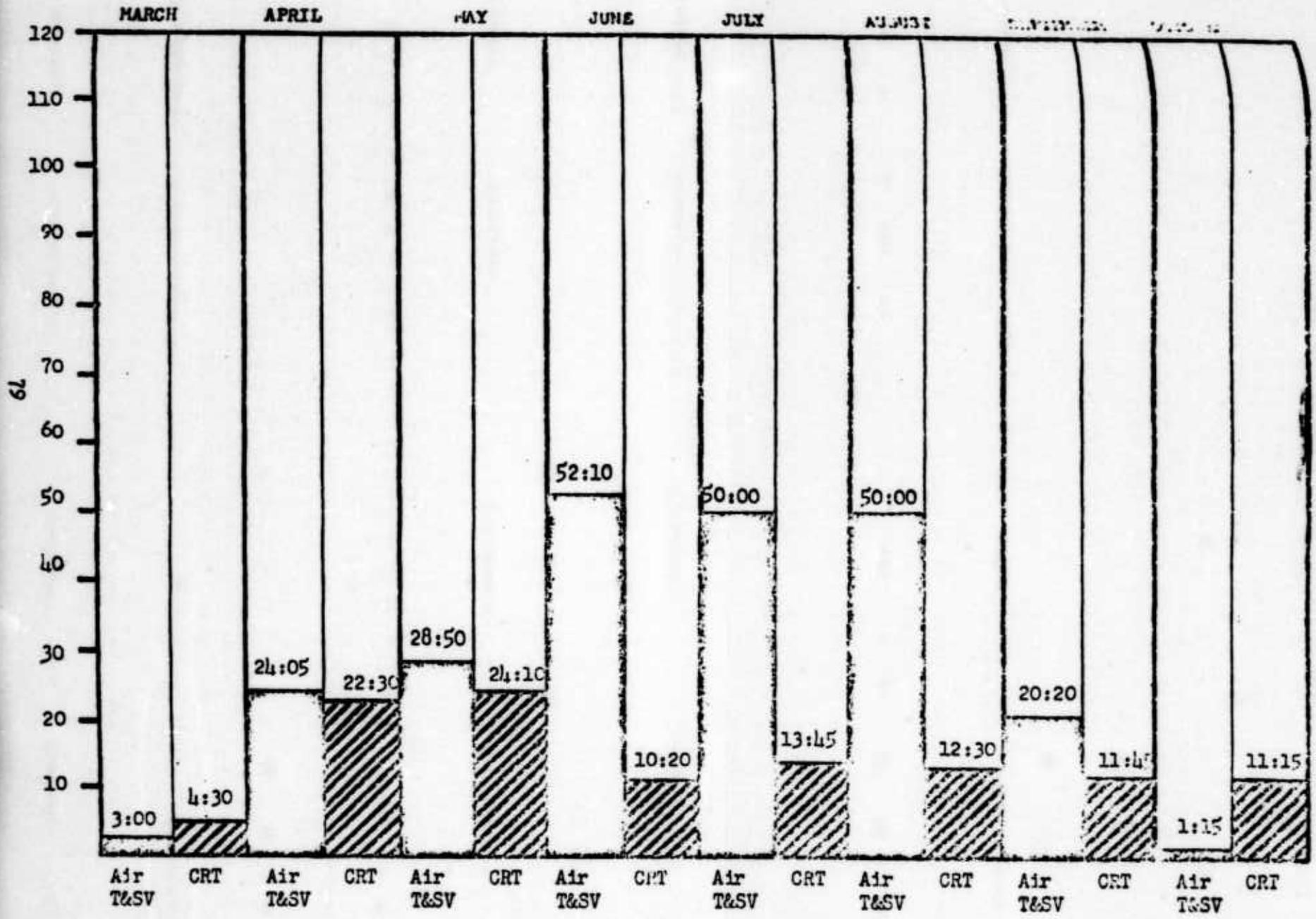
B-25 (1 Assigned 26 Mar 57)

Cargo

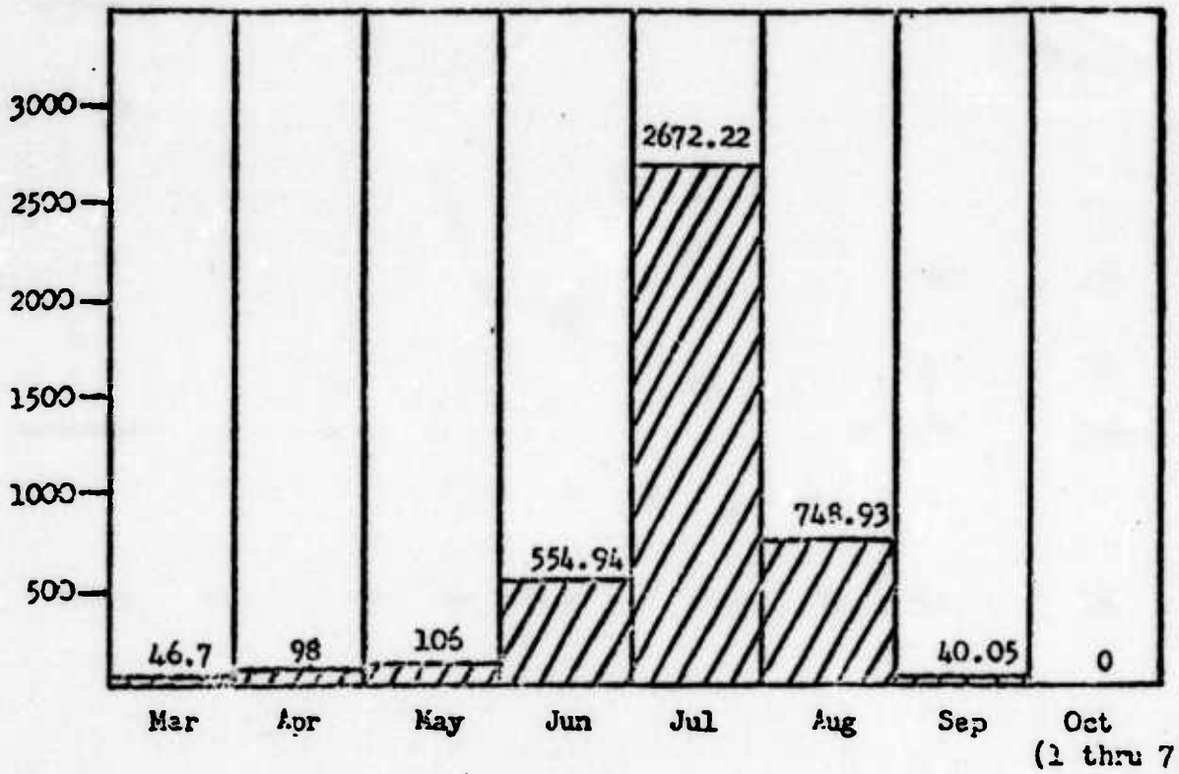


Passengers

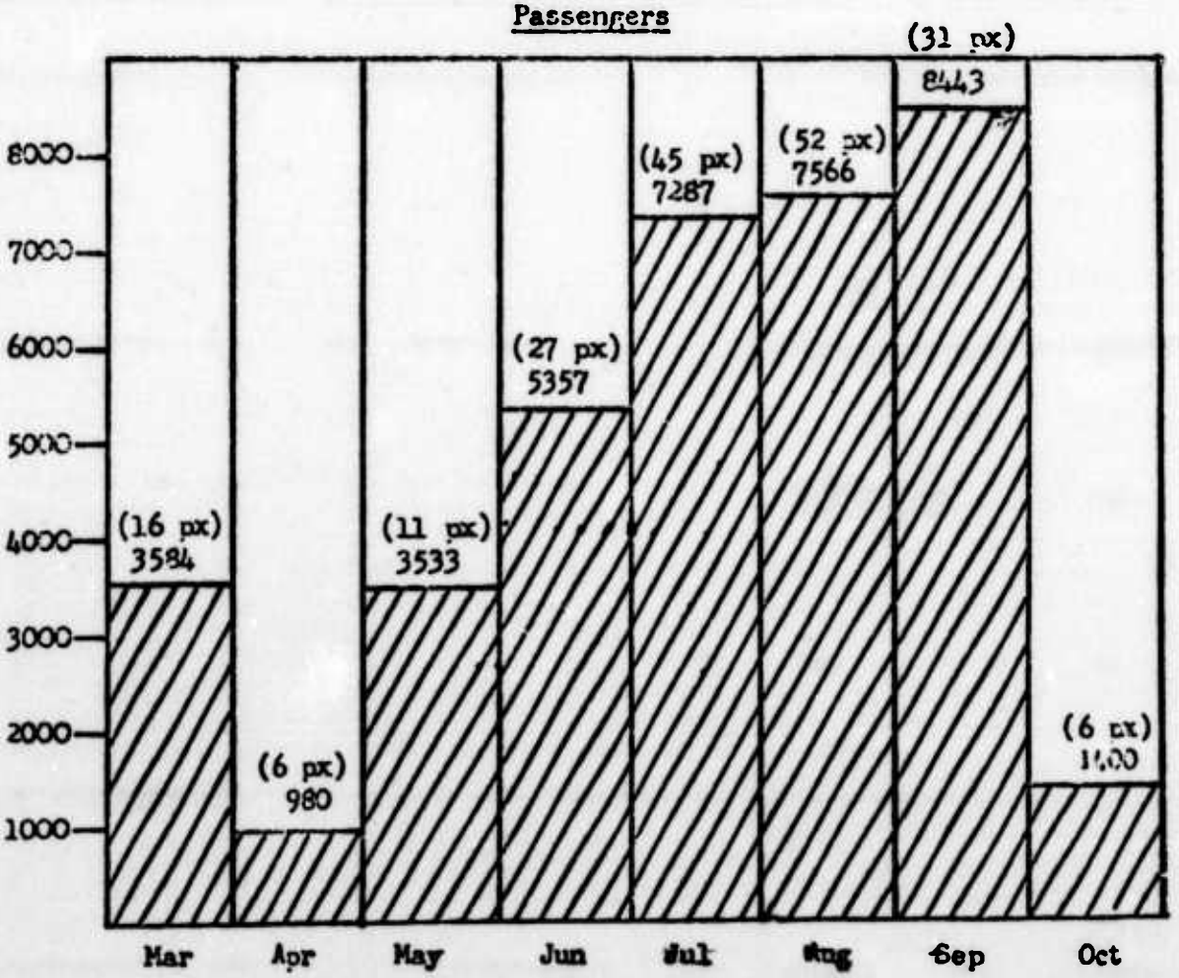


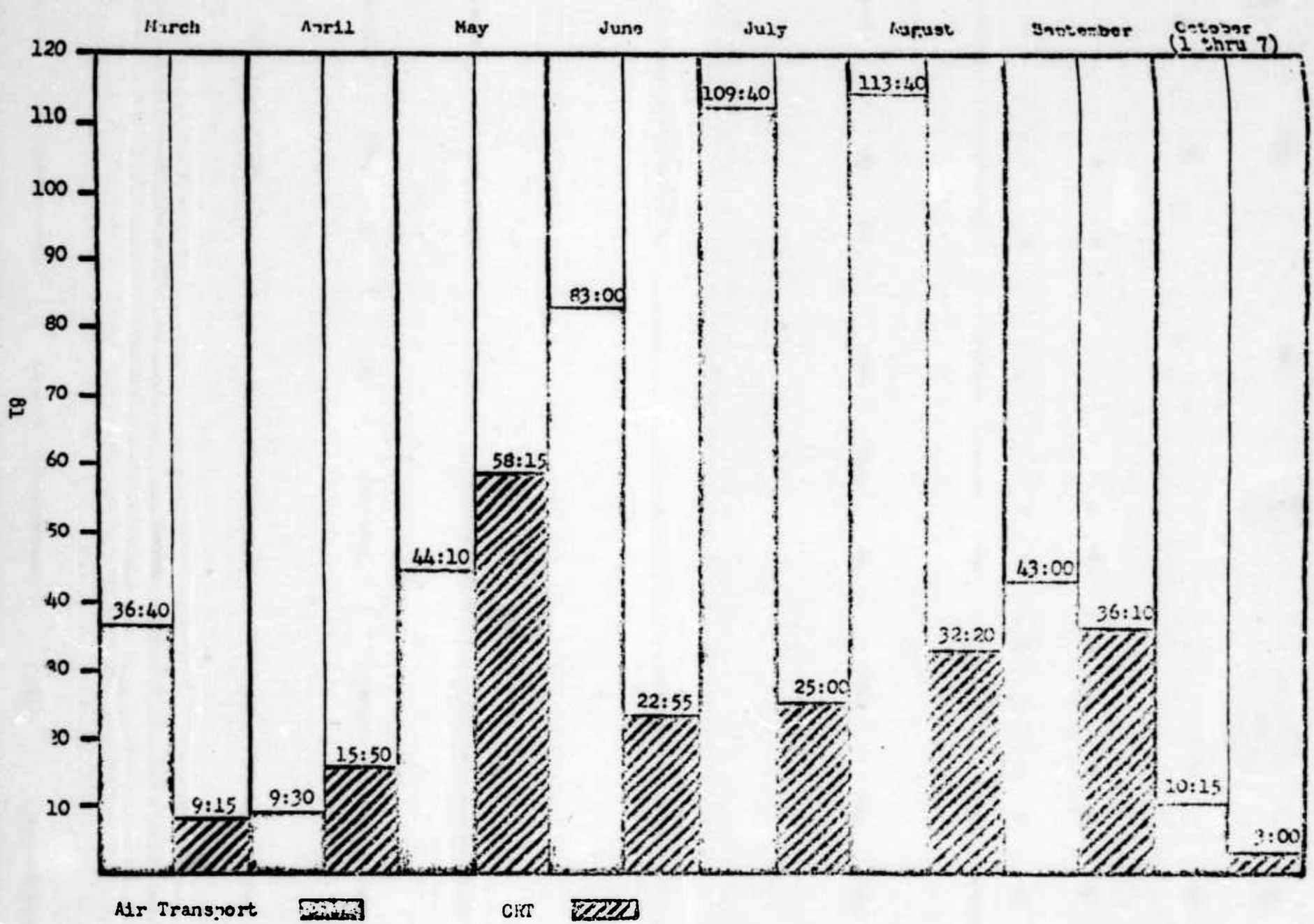

MARCH
APRIL
JUNE
JULY
120
110
100
90
80
70
60
50
40
30
20
10
61
3:00
4:30
24:05
22:30
28:50
24:10
52:10
10:20
50:00
13:45
50:00
12:30
20:20
11:45
1:15
11:15
Air T&SV
CRT

Cargo

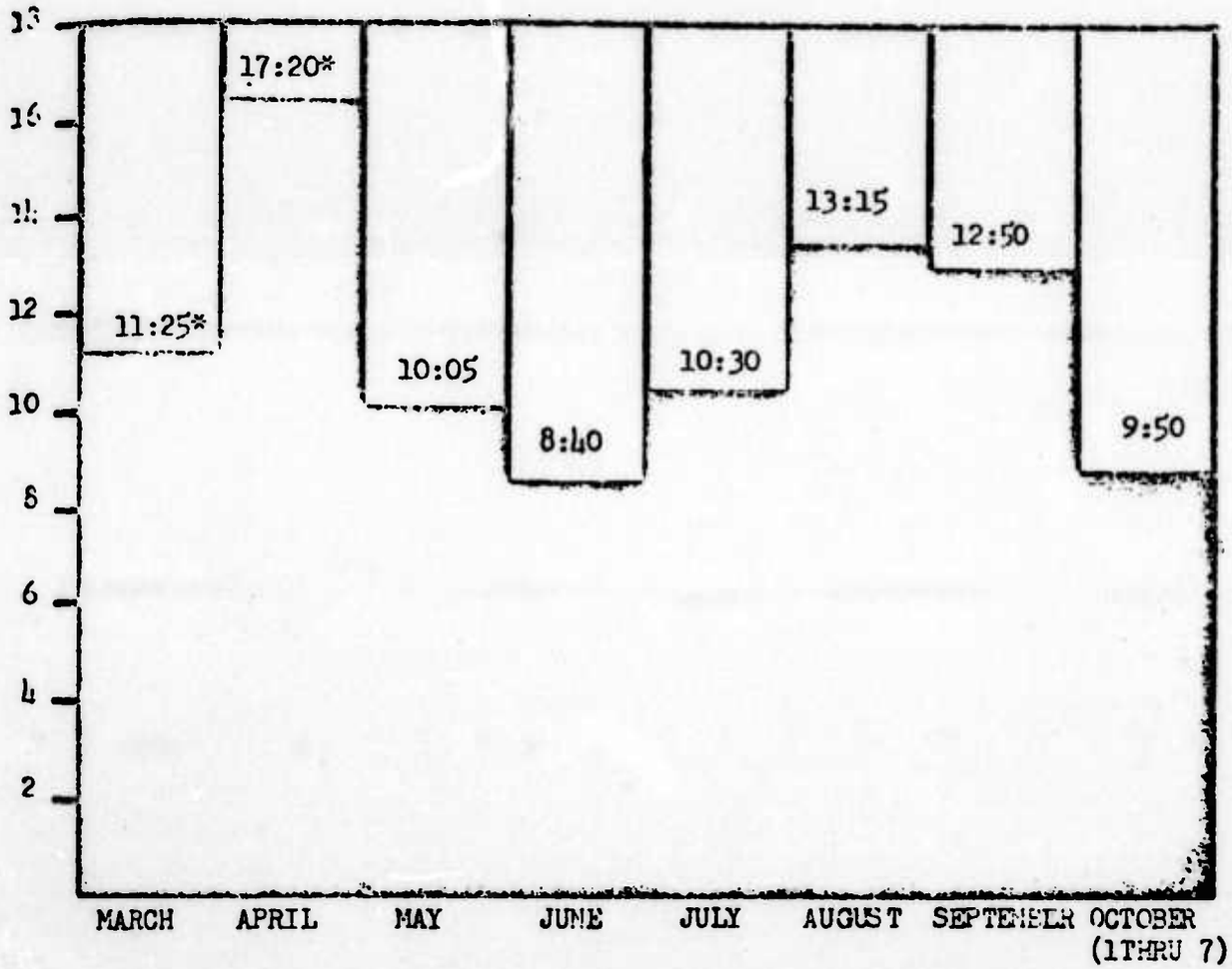


Passengers



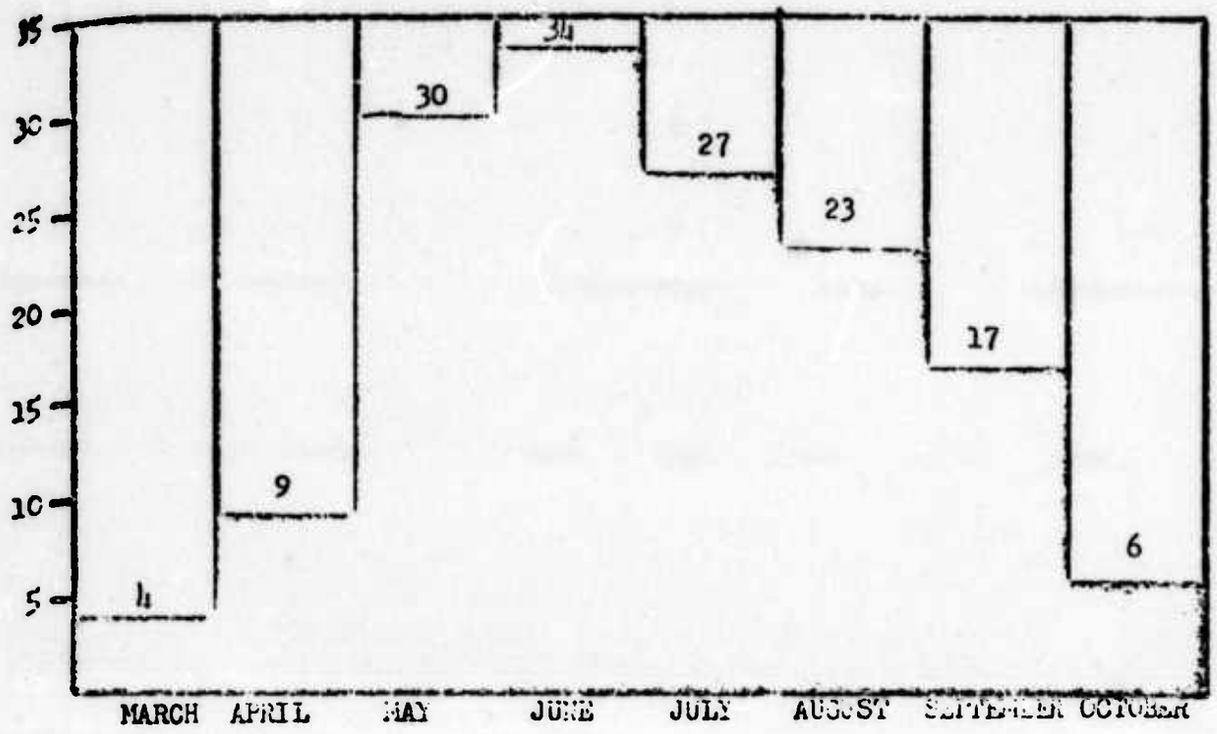

March
April
May
June
July
August
September
October (1 thru 7)
120
110
100
90
80
70
60
50
40
30
20
10
Hr
36:40
9:15
9:30
15:50
44:10
58:15
83:00
22:55
109:40
25:00
113:40
32:20
43:00
36:10
10:15
3:00
Air Transport
CRT

AVERAGE FLYING TIME PER ATTACHED PILOT

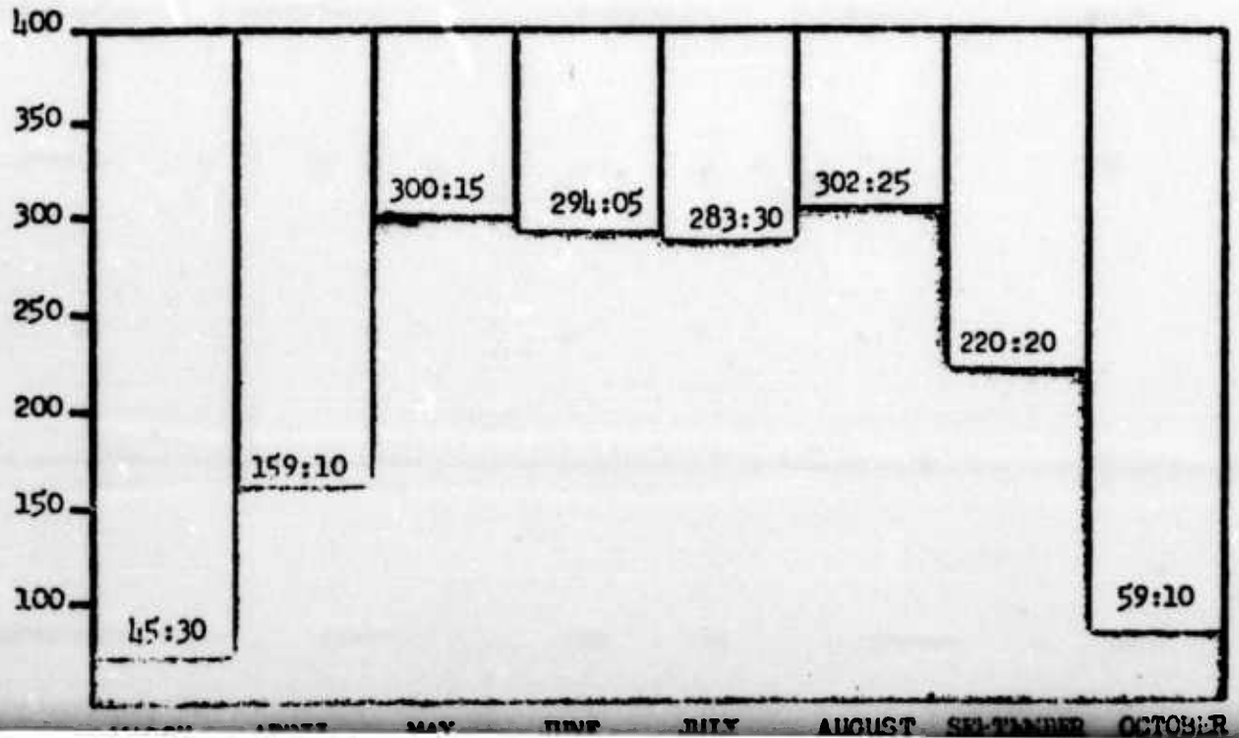


* = Higher averages for March and April due to Project 57 (L-20) at Site 13.

TDY PILOTS ATTAC



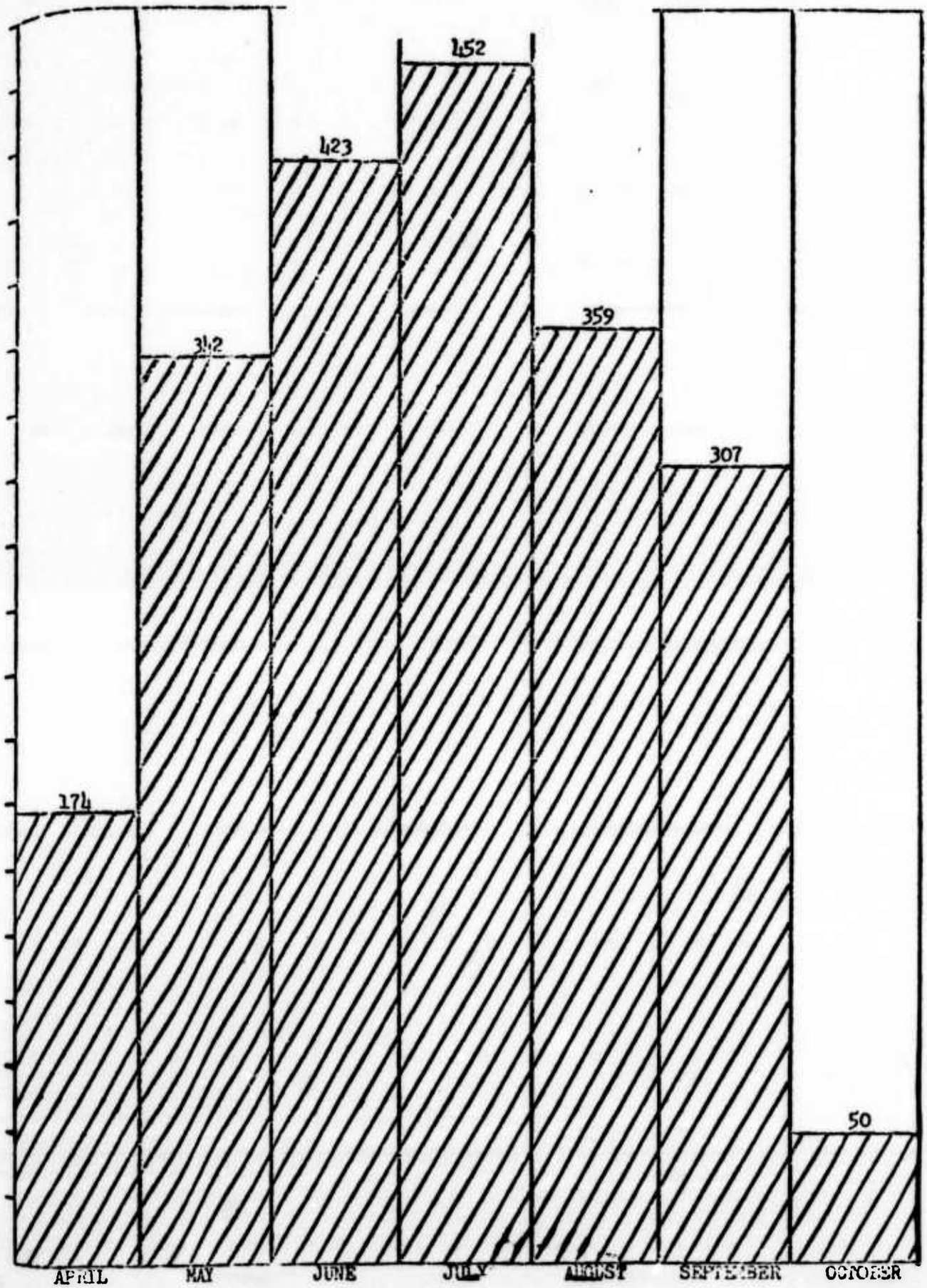
FLYING TIME ACCOMPLISHED BY ATTACHED PILOTS



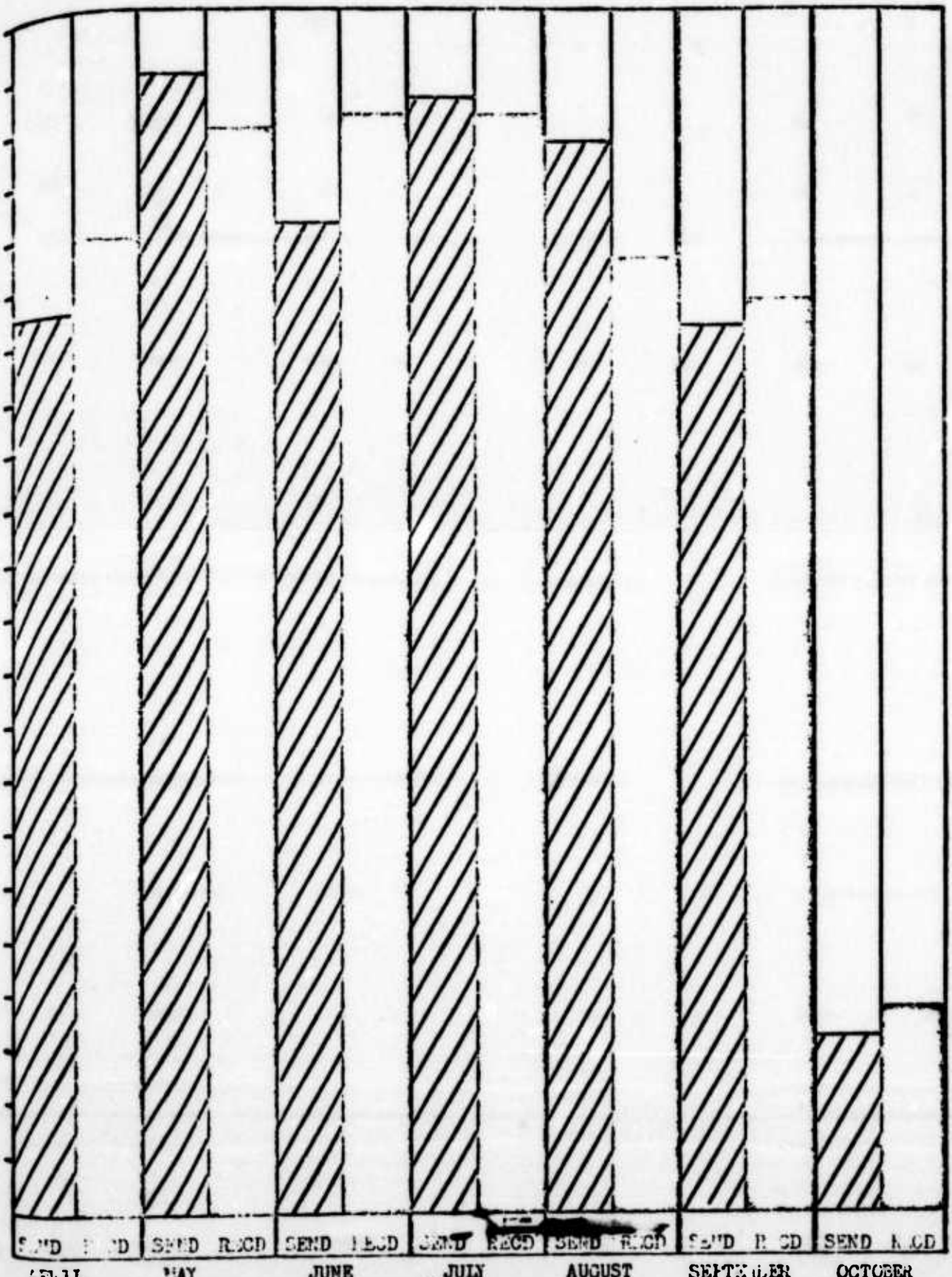
PART III

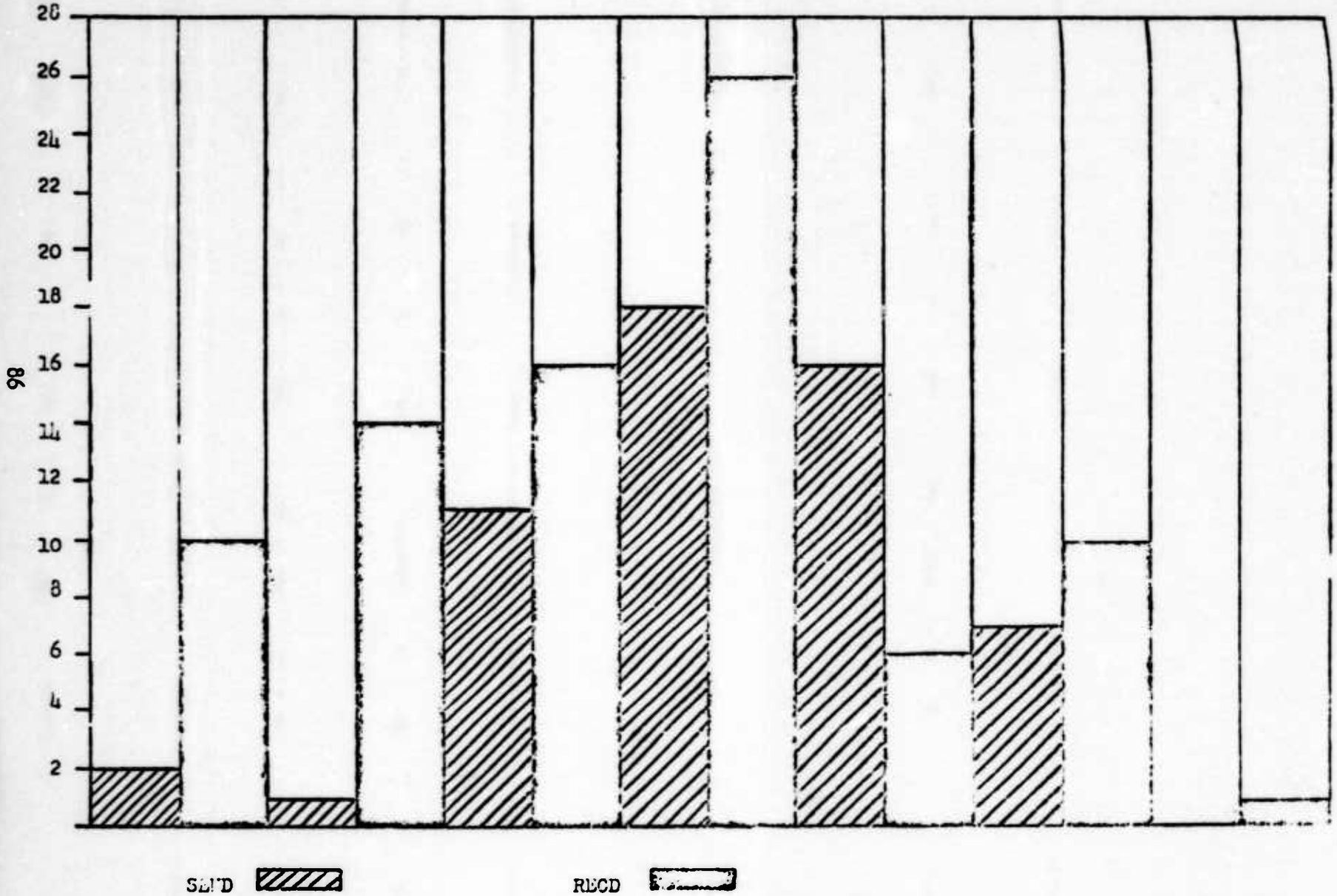
SECTION C

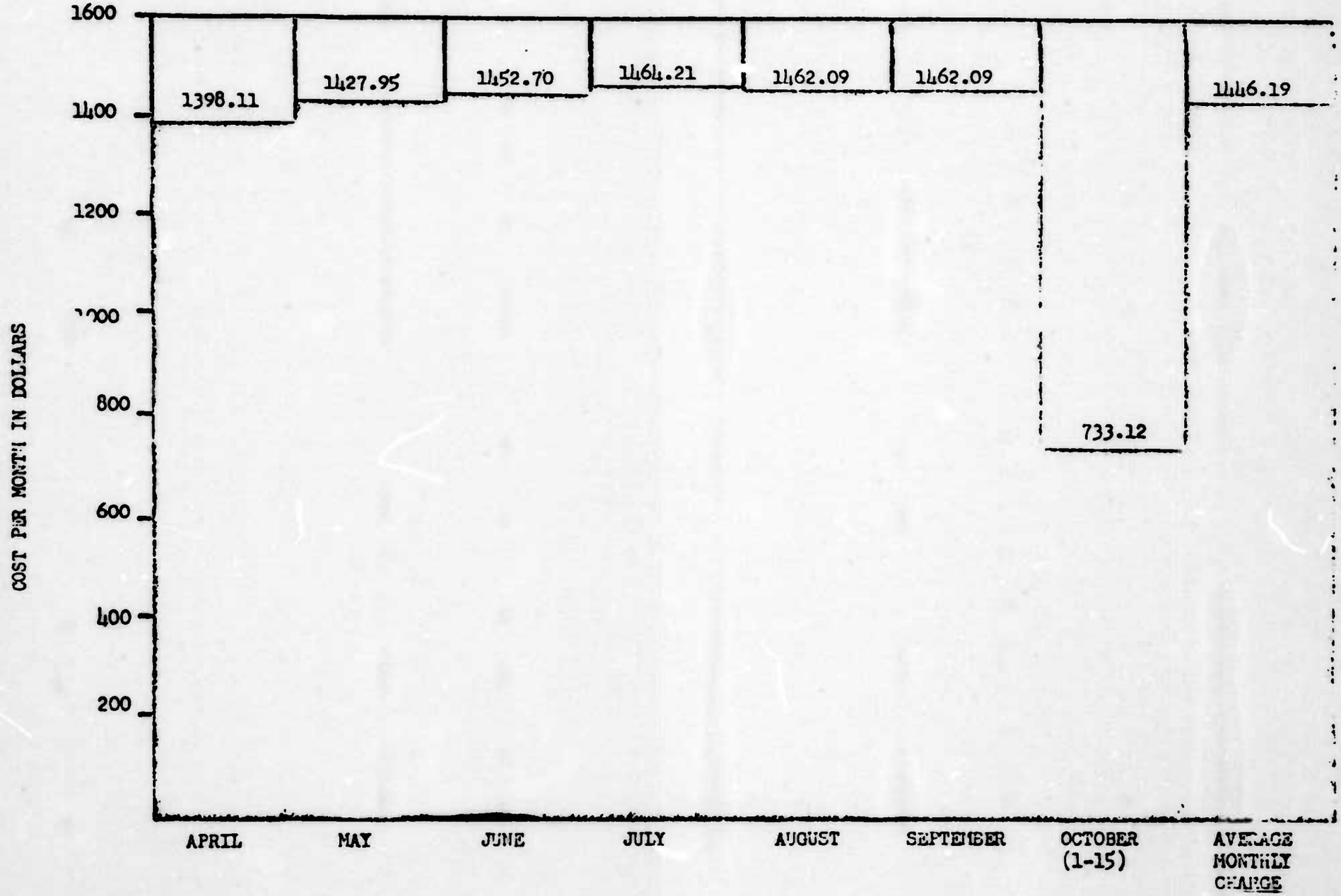
COMMUNICATIONS


174
342
423
452
359
307
50
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER

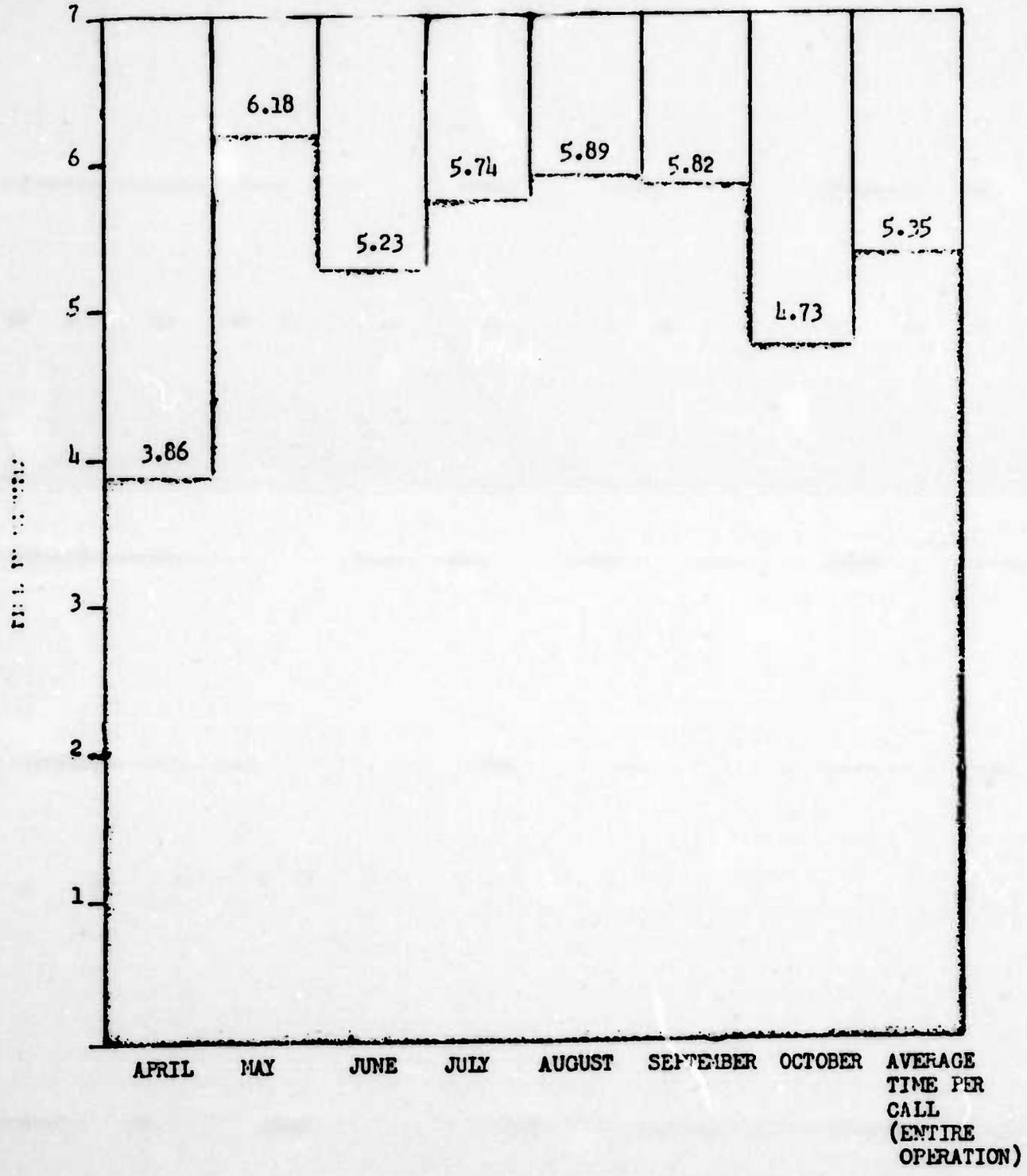
CLASSIFIED ELECTRICAL TRANSMISSION (AIRCONNET) DURING OPERATION PLUMBOB



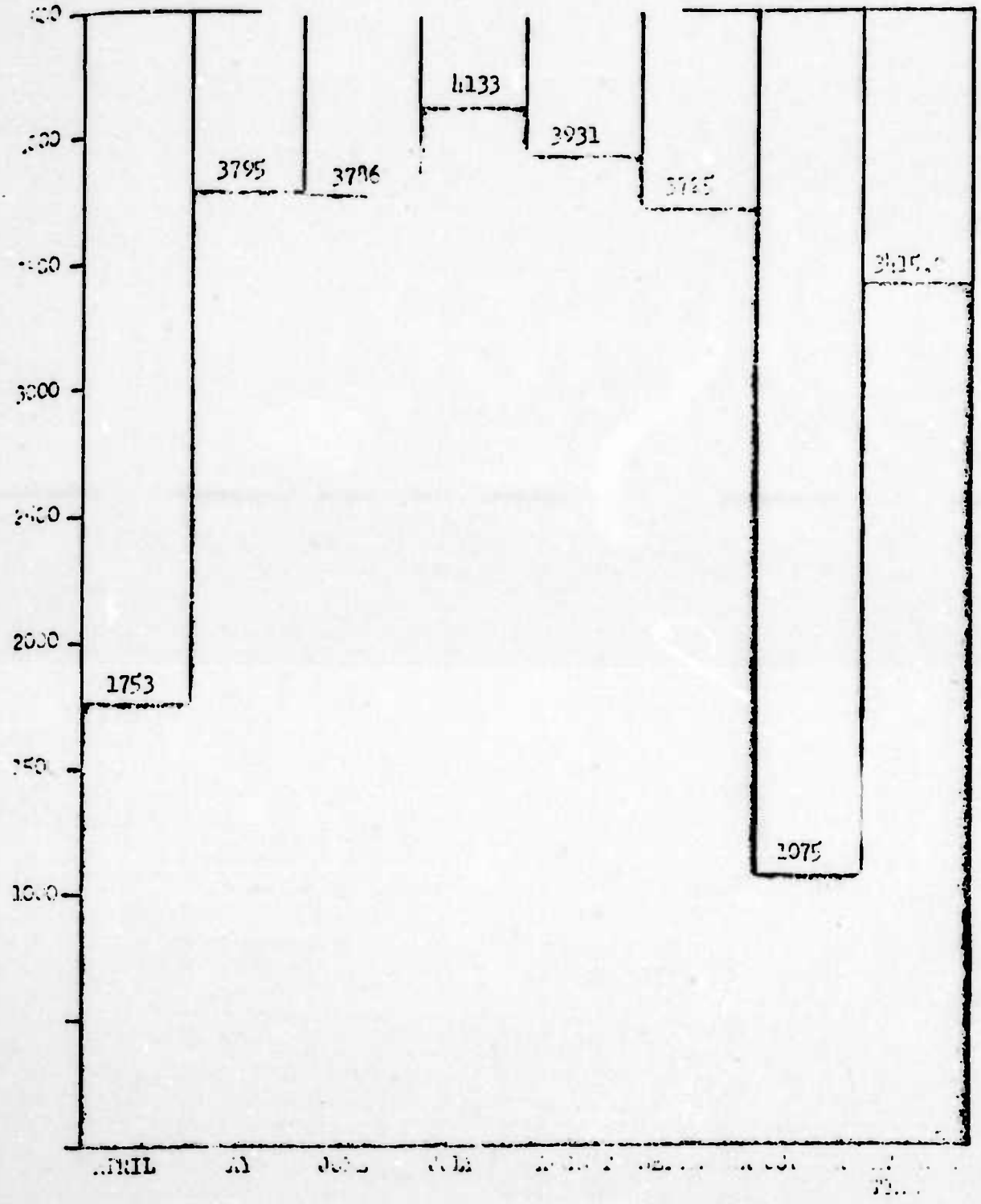

28
26
24
22
20
18
16
14
12
10
8
6
4
2
SENT
RECD


1600
1400
1200
1000
800
600
400
200
COST PER MONTH IN DOLLARS
1398.11
1427.95
1452.70
1464.21
1462.09
1462.09
733.12
1446.19
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER (1-15)
AVERAGE MONTHLY CHARGE

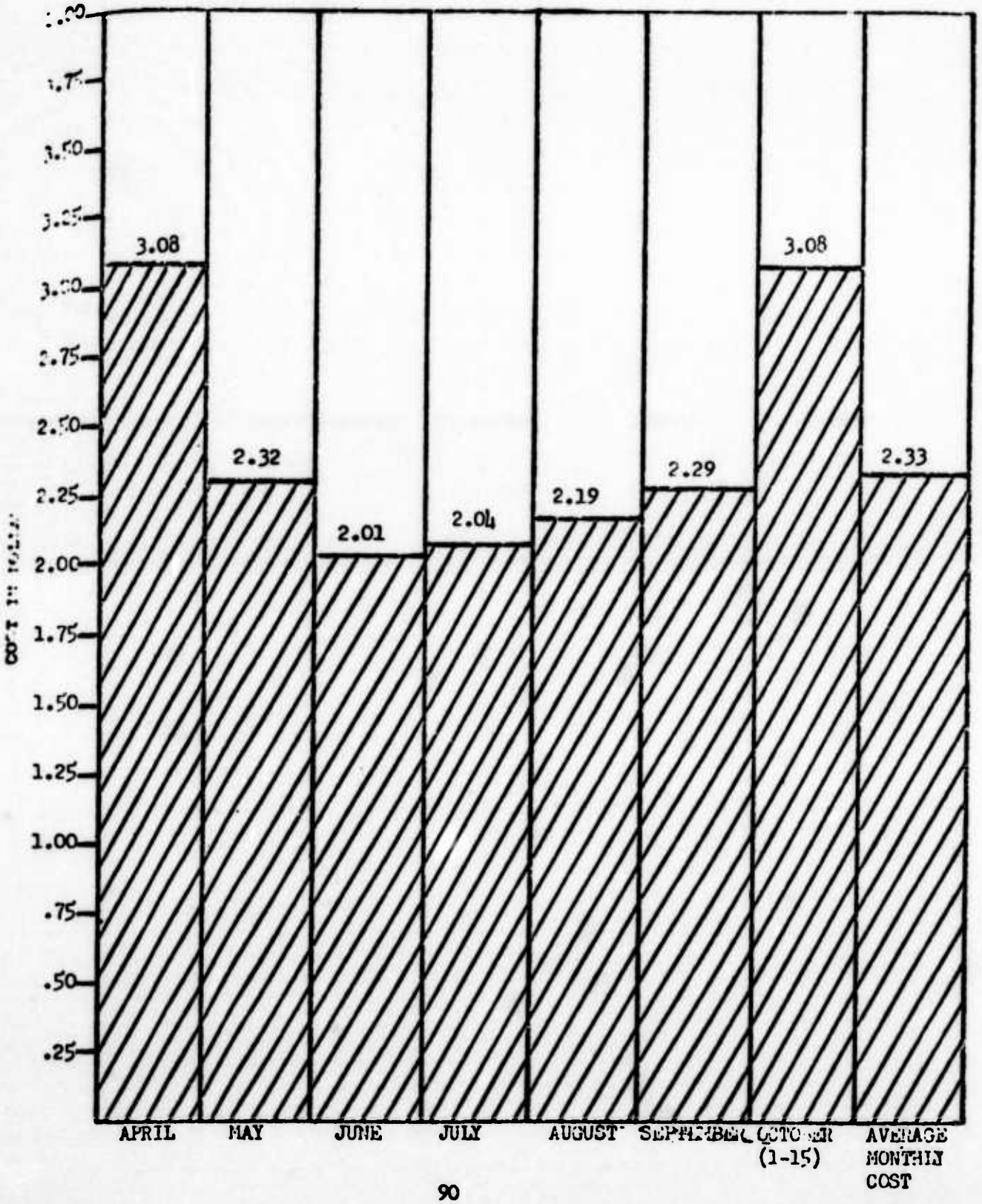
OPERATION PLUMBBOB AVERAGE TIME FOR EACH CALL ON THE LEASED LINE

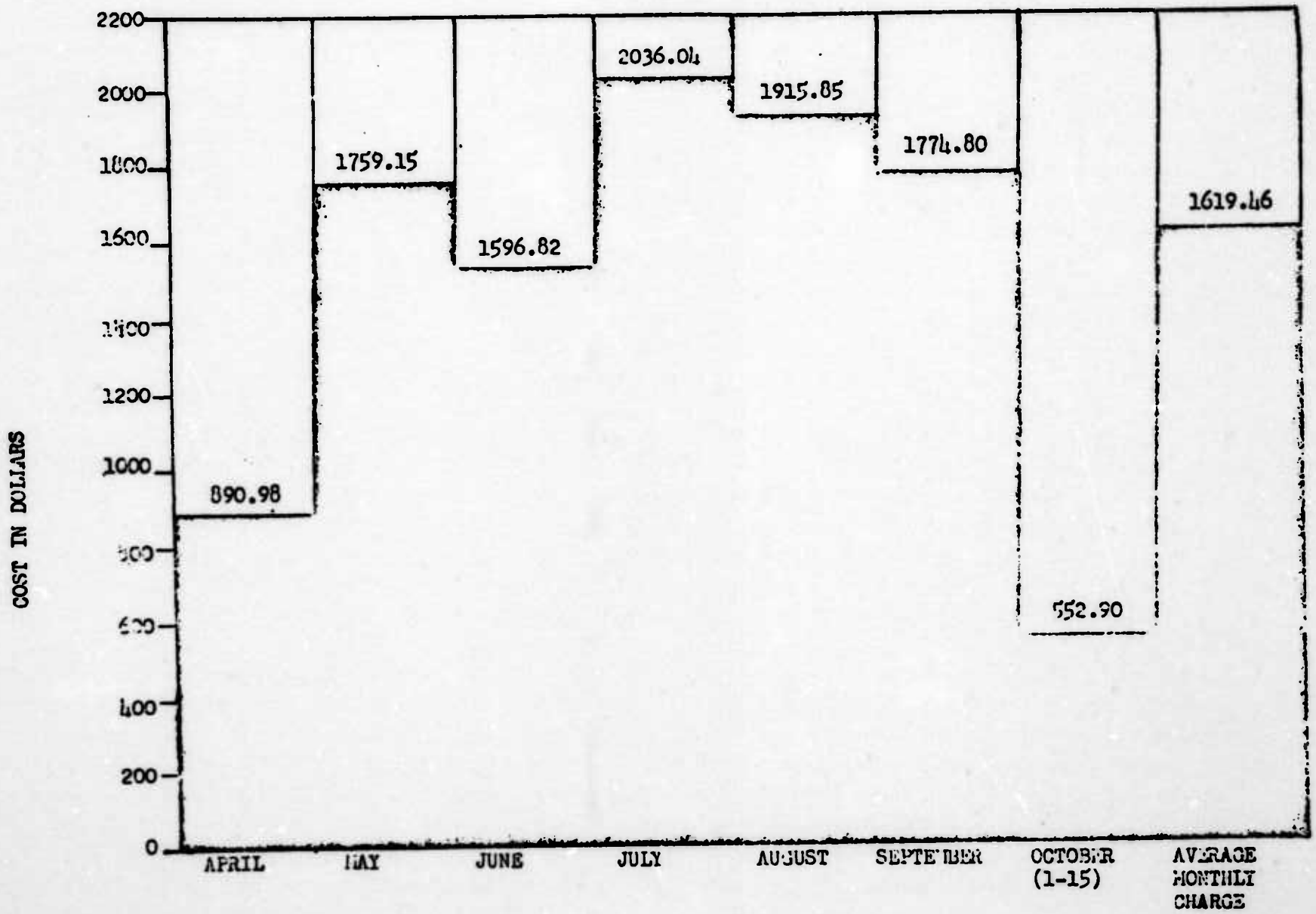


OPERATIONAL ARPANET LEASED LINE TIME
OF USE EACH MONTH

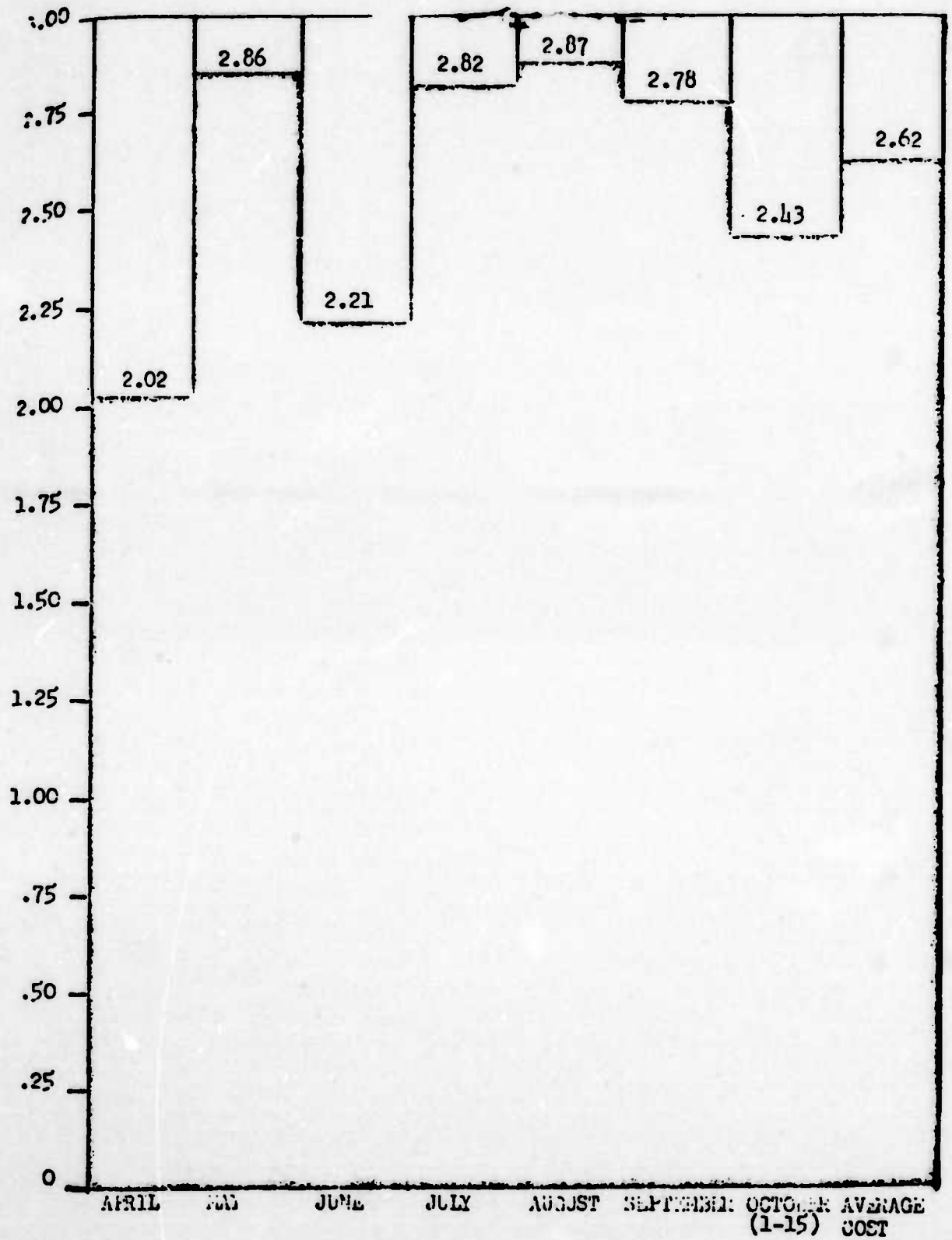


OPERATION PLUMBBOB LEASED LINE
CALLS PER MONTH



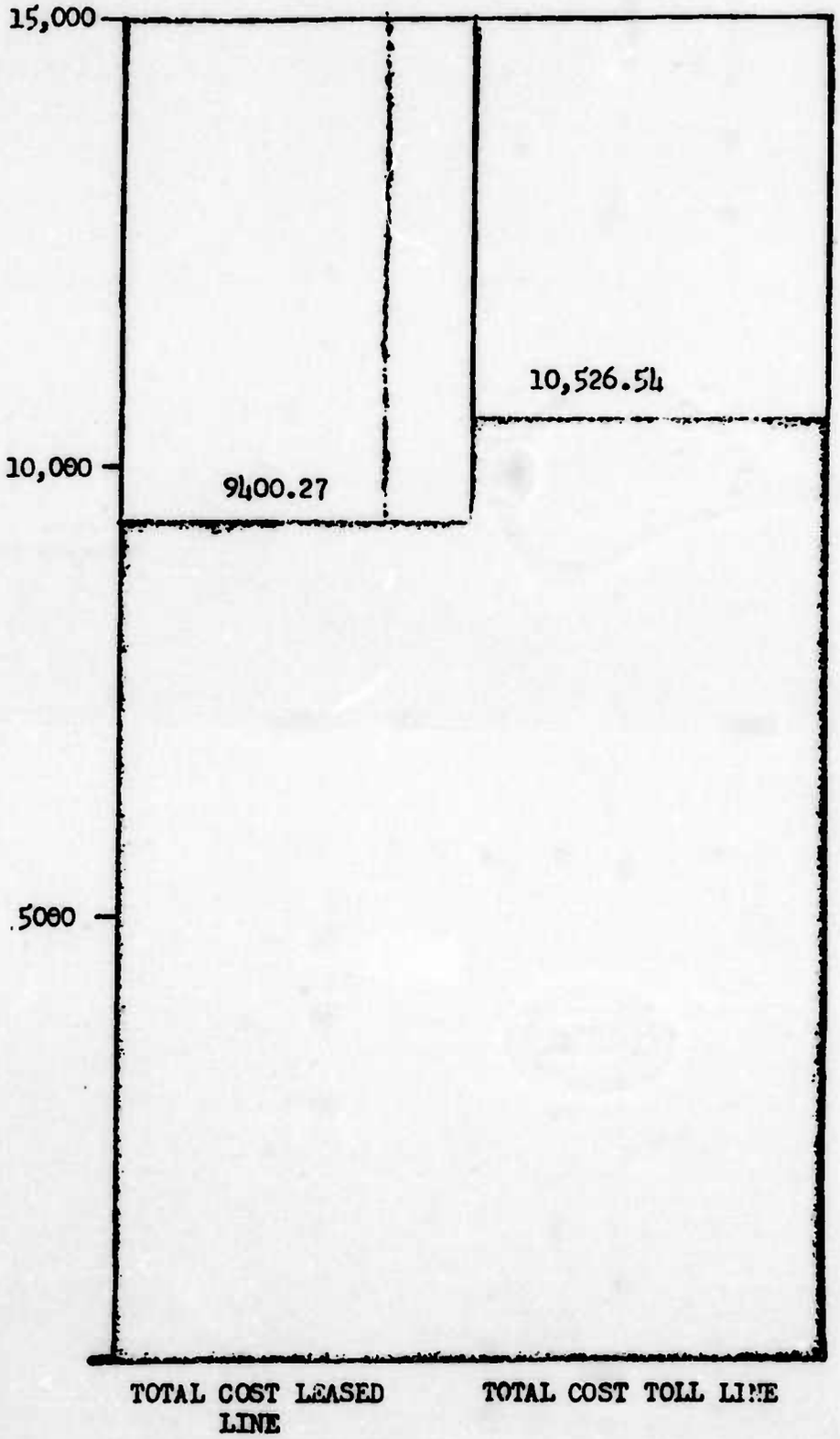

COST IN DOLLARS
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
890.98
1759.15
1596.82
2036.04
1915.85
1774.80
552.90
1619.46
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER (1-15)
AVERAGE MONTHLY CHARGE

OPERATION PLUMBOB AVERAGE COST PER
CALL ON A TOLL LINE

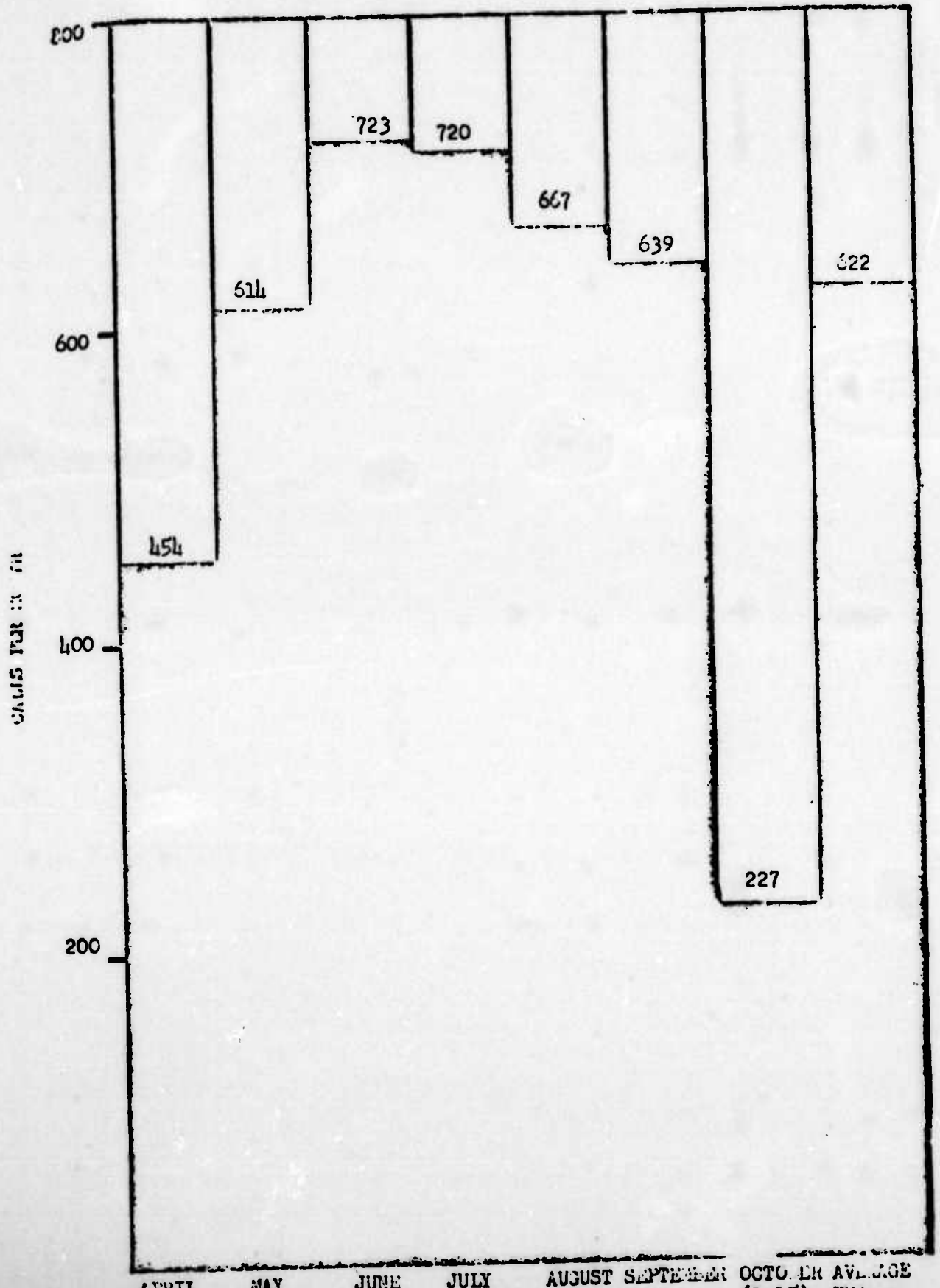


92

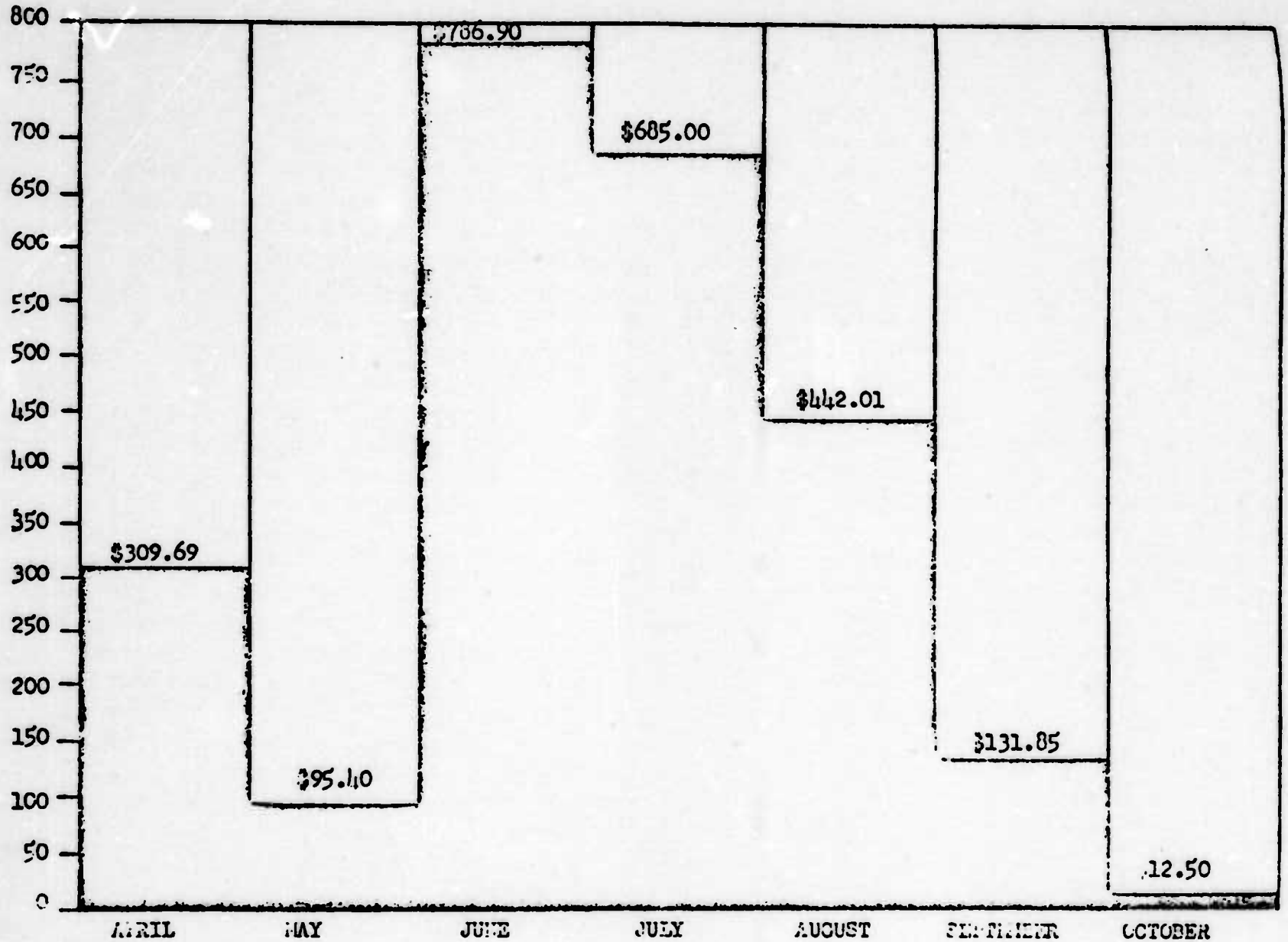
OPERATION PLUMBBOB COMPARISON OF
TOTAL COST BETWEEN LEASED LINE AND TOLL LINE



OPERATION PLUMBOB LEASED LINE
CALLS PER MONTH



MONTHLY TELEPHONE TOLLS CHARGEABLE TO [illegible]

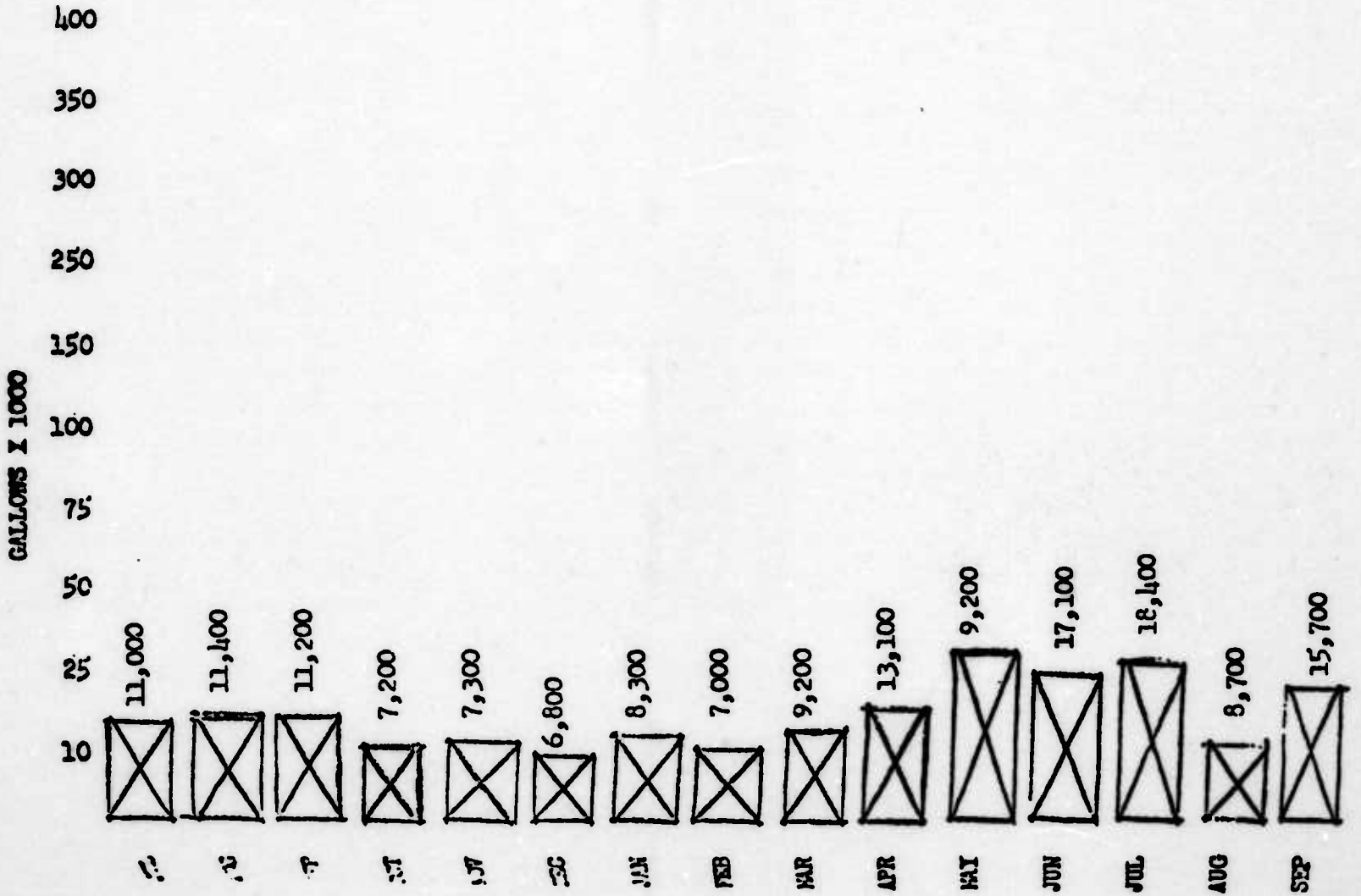


PART IV

MATERIEL

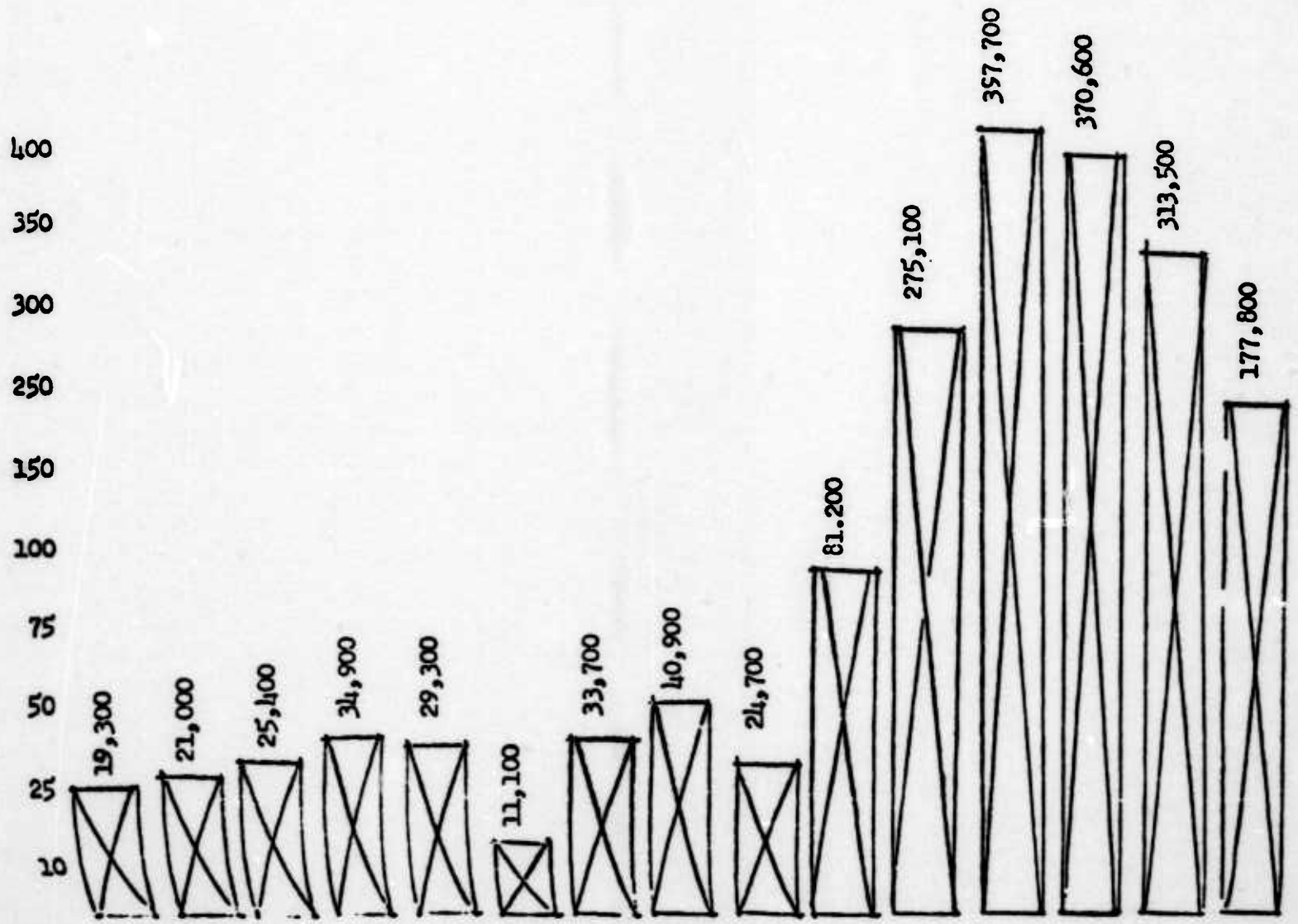
PETROLEUM PRODUCTS
NET ISSUES - TO NEAREST 100 GALLONS
Project "PLUMBBOB" (Build-up & Test Period)

GRADE OF FUEL Auto/Gas



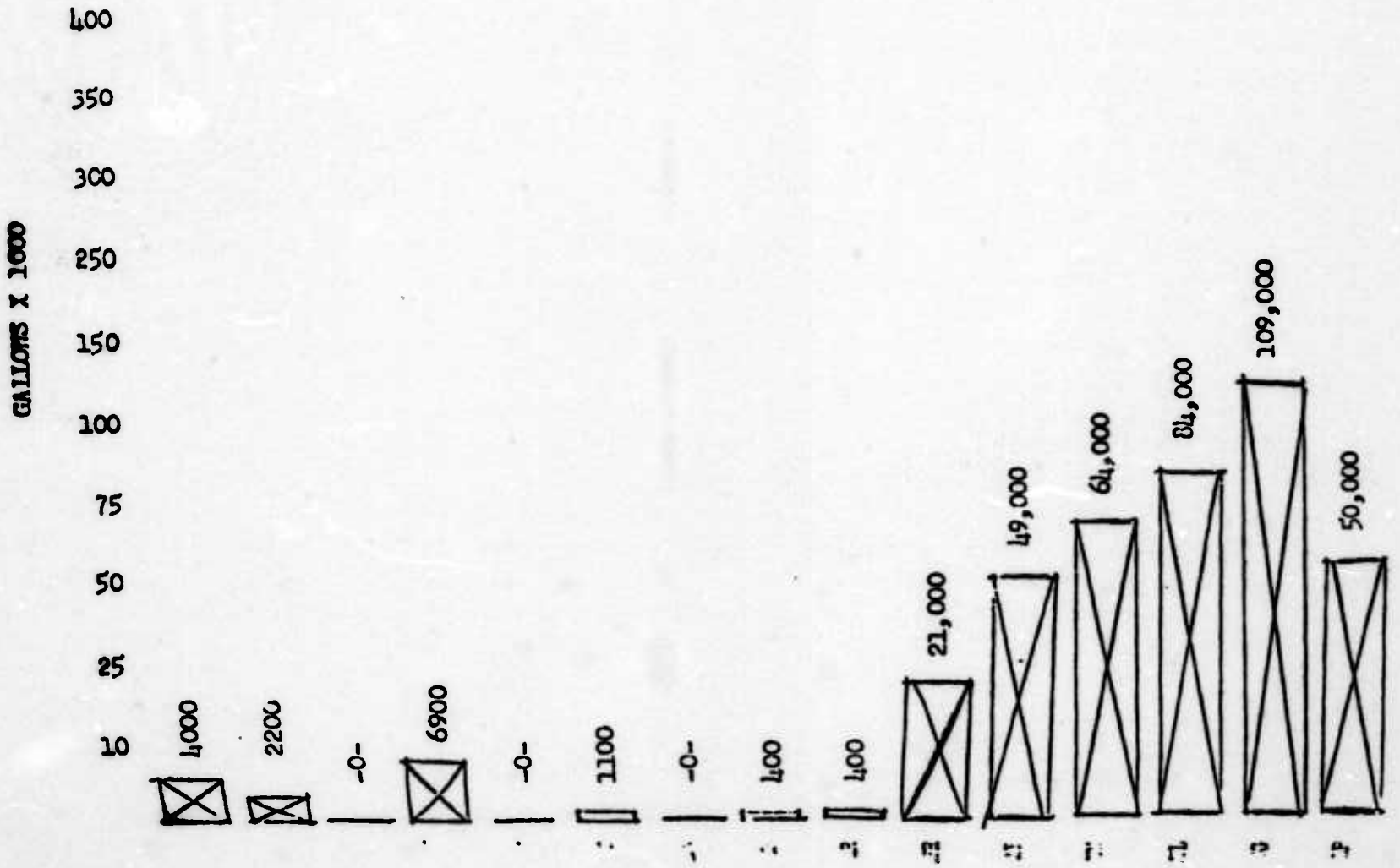
PETROLEUM PRODUCTS
NET ISSUE - To Nearest 100 Gallons
Project "Plumbbob" (Build-up & Test Period)

GRADE OF FUEL



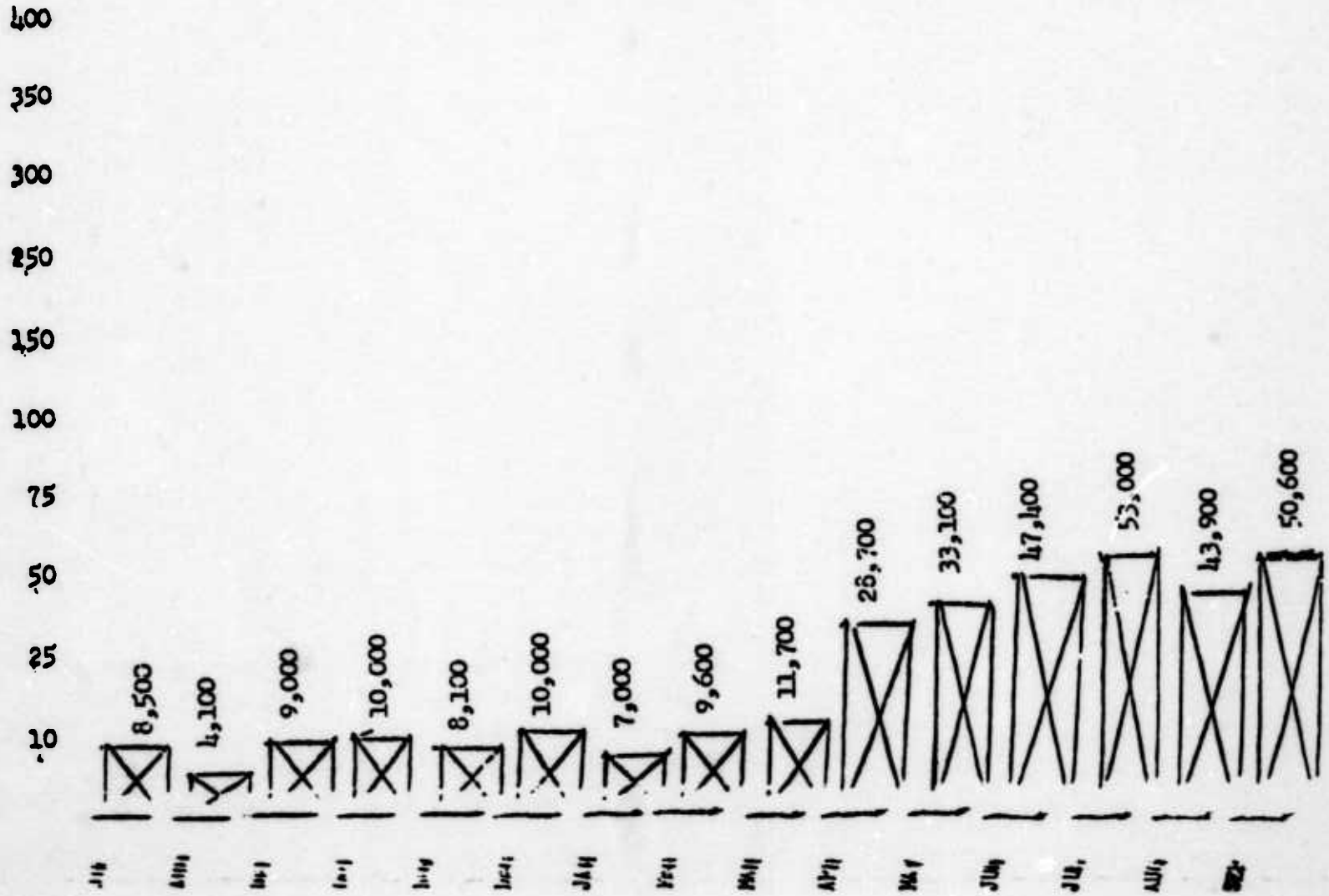
PETROLEUM PRODUCTS
NET ISSUES - To Nearest 100 Gallons
Project "Plumbbob" (Build-up & Test Period)

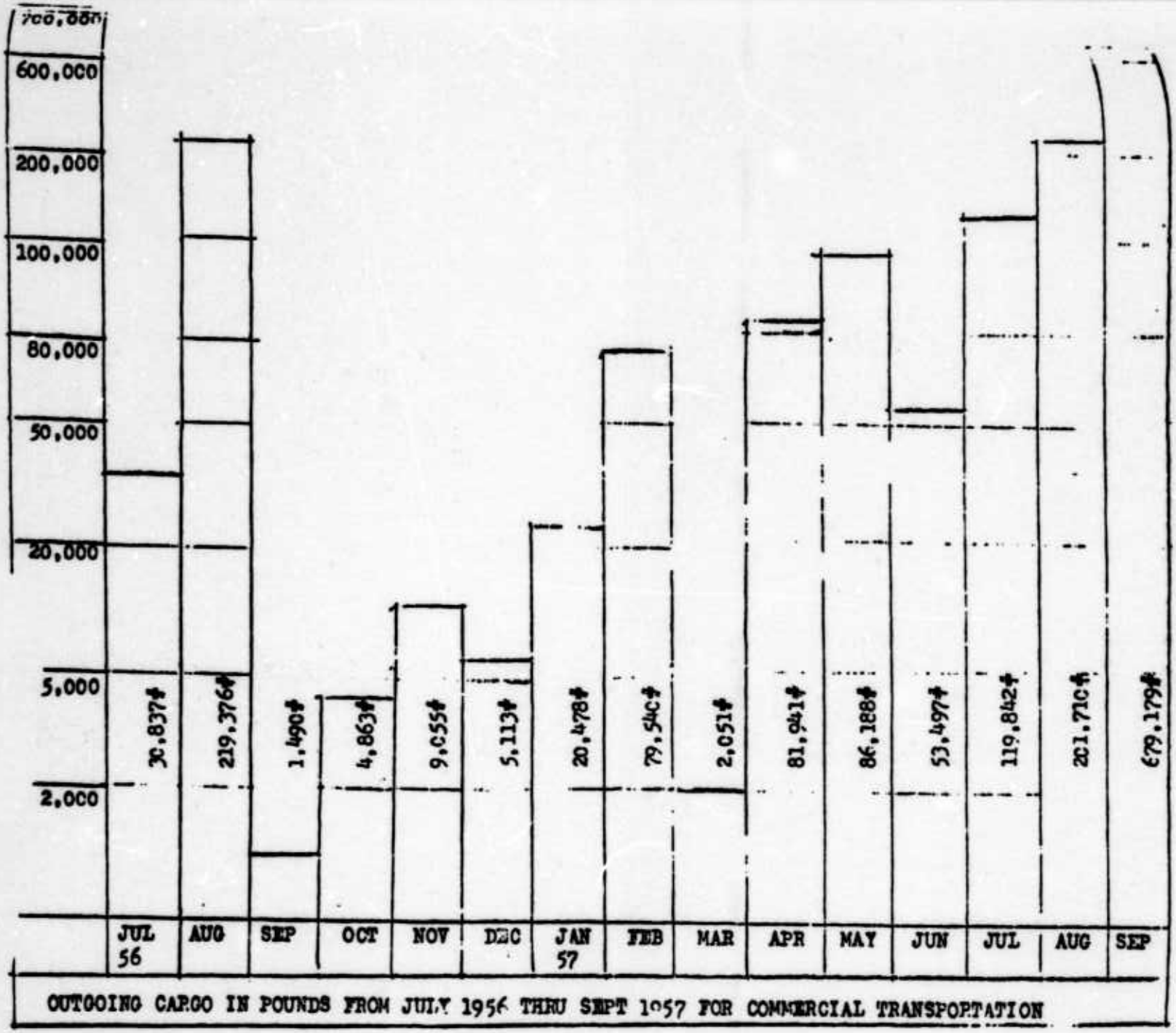
GRADE OF FUEL
115/145



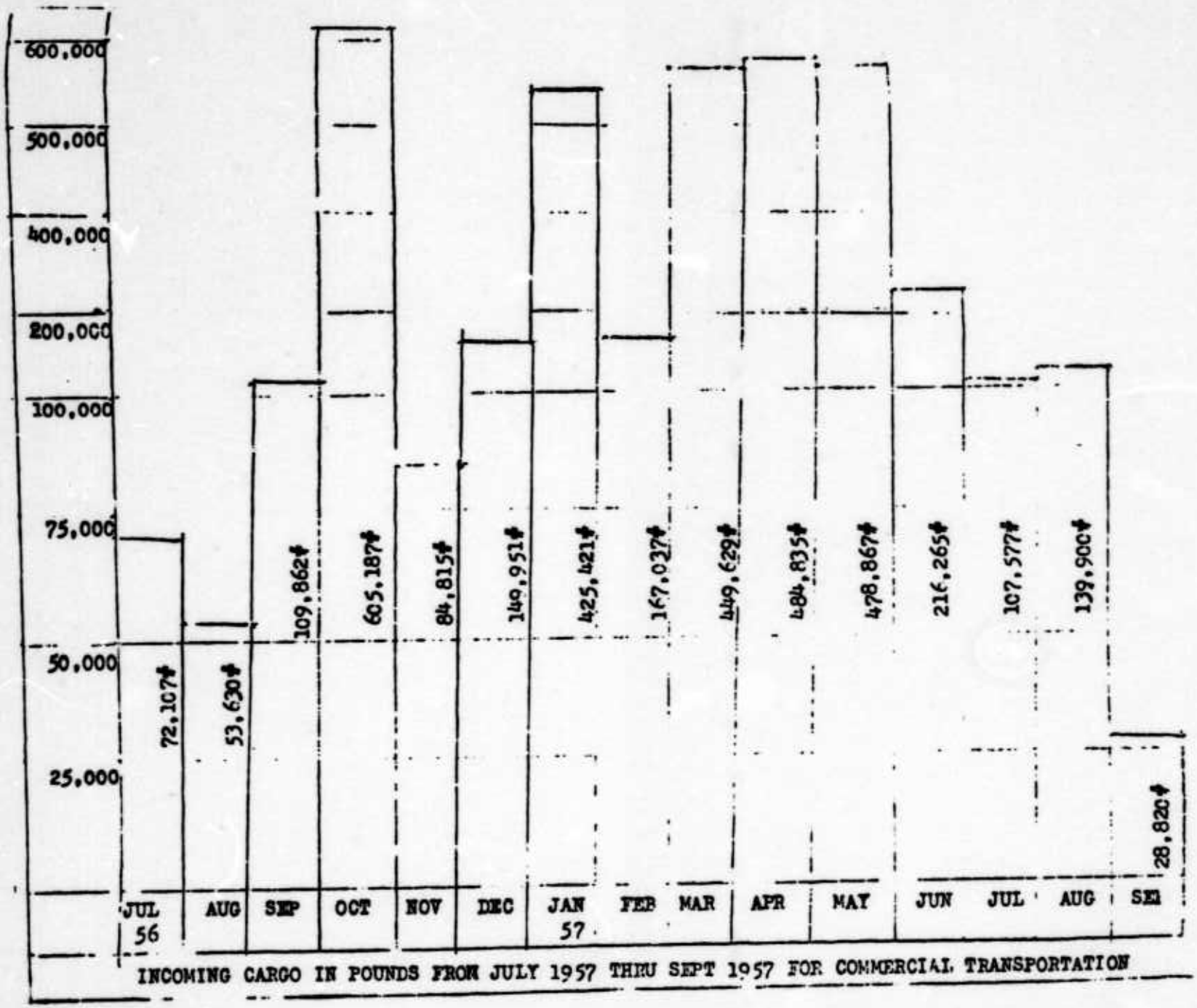
PETROLEUM PRODUCTS
NET ISSUES - TO NEAREST 100 GALLONS
Project "PLUMBOB" (Build-up & Test Period)

GRADE OF FUEL 100/130





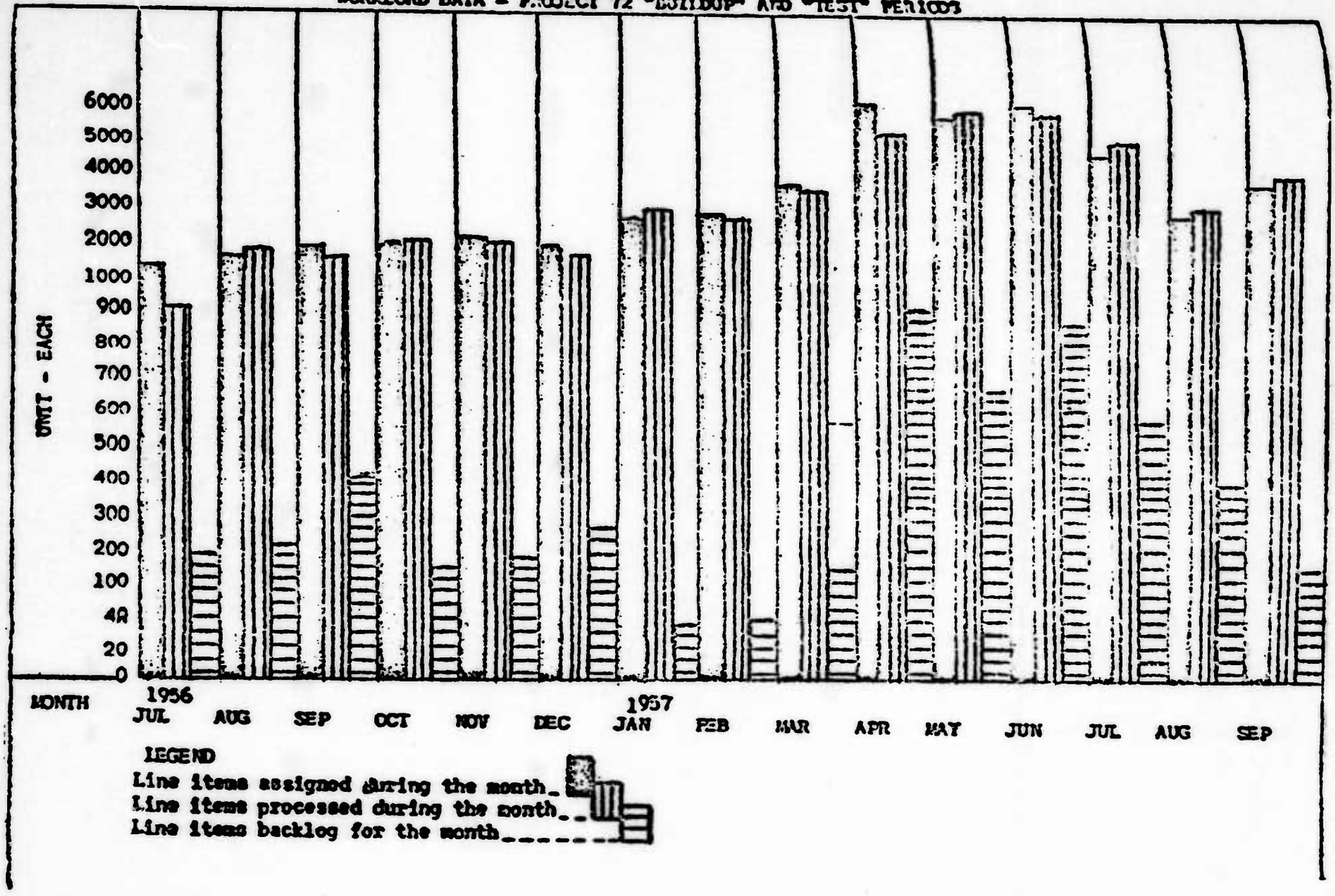
OUTGOING CARGO IN POUNDS FROM JULY 1956 THRU SEPT 1957 FOR COMMERCIAL TRANSPORTATION



INCOMING CARGO IN POUNDS FROM JULY 1957 THRU SEPT 1957 FOR COMMERCIAL TRANSPORTATION

BASE SUPPLY

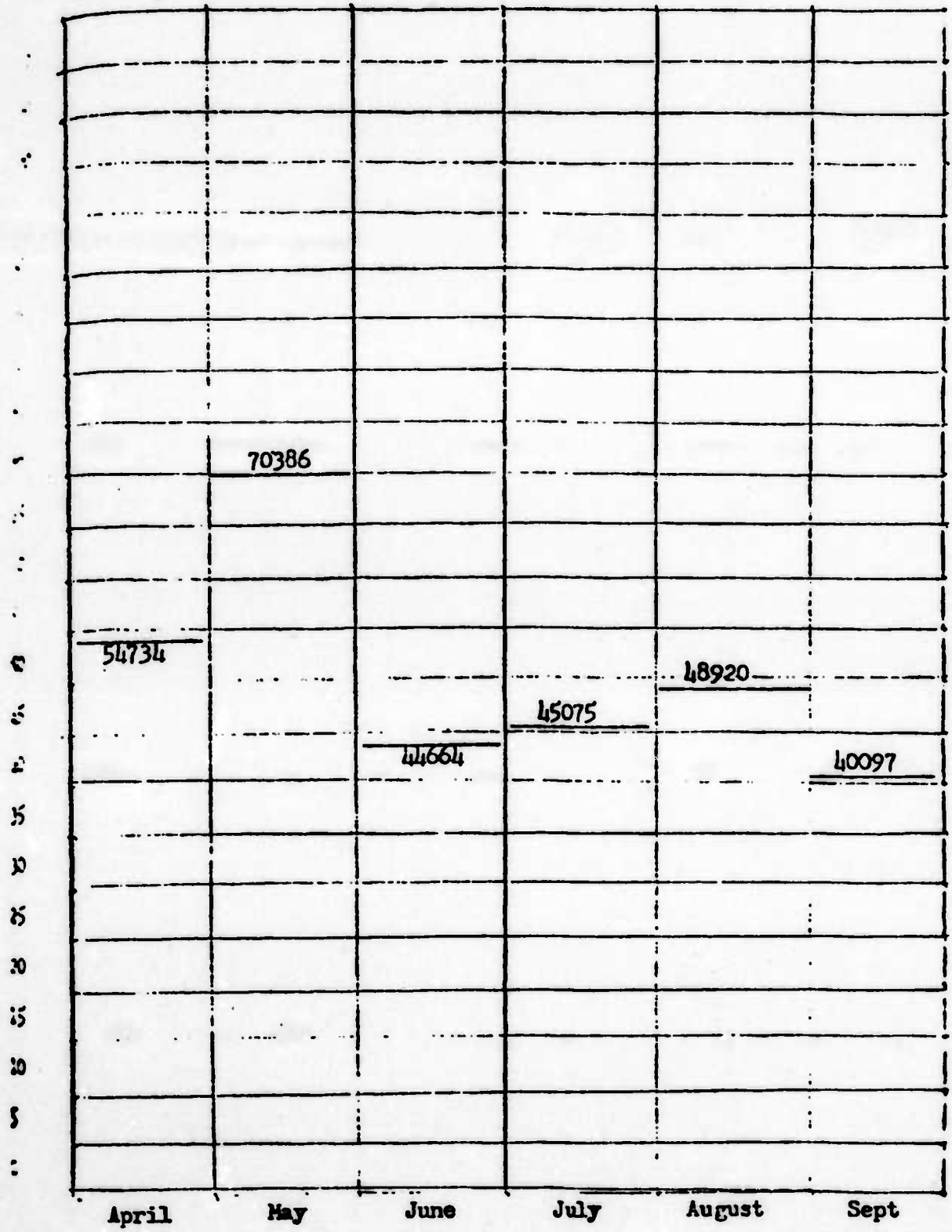
WORKLOAD DATA - PROJECT 72 "BUILDUP" AND "TEST" PERIODS



VEHICLE ASSIGNMENTS

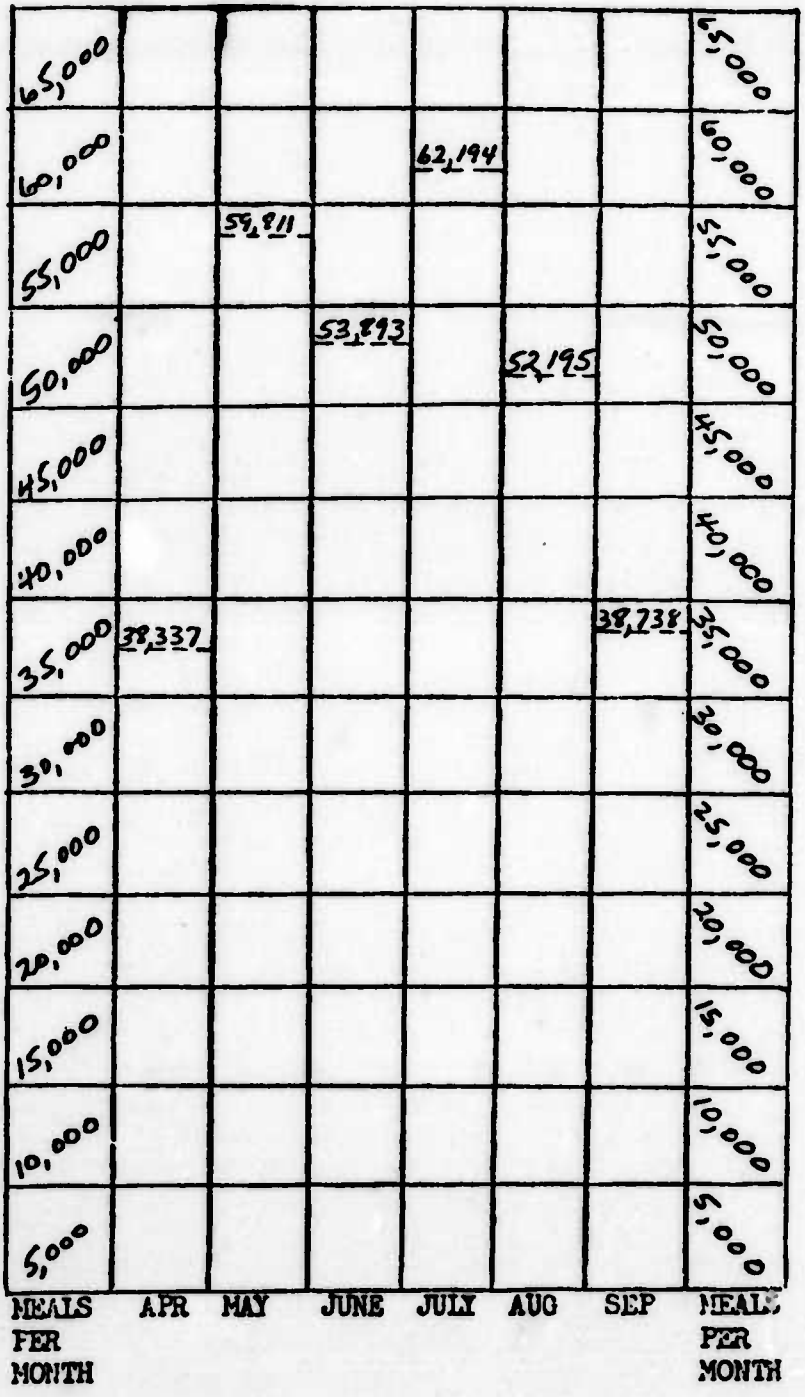
JEEPS	W/C	2½	TRAILERS	F/L	TUGS
	1				1
	1	1		1	1
1		2	1		1
	2				
		6			
	2				1
2	2	1			
	1				
2	4	1	3	1	3
	1				

VEHICLE MILEAGE REPORT



MILES: 1 X 1000

MEALS SERVED DURING OPERATION PLUMBBOB
(INCLUDES MIDNIGHT MEALS)



CHAPTER III

PROBLEM AREAS

CHAPTER III

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd) Page

PART I

PERSONNEL

PROBLEM 1

1.1 Shortages of personnel to man the 4935th Air Base Squadron, Indian Springs Air Force Base, Nevada.

REFERENCES:

1.2 Manning rosters, 4935th Air Base Squadron, October 1956 to September 1957, and Morning Reports for the same period.

DISCUSSION:

1.3 During the build up period, the 4935th Air Base Squadron suffered from severe shortages of assigned personnel. The Fire Department, Installations Engineer Section, Motor Maintenance Section, and Aircraft Maintenance Section, found difficulty in carrying out their mission during the spring of 1957.

1.4 Recission of a large number of orders assigning additional personnel on a PCS basis during the fall of 1956 was caused by postponement of the test starting date. During this period the 4950th Test Group (N) was activated and the decision made that augmentation for the 4935th Air Base Squadron would be on a TDY basis.

1.5 Assignment of personnel to the 4935th Air Base Squadron on a PCS basis lagged between October 1956 and March 1957, with losses greater than gains during this period.

RECOMMENDATIONS:

1.6 No matter whether augmentation for future tests is on a PCS or TDY basis, the 4935th Air Base Squadron should be kept at full strength at all times.

PROBLEM 2

2.1 Shortage of 4952nd Support Squadron personnel to augment the 4935th Air Base Squadron.

REFERENCES:

2.2 Commanders' Status Reports, 4935th ABRON, Jan-Sep 57 and 4952nd Manning and Information Rosters.

DISCUSSION:

2.3 Firm requirements for build-up of the 4935th were established in August 1956 under an operational concept that all augmentation personnel would be furnished on a PCS basis.

2.4 Establishement and activation of the 4950th Test Group (Nuclear), and the augmentation unit, the 4952nd Support Squadron, on 1 September 1956, necessitated a change in personnel concepts, in that augmentation support would be on a TDY basis.

2.5 Requisitions for 4952nd personnel were forwarded to Headquarters, ARDC, listing those required skills which were not available form within AFSWC resources (approximately 60% of the total 4952nd authorisations), and establishing desired in-place dates. During the period 21 August 1956 until starting date for Operation PLUMBBOB, Headquarters AFSWC was levied upon by USAF and ARDC for personnel in almost all career areas. This changed the Center manning picture to the extent that a capability no longer existed for manning of the 4952nd from local sources.

2.6 Shortages of augmentation personnel became most apparent in May 1957, at which time it became necessary to procure additional skills (i.e. Firefighters, Motor Maintenance and Air Police) from 4900th Air Base Group and other ARDC Centers on a TDY basis until completion of Operation PLUMBBOB.

RECOMMENDATIONS:

2.7 That all future requisitions for the 4952nd Support Squadron be forwarded to Headquarters ARDC for appropriate manning action.

PROBLEM 3

3.1 Jurisdiction of military justice and processing of court martial actions.

REFERENCES:

3.2 Special Court Martial cases referred by the 4935th Air Base Squadron, to Headquarters, AFSWC, for trial, and records of trial by Summary Court, Indian Springs Air Force Base, Nevada, during 1957.

DISCUSSION:

3.3 The Commander, 4935th Air Base Squadron was given Summary Court jurisdiction over all units of the 4950th Test Group (N), located at Indian Springs Air Force Base, Nevada.

3.4 During the test period, the problem was one of proper processing of court martial charges. With the assistance of the Judge Advocate General's staff at AFSWC, personnel of the 4935th finally became familiar with the requirements for proper processing of court martial actions.

RECOMMENDATIONS:

3.5 That at least two responsible members of the 4935th Air Base Squadron be schooled by the JAG, AFSWC, prior to the beginning of any future test period.

PROBLEM 4

4.1 Morale of Personnel

REFERENCES:

4.2 Analysis of Discipline Reports, December 1956 thru September 1957; American Red Cross

4.3 Concurrent with temporary duty moves of the 4926th Test Squadron (Sampling) and the 4952nd Support Squadron, there was a marked upward trend in disciplinary violations within Headquarters, AFSWC, the majority of such cases occurring among personnel at Indian Springs Air Force Base.

4.4 Members of the 4952nd Support Squadron were not properly briefed as to the nature of their assignment when selections were made and hence reported to Kirtland Air Force Base bringing their families and household goods expecting to remain there. During the duration of their TDY at Indian Springs, numerous problems arose within their immediate families, contributing to a major morale problem within the unit.

4.5 Mid-way in Operation PLUMBBOB, it became necessary to establish requirements for augmentation of the 4951st Support Squadron (Test) at Eniwetok for future overseas nuclear tests. Final formulation of UMD's for the 4952nd overseas disclosed that approximately 50% of those personnel on TDY at Indian Springs would be required in support of overseas tests. The prospect of further long periods of TDY caused a decline in the morale of those personnel who will accompany the 4952nd overseas.

RECOMMENDATIONS:

4.6 That a system be established to insure that 4952nd Support Squadron (and 4926th Test Squadron (S)) personnel are given the opportunity for a more stabilized type of assignment after participation in nuclear test series.

4.7 That future requisitions for personnel included information regarding assignment conditions (i.e. frequency of TDY) and indoctrination conducted at home stations for all selectees for assignment. Care must be exercised to assign only mature, emotionally stable individuals with no record of personal or financial misconduct.

PROBLEM 5

5.1 Multiplicity of duties performed by officers of the 4935th Air Base Squadron.

REFERENCES:

5.2 PERAM #35, dated 27 June 1957, 4935th Air Base Squadron.

DISCUSSION:

5.3 During interim periods wach officer of the 4935th Air Base Squadron has responsibility for a number of additional duties. Combination of a primary duty with other major duties such as Food Service, Communications, and Flying Safety are taken for granted and the officer can usually spend enough time with his additional duties to do a satisfactory job.

5.4 During build up and test periods, however, certain of these additional duties assume greater proportions and take more and more of an officer's time at the same time that his primary duty has become much more demanding. Adjutant, Billeting, and Aircraft Maintenance, duties become full time jobs in themselves. Augmentation officers are assigned to perform these functions as well as Assistant Base Operations Officer and Security Pilot. Other additional duties also expand to almost full time proportions. Augmentation by officers who are qualified to perform several of these jobs at the same time, or by junior officers who could each assume responsibility for one of these functions, would take a tremendous load away from assigned officers and enable them to more effectively perform their primary duties.

RECOMMENDATIONS:

5.5 That for future tests the 4935th Air Base Squadron receive augmentation as follows: Adjutant; Aircraft Maintenance Officer; Assistant Base Operations Officer; Security (L-20) Pilot, (to perform combined duties also as Shuttle Coordinator and Sample Return Coordinator); Chaplain (in the event a Chaplain is not authorized on the 4935th UMD; and Personnel Services Officer, to supervise Special Services, the Officers Club and Military Association.)

PROBLEM 6

6.1 Difficulties encountered in accounting for temporary duty personnel during Operation PLUMBBOB.

REFERENCES:

6.2 Morning Reports, 4935th Air Base Squadron, 4926th Test Squadron, 4950th Test Group (N) and 4952nd Support Squadron (December 1956 - September 1957).

DISCUSSION:

6.3 Most of the individuals sent in TDY status in support of Operation PLUMBBOB were authorized a set number of round trips to and from Albuquerque during the duration of their TDY assignment.

6.4 Those individuals who did return to Kirtland Air Force Base during their period of TDY did not sign in and out; the Commanders of the units concerned did not keep any records of number of days spent at Kirtland.

6.5 The above situation resulted in an inability to accurately account for exact number of days of temporary duty used by individuals and possibly generated some per diem payments in excess of actual TDY.

RECOMMENDATIONS:

6.6 That in all future tests, where round trips to and from Kirtland Air Force Base are authorized, the Commanders concerned keep accurate records of such trips. When per diem payments are authorized, or requested, time spent away from the test site must be taken into consideration.

PART II

OPERATIONS

PART II

SECTION A

TEST OPERATIONS

PROBLEM 1

1.1 Planning Documents

REFERENCES:

1.2 PILGRIM (PLUMBBOB) Planning Directive 1-56, Headquarters 4950th.

1.3 PLUMBBOB Operation Plan 1-57, Headquarters 4950th.

DISCUSSION:

1.4 Planning of Operation PLUMBBOB (formerly PILGRIM) began, unofficially, on 10 May 1956 as a part of the activity assigned to the REDWING Task Group 7.4 Rear Echelon. At that time little definitive information was available. Except for the publication of a Programming Plan by AFSWC in July 1956 little positive planning was done until after the activation of the 4950th Test Group (Nuclear) on 1 September 1956.

1.5 A Planning Directive was published the latter part of November despite the lack of a shot schedule or aircraft participation information. Five amendments were necessary to keep the directive current prior to publication of the Operation Plan.

1.6 The Operations Plan (1-57) was published on 1 April 1957. Working on the basis that illustrations and tabulated information was easier to use than verbal descriptions of operations, the PLUMBBOB Operation Plan was designed to include more pictures. Terrain photographs to scale and scale representations of flight patterns were used in an attenpt to simplify shot planning and participation. These pictures, with altitude ladders, face to face with pages listing shot mission detail tabulation presented complete shot information in two (2) pages that was current at the time it was printed. It was a very attractive presentation which was outdated at the start of the operation.

1.7 The Operation Plan was printed by the Defense Printing Plant at Ogden, Utah. The use of bold faced type for emphasis and paragraph headings resulted in a document which was much easier to read than former plans. Cost of printing was higher than the multigraph method by about $.50 per page for the entire run.

RECOMMENDATIONS:

1.8 That planning documents which will be in excess of 150 pages (Multilith) be printed at Ogden, Utah in order to cut down on the "bulk" involved in one document.

1.9 That a tabular format only, showing shots and aircraft participation, be published prior to on-site phase of the operation. Addendums would be published on D-3 which would give details of aircraft participation, patterns and altitudes.

PROBLEM 2

2.1 Positioning Conferences

REFERENCES:

2.2 Letter, Headquarters AFSWC, Subject: "Positioning of Aircraft Supporting Nuclear Test", 25 January 1957.

2.3 ASG Message, 7-3-E, 3 July 1957.

DISCUSSION:

2.4 Overall responsibility for PLUMBBOB aircraft positioning, as in previous operations, rested with the Commander, 4950th Test Group. Through pre-operation direction, the WADC was held responsible for determining the technical positioning of USAF aircraft while BUAER, USN, was held responsible for determining technical positioning of Navy aircraft. These responsibilities were normally exercised through the Director Program 5, FC/AFSWP.

2.5 During previous operations, the Air Control organization normally held a positioning conference prior to each shot and confirmed the safe positioning of each aircraft. PLUMBBOB planning resulted in the elimination of these positioning conferences since it was felt to be a duplication of pre-shot conferences normally held by Program 5, FC/AFSWP. Agreement was reached with Program 5 as follows:

a. Program 5 would sponsor a positioning conference prior to each shot and submit results, including detailed flight plans, to the Commander, Air Support Group, not later than D minus four (4) days for the event concerned. This would provide enough time for the Air Support Group to coordinate aircraft positions with the Test Aircraft Unit, Indian Springs AFB, which would be responsible for aircrew briefings and the submission of a mission execution chart on D minus 2 days.

2.6 In practice, this plan was not followed. The results of the Program 5 positioning conferences were consistantly received late. In addition, certain O&T projects attempted to participate or change their participation after the D minus 4 positioning conference. These late changes resulted in the Test Aircraft Unit having incomplete data for aircrew briefings on D minus 1 and incomplete information for mission execution charts which they prepared on D minus 2.

2.7 In early July all projects were notified that detailed reports of aircraft participation would reach the Air Support Group not later than 1200 on D minus 4 days. This message further stated that changes in aircraft patterns would not normally be favorably considered after D minus 4 days. The Director Program 5, FC/AFSWP, agreed to make every effort to meet the deadline established by the Air Support Group. This

system allowed enough time for the Air Support Group to prepare an air participation chart which was published and distributed as an addendum to the ASG Operations Plan on D minus two (2) days for all subsequent shots. In addition, this allowed the TAU to have the latest information for aircrew briefings and for preparation of mission execution charts. This system eliminated problems encountered earlier in the operation.

RECOMMENDATIONS:

2.8 That FC/AFSWP sponsor pre-shot positioning conferences.

2.9 That results of positioning conferences be forwarded to the Air Control Organization to arrive no later than D minus 4 days.

2.10 That last minute changes, other than those effecting air safety, not be accepted.

PROBLEM 3

3.1 Altitude Separation of PLUMBBOB Aircraft.

REFERENCES:

3.2 PLUMBBOB Positioning Conference Notes, Headquarters 4950th Test Group (N).

DISCUSSION:

3.3 A safe and uniform method of altitude separation of aircraft for Operation PLUMBBOB was discussed during the PLUMBBOB Positioning Conference held in February 1957. The method presented at the conference by the 4950th Test Group was as follows:

a. A minimum altitude separation of 1,000 feet would be maintained by all PLUMBBOB participants except where formations of aircraft were involved.

b. All aircraft would use the current altimeter setting provided by the Air Operations Center.

3.4 After the first PLUMBBOB shot, it was learned that Program 5 (Effects) aircraft were using 29.92 settings in their altimeters and were applying "D" corrections to their indicated altitudes in order to insure that they would fly at the correct true altitude. The corrections in some instances were as great as 500 - 1,000 feet. Program 5 insisted that it was necessary to apply these errors in order to be at pre-determined true altitudes.

3.5 The method used by Program 5 created some altitude conflicts with other project aircraft. Action taken by the 4950th Test Group (N) to resolve this conflict of aircraft altitudes was as follows:

a. All participating aircraft would use the current altimeter setting provided by the AOC.

b. A "D" correction (correction for non-standard atmosphere) graph would be prepared by the Mercury Weather Detachment and given the Senior Controller in the AOC at H minus 2 hours on each shot day.

c. The Senior Controller would apply the "D" corrections to the assigned altitudes of all participating aircraft. These corrected altitudes would be given to each aircraft upon entry into the Nevada Test Site.

d. Each aircrew would apply its installation and instrument error to the indicated altitude received from the AOC.

3.6 The above solution to the altitude separation of PLUMBBOB aircraft eliminated any further conflicts.

RECOMMENDATIONS:

3.7 That the revised PLUMBBOB method of applying corrections to indicated altitude of air participants be used on future operations.

3.8 That all projects present any peculiar altitude problems to the Air Control Organization prior to any future nuclear tests so that these requirements can be fitted into the overall aircraft control problem.

PROBLEM 4

4.1 Re-Scheduling of Shot After Official Cancellation.

REFERENCES:

4.2 SHASTA Mission Summary Report.

DISCUSSION:

4.3 After having been officially postponed at the 1600 hour weather briefing, the SHASTA event was called "on" or became D minus 1 at 2200 hours. This change in shot status was made by the Scientific Advisor to the Test Director when a favorable change in the weather condition occurred.

4.4 Air participants in ZI tests come from widely scattered air bases throughout the United States, and it is difficult, if not impossible, to contact them at times. This was especially true on the SHASTA event since all participants had been notified after the 1600 hour weather briefing on Saturday, 17 August, that the shot had officially been called off for the following morning. Many personnel at the Nevada Test Site, Kirtland AFB and other bases had scattered to their homes,

places of recreation, etc., after learning of the shot postponement.

4.5 Through a concerted effort on the part of Air Support Group personnel and with much difficulty, the majority of the aircrews were located after the 2200 hour change in shot status. Out of a total of 42 aircraft scheduled to participate, only 30 aircrews could be notified in time to meet the take-off schedule.

4.6 Safety of flight is compromised under such conditions since aircrews are not afforded time for pre-mission crew rest and the "hurry-up" attitude prevailing at the time is conducive to missed check list items, etc.

RECOMMENDATIONS:

4.7 That shots not be rescheduled once the decision has been made to postpone.

PROBLEM 5

5.1 Radar Reflectors and Target Lights

REFERENCES:

5.2 Memo for the Commander, "Report of Staff Visit" dated 2 October 1956.

5.3 PLUMBBOB Positioning Conference Notes, Headquarters 4950th Test Group (N).

5.4 HATWG 2, TWX 28 May 1957.

5.5 15th AF TWX 27 May 1957.

DISCUSSION:

5.6 The concept for target lights and radar reflector locations on PLUMBBOB differed from that used on previous nuclear tests in that the 4950th Test Group (N) proposed to install one (1) permanent target light array and three (3) permanent radar reflector installations, all offset sufficiently from detonation sites so as to withstand the blast effects. On previous tests these aircraft positioning devices had been located at each groud zero location. The economic advantages of the new concept are obvious.

5.7 This concept for target lights and radar reflectors and their proposed locations was presented to all participating projects during the 4950th Test Group (N) Positioning Conference held in February 1957. All projects were apparently satisfied with this proposal as no additional requirements were received for these items.

5.8 During May 1957, requests for additional radar reflectors and target lights were received from Projects 53.8 and 51.3. These projects were involved in four (4) shots and felt that the installed reflectors and light array would not be adequate for their positioning. Both projects agreed to jointly use one (1) additional target light array and one (1) additional radar reflector. No funds were available from AFSWP for these Operation and Training Projects; therefore, the projects concerned were required to furnish the necessary funds. After considerable time and difficulty these positioning devices were installed in time for use by the projects concerned.

RECOMMENDATIONS:

5.9 That offset radar reflectors and target light arrays be used on future overseas and continental tests.

5.10 That all projects submit their target requirements well in advance of the operational period in order that required items may be budgeted for, procured, and installed in the normal manner.

PROBLEM 6

6.1 MB-1 Personnel.

DISCUSSION:

6.2 On 28 September 1956, the Commander, AFSWC, assigned the MB-1 air-to-air rocket project to the 4950th TG (N). The group was not manned quantitatively nor qualitatively to supervise such a project but it was accepted and assigned to the Plans section for execution. Thus, concurrently with the normal Plans section function of preparing the overall planning directives and Operations plan for the PLUMBBOB air operation, the planning for the MB-1 delivery was accomplished.

6.3 During the early stages of planning two (2) officers were assigned to the project. Three (3) months before the operational, on-site phase of the delivery project it was possible to reduce MB-1 personnel to one (1) officer. However, loss of just this one (1) officer reduced the officer personnel strength of the plans section by 50%.

6.4 Except for the project officer, all project support, personnelwise as well as supply-wise, had to be obtained from resources outside the Group.

RECOMMENDATIONS:

6.5 Since the 4950th TG (N) is not manned to accomplish such special projects, it is recommended that comparable projects in the future be accomplished by agencies manned in a manner more homogenous to the type project.

PROBLEM 7

7.1 Excessive Crew Exposure.

REFERENCE:

7.2 Operation PLUMBBOB Monthly Report, dated 28 August 1957; Detachment 1, 21st Helicopter Squadron.

DISCUSSION:

7.3 On two (2) occasions during PLUMBBOB there were high helicopter pilot exposures resulting from post shot surveys or recovery missions. It was discovered that these excessive exposures were a result of improper mission planning and/or monitor briefing by the responsible projects.

7.4 As a result of these exposures, three (3) pilots were "burned out" and were thus unavailable for further post shot missions. There were indications that additonal exposure might have to be requested for the remaining pilots. Through the efforts of the Test Director's Rad/Safe Advisor, however, projects utilizing the H-21's were carefully screened and mission requirements re-evaluated to minimize further exposure thus obviating a request for over-exposure limits.

RECOMMENDATION:

7.5 That helicopter requirements be carefully programmed and screened on a mission to mission basis by the Test Director's staff to insure that pilot exposure is minimized.

7.6 That all technical projects be canvassed well in advance of the operational period to establish basic requirements and these requirements thoroughly evaluated to determine necessity.

PROBLEM 8

8.1 Neutron Dosimetry.

REFERENCE:

8.2 Experimental film data sheet, UCRL, dated 17 September 1957.

DISCUSSION:

8.3 During Operation PLUMBBOB several effects aircraft were positioned to receive non-radiation inputs such that the pilots were exposed to measurable initial gamma flux. In the planning phases of the operation the possibility of receiving measurable neutron dose was neglected.

8.4 On the John shot neutron measurements were taken. The neutron dose to the delivery crew was measured as almost twice the gamma dose. It was decided to utilize neutron film badges on remaining NASWF effects aircraft participations to determine whether or not neutrons contributed an appreciable dose under lower altitude burst conditions. Neutron badges were obtained through the REECO rad-safe organization and the Test Director's rad-safe advisor. The badges were processed and interpreted by the UCRL. On approximately 40% of the NASWF test missions there was a noticeable neutron dose and on about 17% of the missions a very significant neutron contribution, the overall average dose being 270 mrems with a maximum of 2.24 rems.

RECOMMENDATIONS:

8.5 That neutron dosimetry facilities be provided for future tests in which aircraft may be positioned to receive significant initial nuclear radiation. This would normally be required for most of the Program 5 participation.

PROBLEM 9

9.1 Radiation Exposure of H-21 Crews.

DISCUSSION:

9.2 Early in the PLUMBBOB series it became obvious that the H-21 pilots on post shot surveys were receiving radiation exposures of the same or greater magnitude as the monitor in the aft compartment. This one (or more) to one ratio of pilot to monitor exposure is in sharp contrast to the one to three ratio in the H-19 aircraft. In the H-19 there is a considerable pilot shielding effect from the engine which is situated below the cockpit. There is almost no aircraft shielding in the H-21. Moreover, the H-21 is less maneuverable than the H-19 and the entire crew receives excess exposure since the H-21 takes a longer time to turn out of a radiation field.

RECOMMENDATION:

9.3 That a helocopter of the "cockpit-over-engine" type be used in future operations for rad-safe and/or post shot survey missions.

PROBLEM 10

10.1 B-25 Cloud Tracker Crew Continuity.

DISCUSSION:

10.2 The monthly rotation of B-25 tracking crews presented several problems. Each crew had to be briefed and given monitor training. Since a crew would be in place for such a short duration, it had little opportunity to develop its own procedures and techniques, to

become familiar with test procedures and terrain features, or to get a real grasp of the mission. Low level tracking suffered from the resulting lack of crew experience.

RECOMMENDATIONS:

10.3 That tracking crews be assigned for the duration of an operation. If rotation must be utilized, rotation should be staggered so there is a continuity of experienced aircrews to perform cloud tracking.

PROBLEM 11

11.1 Very High Altitude Cloud Tracking

DISCUSSION:

11.2 On the Priscilla and Hood events a requirement for very high altitude tracking was generated by the Test Manager since the predicted cloud top height was above 40,000 feet. On Priscilla a T-33 performing a routine local flight was utilized to give estimated positions of the leading edge of the cloud at 40,000 feet. On Hood, arrangements were made for a 4926th B-57 to track the cloud above 40,000 feet for approximately five (5) hours. The Test Manager indicated that there would probably be a future requirement for very high altitude cloud tracking capability for higher yield events.

RECOMMENDATIONS:

11.3 That a B-57 be made available as required for very high altitude cloud tracking from within 4926th resources. That this requirement be considered in establishing sampling aircraft requirements.

PROBLEM 12

12.1 Utilization of High Level Cloud Trackers.

REFERENCE:

12.2 Letter to Test Manager, Subject: Operating Procdures for Cloud Tracking, dated 4 June 1957.

DISCUSSION:

12.3 Early in the PLUMBBOB series it was noted that one (1) or both of the high level cloud trackers was not needed for low yield events. On Franklin, for example, the high level trackers were released before starting the tracking mission. Later in the series the high level tracker orbits conflicted with sampling activities and it was decided to hold the trackers back on future missions until sampling was complete. This procedure, however, prevented the high level trackers from getting early time information (H + 30 minutes to H + 2 hours) which is the most useful in determining the cloud path. Since the B-25's at 12,000

fect were, in general, obtaining satisfactory early time information by observing the cloud path, the high level tracker missions were often cancelled for shots of even high yield ranges. Although the information from the high level trackers at early times is more reliable than that from low level trackers, the sampling activities prevented obtaining high level tracker reports. This not only reduced the effectiveness of the high level trackers but, in part, reduced the requirement for them.

RECOMMENDATION:

12.4 That the possibility of eliminating the high level trackers as such be investigated.

12.5 That the high and low level cloud tracker requirements be fulfilled by the same aircraft, thereby eliminating two (2) test support aircraft.

PROBLEM 13

13.1 Air Activity in Areas Adjacent to the NTS.

REFERENCES:

13.2 Histories, 4950th Test Group (N), May 1957 through July 1957.

DISCUSSION:

13.3 Aircraft which are to participate on "events" during a nuclear test series are assigned specific altitudes and flight patterns within a limited area of operations. This is necessary to provide sufficient clearance between aircraft.

13.4 The flight patterns of participating aircraft are not necessarily restricted to the limits of the Nevada Test Site. Those aircraft flying a race track pattern may extend well beyond the reaches of the Test Site itself.

13.5 Air Support Group procedures required that all participating aircraft perform several practice missions prior to shot participation. A summary of the AOC Controllers' Log revealed a daily average of approximately thirty (30) flights into the test area during the months of May, June and July 1957.

13.7 Approximately fifteen (15) aircraft of various types staged from Groom Lake during this period. All Groom Lake air activity

was seldom coordinated with the Air Operations Center. The possibility always existed that PLUMBBOB aircraft performing practice missions might overlap the area of operations of the Groom Lake aircraft. Aircraft in each instance were high speed jet type with the pilot most probably on instruments.

13.8 Upon request of the Operations Officer of Groom Lake a flight restriction was placed upon aircraft under control of the Air Support Group limiting them at all times from flight below ten thousand feet (10,000) within six (6) miles of Groom Lake.

13.9 In turn, Watertown (transient) aircraft entering or leaving the Groom Lake area filed a clearance with the Air Operations Center, giving penetration, departure and landing times. Aircraft penetrating the NTS area had radio contact with the AOC but few carried Mark X IFF transponders for AOC aircraft identification.

13.10 Prior to Operation PLUMBBOB coordination was made with Nellis Air Force Base for closing of the Las Vegas Gunnery and Bombing Ranges prior to a nuclear event and for providing clearance between Nellis AFB aircraft and Indian Springs aircraft.

13.11 Under agreement with Nellis Air Force Base the Operations Officer or Airdrome Officer was notified of all immediate changes to the shot schedule and, in particular, the D minus one status. Upon receipt of D-1 instructions the ranges were considered to be closed until termination of the D minus one status or until a radiological safety survey of the NTS declared all personnel clear of the area and air contamination not present.

13.12 A corridor was established between Las Vegas VOR and Indian Springs AFB to provide clearance between Indian Springs AFB traffic and Nellis AFB-Las Vegas Gunnery Range traffic. Indian Springs AFB aircraft were instructed to fly on the West Side of Highway 95 at altitude of 10,000 feet between Las Vegas VOR and Charleston Road and at 6,000 feet between Charleston Road and Indian Springs AFB. Nellis jets occupied traffic altitudes above 10,000 feet except during climb and letdown to the East of Highway 95.

RECOMMENDATIONS:

13.13 That prior to a Continental Nuclear Test series, a close survey be made of all airfields and flight areas positioned near the Nevada Test Site or within the prescirbed NTS Control Area.

13.14 That early coordination be made with personnel from each facility to ascertain hours of operation, Air Support Group control over the areas, shutdown procedures and flight restrictions within each area of operations.

13.15 That all pilots who are apt to fly within the NTS Control Area be made cognizant of the type of operations being conducted within each described area.

13.16 That early coordination be made with Nellis AFB on following continental tests to determine flight corridors and instructions for opening-closing of the Las Vegas Ranges.

PROBLEM 14

14.1 Clearance of Aircraft into NTS.

REFERENCES:

14.2 4950th Test Group (N) Operations Plan, Operations Control Annex.

14.3 Letter, 4950th Test Group (N), dated 25 July 1957, Subject: "Air Operations Center (DRAGNET) Hours of Operation".

14.4 Letter, 4950th Test Group (N), dated 3 September 1957, Subject: "Air Operations Center (DRAGNET) Hours of Operation".

DISCUSSION:

14.5 The mission of the Air Support Group during Operation PLUMBBOB and previous Continental Nuclear Tests included responsibility for the control of all aircraft entering the Nevada Test Site.

14.6 This was accomplished by dissemination of procedures instructiong all aircraft to obtain clearance from the Air Operations Center prior to actual entry into the prohibited area.

14.7 The information regarding clearance of such aircraft was in turn relayed to the AEC Security Office. This included the type of aircraft, serial number of low-flying aircraft, time into and out of the area, landing areas, if applicable, together with information regarding security clearance of personnel aboard the aircraft.

14.8 There were numerous occasions in which AEC security reported aircraft flying within the area without known clearance. On most occasions these aircraft were mis-identified because of silhouette similar to other aircraft. On other occasions the aircraft were at altitudes estimated to be 35-40,000 feet making them appear to be very close in, while actually they were over the Tonapah Bombing or Nellis Gunnery Ranges. The Security personnel in such instances thought it appropriate to "scramble" an aircraft for interception which course of action was not described in the mission of the Air Support Group.

14.9 The Air Operations Center normal hours of operation were as follows:

a. Normal hours of operation, 0730 to 1630 unless required to open earlier or remain open later to allow scheduled practice missions.

b. On D minus 1 days, from 0730 until 1900 hours.

c. On D-days, from one (1) hour prior to entry into NTS of first aircraft until 1630 hours or until departure of last aircraft.

d. Closed on Sundays, except for D-1 or D-Days.

14.10 AEC Security was given the perogative of clearing non-military aircraft into the NTS during periods when the AOC was not manned. This was necessary to permit delivery of cargo to EGG, LASL and UCRL. Landing in most cases was performed at the YUCCA Strip. During these periods no crash crews were on duty. Military aircraft were not permitted to land until crash crew were present at the YUCCA Strip.

RECOMMENDATIONS:

14.11 That during periods in which the AOC is inactive, cargo deliveries be made at the Mercury Strip. This will permit ready availability of crash equipment from the Mercury Fire Department. Clearance of aircraft for landing would, in the above instance, be accomplished through AEC Security. Deviation from the above should be clearly defined in letter form to relieve the Air Support Group Commander of responsibility in case of aircraft accident or flight violation.

14.12 That military aircraft be permitted into or through the NTS Prohibited Area only by clearance of the Air Operations Center.

14.13 That coordination be made with NTS Security to clearly define the Air Support Group responsibilities regarding action to be taken against aircraft violating the NTS Prohibited Area.

PART II

SECTION B

COMMUNICATIONS

PROBLEM 1

1.1 Refurbishing of the AN/USQ-12 Air Operations Control System.

REFERENCES:

1.2 Letter, 4950th Test Group (N), dated 18 July 1957, Subject: "Request for AN/USQ-12 Factory Engineer Service"

DISCUSSION:

1.3 The AN/USQ-12 Air Operations Control System was assembled in February 1956 and placed in use on Eniwetok Atoll for Operation REDWING.

1.4 Upon completion of REDWING the equipment was returned to Kirtland Air Force Base for refurbishing and modification. The equipment was in excellent condition. However, an average of twenty-two (22) vacuum tubes per UPA-35 Universal Indicator had to be replaced because of malfunction.

1.5 All modification and refurbishing was accomplished by 4950th Test Group, 4926th Test Squadron (Sampling) and 4929th Test Squadron (Development) at Kirtland Air Force Base prior to shipment to the Nevada Test Site for Operation PLUMBBOB.

1.6 During both operations the equipment operated daily without serious breakdown. However, the spare parts replacement after PLUMBBOB is expected to be as extensive as in the prior operation. Experience has shown that any type of electronic equipment receiving extensive usage (such as with the AN/USQ-12) should receive factory overhaul after two years operation. If this is not accomplished, spare parts replacement and breakdown will become more numerous. A breakdown of equipment in the Eniwetok Proving Grounds could result in lengthy delay in repair resulting in costly delay of pending shots or cancellation of some aircraft participation.

1.7 Air Force Special Weapons Center was notified by letter of the requirement for a factory overhaul of the electronic equipment. A requirement was placed for assignment of a Hazeltine Electronic Factory Engineer to perform the required analyzing prior to overhaul on site in Nevada. This area was chosen to save time and to use facilities which were already in place.

RECOMMENDATIONS:

1.8 That the Hazeltine Factory Engineer performing overhaul services be acquired for additional duty with the 4950th Test Group (N) for the initial two months at Eniwetok for Operation HARDTACK.

1.9 That plans be made well in advance for factory overhaul upon completion of Operation HARDTACK if overhaul is not accomplished prior to HARDTACK. Equipment should remain in place after refurbishing and or overhaul until required for future operations.

PART II

SECTION C

FLYING SAFETY

PROBLEM 1

1.1 Aircraft Accident Prevention Program

DISCUSSION:

1.2 Detailed planning, high air discipline and precise flying during the operational period resulted in a remarkable record of accident free operation for test and test support aircraft. The only mar in the accident record came when two Army transport helicopters sustained damage during a troop movement exercise.

1.3 The peculiar type of operation, the rugged terrian, uncertain surface winds, limited air base facilities and odd hours of operation all contributed to the flying safety problem. In addition, a high density of critical aircraft operations on shot days required close coordination between aircrews and air control agencies. Actions taken to promote flying safety were as follows:

a. A mission execution chart was prepared by TAU for each mission to assist all personnel in maintaining a safe, orderly flow of aircraft from engine start to landing.

b. Safe positioning of test array aircraft was insured at a positioning conference where thr flight patterns for each aircraft were thoroughly studied to ascertain for safety with respect to nuclear effects and conflicts of flight patterns.

c. Night and dawn training missions were performed which closely simulated the actual shot day conditions.

d. Close supervision of the accident prevention program was exercised by the Air Support Group Commander.

e. Aircrew briefings were scheduled so as to provide ample crew rest prior to flight.

f. Physical conditioning and training in desert survival techniques were stressed.

RECOMMENDATIONS:

1.4 That all operations and command personnel take personal cognizance of this program in planning for future operations.

PROBLEM 2

2.1 Aircraft Arresting Devices at ISAFB

DISCUSSION:

2.2 Indian Springs Air Force Base has an Air Force MA-1 aircraft arresting barrier located on the overrun at either end of the runway

08-26. This is a standard Air Force Barrier designed to arrest aircraft that are unable to stop before reaching the end of the runway.

2.3 The barriers are normally left in the erected position but must be lowered whenever a heavily loaded aircraft with marginal performance characteristics takes off. This is to preclude the possibility of snubbing the trigger cable inadvertantly. The erection of these barriers is accomplished manually and takes about five minutes for each operation.

2.4 During PLUMBBOB it was necessary that the barriers be lowered whenever the effects F-89D aircraft took off. This necessitated Stationing personnel by the barriers to raise and lower them as necessary during take off of the test array aircraft. The time required for erection made the barriers unavailable to the F-89's in case of an aborted take off.

2.5 In addition to the above MA-1 barriers, ISAFB has a Navy Cross Deck Pendant type arresting device. This barrier is designed to arrest aircraft equipped with an arresting hook assembly. It consists of two cables, 30 feet apart, stretched across the runway and connected on each side to lengths of heavy chain which are laid parallel to the sides of the runway. The cables are elevated about six inches above the runway surface by tire sections placed under each of the cables at 20 feet intervals.

2.6 To erect this device, the tire sections are manually positioned under the cables. This operation takes about 15 minutes. Except in emergencies, this barrier is left in the lowered position. Few emergencies are of such a nature that 15 minutes would be available for barrier erection.

RECOMMENDATIONS:

2.7 That erection of the Air Force MA-1 aircraft arresting barrier be mechanized and control remoted to the control tower. This would allow the tower personnel to operate the barrier from their position and it would be immediately positionable in case of emergency.

2.8 That a survey be made to determine the necessity for raising the Navy Cross Deck Barrier to insure successful engagement.

PART III

MATERIEL

PART III

SECTION A

BASE SUPPLY

PROBLEM 1

1.1 Spares support for field maintenance of the ARC-27 Airborne Communications System.

REFERENCES:

1.2 Headquarters AMC booklet, titled "AMC Materiel Support Plan in Support of Continental Test Operations," dated 1 February 1957.

DISCUSSION:

1.3 Critical item requisitions were received at AFB 2890 for spare items to support the field maintenance of the ARC-27, Airborne Communications System for WADC and the 21st Helicopter Detachment.

RECOMMENDATIONS:

1.4 That future operation planning should assign to the 4926th Field Maintenance Officer or a 4935th Air Base Squadron Field Maintenance Office the responsibility for providing field maintenance support of the Airborne Communications Systems of all organizations deployed to this base during a test period. This will reduce the number of stand-by spares items in each test support organization and place the responsibility for back up spares on one organization.

PROBLEM 2

2.1 AMC depot indorsement of local (AFB 2890) requisitions for Project 72 support items.

REFERENCES:

2.2 Operation Plan 1-57, Operation PLUMBBOB, dated 1 April 1957 and Headquarters, AMC booklet, titled "AMC Materiel Support Plan in Support of Continental Test Operations," dated 1 February 1957.

DISCUSSION:

2.3 AFB 2890 has experienced great difficulty in obtaining supply support on requisitions submitted for certain Project 72 requirements. Project 72 was classified code for Operation PLUMBBOB. Requisitions were returned from AMC depots and stations indicating "cancellation," "more justification", "not on UAL", etc. Referenced requisitions were obviously coded by depot personnel who were not familiar with the priority and precedence ratings of Project 72 requirements.

RECOMMENDATIONS:

2.4 That future operations should dictate that a booklet comparable to the Headquarters, AMC booklet, titled "AMC Materiel Support

Plan in Support of Continental Test Operations", dated 1 February 1957, again be prepared and that the following additional data be included as part of Chapter II - Supply: Hq AMC should appoint a liaison officer in each AMA, depot or station to monitor all requisitions for a particular operation. Since these tests are Hq USAF directed, the name, address, telephone number "on base" and "off base" and the office symbol for one or more supply representatives at each AMC depot or station should be included." This was done to a degree during PLUMBBOB for Maintenance and Engineer Liaison Officer at AMA's. Mr. Douglas was appointed at Hq AMC as the overall representative. This is fine, however, an individual contact is needed at all AMC depots or stations.

PROBLEM 3

3.1 Use of Project Code Number in lieu of Project Name should be eleminated on requisitions in support of future operations.

REFERENCES:

3.2 Operations Plan 1-57, Operation PLUMBBOB, dated 1 April 1957.

DISCUSSION:

3.3 The use of a Project Code Number, e.g. "Project 72," in lieu of the Project Name "Project PLUMBBOB" has contributed to the no-action indorsement of requisitions by AMC depots and stations. It is felt that depot clerks do not place as much emphasis on a Project Number as on a Project Name.

RECOMMENDATIONS:

3.4 That the Project Name, in lieu of the Project Number, be indicated on all requisitions prepared by AFB 2890 for future operations.

PROBLEM 4

4.1 Unservicable tires mounted on vehicles received for Project 72 requirements.

REFERENCES:

4.2 Headquarters AMC booklet, titled "AMC Materiel Support Plan in Support of Continental Test Operations," dated 1 February 1957.

DISCUSSION:

4.3 Requisitions were received from using organizations by AFB 2890, for tires to replace tires mounted on fuel servicing units,

which were shipped to this headquarters for Project 72 requirements. Research indicates that certain of these are coded in the stock list as LP items which would necessitate expenditures of local funds to meet this requirement.

RECOMMENDATIONS:

4.4 Because AMC depots and stations were directed to ship serviceable vehicles to this base, the tires mounted on these vehicles should be inspected to determine their serviceability prior to shipment of the vehicles. Unserviceable tires should be replaced if necessary. This would preclude expenditure of Local Purcahse funds at this headquarters and preclude the possibility of having a refueling unit out of commission, pending receipt of replacment tires.

PROBLEM 5

5.1 Furnishing AOCP spares and minor maintenance parts for TDY aircraft and items peculiar to other TDY organizations stationed at Indian Springs Air Force Base, Nevada, during future test operations.

REFERENCES:

5.2 Headquarters, AMC booklet, titled "AMC Materiel Support Plan in Support of Continental Test Operations," dated 1 February 1957.

DISCUSSION:

5.3 The aircraft in question are not those which were there for the entire operation but those who were transient and/or TDY aircraft, such as the B-25 aircraft from Denver, Colorado, which arrived at this station with only the pilots and crew for several shots. The aircraft on this status did not have flyaway kits and in the event of an AOCP the crew chief or pilot would contact the transient alert crew, operations officers and/or the 4935th aircraft maintenance section and eventually someone in one of these sections would contact the Base Supply Officer.

5.4 Some organizations did not bring qualified supply personnel, and because of this supply requests were not prepared in accordance with AFM 67-1. This in turn caused the normal operation of Base Supply to slip behind due to extensive research and reaccomplishment of paper work.

5.5 There must be one central place for all TDY and transient aircrews to report for AOCP's and maintenance problems.

RECOMMENDATIONS:

5.6 To preclude recurrence of this additional workload in the Base Supply Office and to insure expeditious issue of aircraft and

ACOP parts during future test periods it is recommended that the transient alert personnel be made solely responsible for ordering parts for transient aircraft and performance of minor maintenance. Request for spares AOCP's and minor maintenance for TDY aircraft would be the responsibility of the Test Aircraft Unit.

PART III

SECTION B

BASE MOTOR POOL

PROBLEM 1

1.1 The skill level of the personnel.

REFERENCES:

1.2 Historical Report from SWSIVM, dated 5 August 1957.

DISCUSSION:

1.3 Inadequate numbers of enlisted supervisory personnel were available for this operation. The skill level of the personnel assigned in most cases was below the minimum acceptable to accomplish the assigned mission properly. Throughout this operation there was a shortage of five (5) mechanics. This manpower shortage has been relieved through the contractual maintenance program and by borrowing two (2) civiliam mechanics from Norton AFB to help get the fire trucks in servicable condition.

RECOMMENDATIONS:

1.4 That a manning table be set up in accordance with AFM 26-1 and AFM 66-12 for the next operation.

1.5 It would be desirable if we know at least six (6) months in advance of any forthcoming operation, the quantity, type, model, year and manufacturer of vehicles that are going to be assigned and supported by this base. This is necessary to properly man for the workload.

PROBLEM 2

2.1 Type and condition of vehicles.

REFERENCES:

2.2 Report on Operation Plumbbob, dated 25 June 1957.

DISCUSSION:

2.3 The vehicles received at this base for Operation Plumbbob were of the wrong type. Two and one half (2½) ton trucks were substituted for one and one half (1½) ton trucks and three quarter (3/4) ton trucks were substituted for one half (½) ton pickups. No pickup trucks were received at all and our biggest requirement was for one half (½) ton pickups. Truck tractor commercial, and Materiel Handling Equipment shipped to this base for Operation Plumbbob were in an unservicable condition (reference T.O. 36-1-23.) This caused a great hardship and undue workload on this section because of the insufficient number of qualified mechancis. There were a number of excess vehicles shipped for which no requirement existed. Vehicles in excess

included cletracs, aircraft towing coleman tractor, twelve and one half ($12\frac{1}{2}$) ton stake and platform trailers, two and one half ($2\frac{1}{2}$) and three quarter (3/4) ton trucks.

RECOMMENDATIONS:

2.4 Closer coordination should be maintained between Indian Springs Air Force Base and higher command for the establishment of the number of vehicles and equipment to be utilized during the next operation.

2.5 All vehicles should be in a servicable operating condition.

2.6 If qualified mechanics are assigned at this base, it reduces the need for contractual maintenance.

PART III

SECTION C

INSTALLATIONS

PROBLEM 1

1.1 The delay by participating units in submitting their requirements caused a serious backlog of work orders and necessitated $7,000.00 in civilian overtime.

REFERENCES:

1.2 Letter from Headquarters, 4950th Test Group (N), Subject: Allocation of Work and Storage Space, dated 5 March 1957.

DISCUSSION: None

RECOMMENDATIONS:

1.3 Requirements for future test operations should be received 120 days prior to date tenant organizations will occupy work space. This would give the Installation Engineer time to efficiently and economically organize the increased workload.

PROBLEM 2

2.1 Augmentation personnel for the Installations Engineer were requested to be in place 120 days prior to test operations so that all requirements could be accomplished prior to operations. Manning action was slow and the personnel arrived too late to be utilized during the peak workload prior to test operations. The Installation Engineer was only 75% manned during this period.

REFERENCES:

2.2 Manning Requirement Roster, August 1956.

DISCUSSION:

2.3 It was necessary to utilize civilian personnel in an overtime status which resulted in approximately $7,000.00 in civilian overtime. Civilian personnel were required to go on a 7 day week, 9 hour day for five or six weeks.

RECOMMENDATIONS:

2.4 That in the future every effort be made to get Installation Engineer augmentation personnel assigned 120 days prior to test operations in order to accomplish known requirements.

PROBLEM 3

3.1 During Operation Plumbbob the Installations Engineer furnished Camp Desert Rock approximately 23,413,430 gallons of water (1 February thru 14 September 1957). In the future water will no longer be available from Indian Springs Air Force Base due to additional requirements by the Air Force.

REFERENCES: None

DISCUSSION:

3.2 The following increased demand for water consumption at Indian Springs Air Force Base will use our available water supply:

a. 50 family housing units.

b. Base wide landscaping program.

c. Athletic field.

RECOMMENDATIONS:

3.3 That Camp Desert Rock obtain water from another source.

PROBLEM 4

4.1 Trailer vans from the 4926th Test Squadron (Sampling), WADC and NASWF were transported to Indian Springs Air Force Base and parking space was available. In a number of the trailers, air conditioning and electrical equipment was not serviced prior to shipment to Indian Springs Air Force Base. This was particularly true of WADC trailers.

REFERENCES:

4.2 Letter from the 4950th Test Group (N), Subject: Allocation of Work and Storage Space, dated 5 March 1957.

DISCUSSION:

4.3 Since servicing of trailers was not accomplished prior to arrival, a number of mechanical refrigeration and air conditioning units were unserviceable. They required extensive maintenance and repairs. In several cases it was necessary to remove the entire unit before repairs could be made. Difficulty in obtaining parts was experienced since the items had to be local purchased.

RECOMMENDATIONS:

4.4 That trailers be serviced thru a depot or field maintenance shop prior to shipment to Indian Springs Air Force Base for test operations.

PROBLEM 5

5.1 The five obstruction beacon lights installed for test operations on nearby mountains required servicing at intervals from sixty to ninety days with acetylene bottle gas. Each light is equipped with attachments to install six bottles of gas with a minimum of 225 cubic feet of acetylene. The hazardous climb over rugged terrain (shale and rock) by military personnel in order to hand carry the acetylene cylinders (weighing from 165 to 195 lbs) was unsatisfactory. Personnel were not properly trained or equipped and it endangered their lives.

REFERENCES:

5.2 T.O. 35D5-4-7-1, T.O. 35D5-4-7-2, and T.O. 35D5-4-7-4.

DISCUSSION:

5.3 During Operation Plumbbob, helicopters were used successfully on occasions in supplying the lights, especially the H-19 type, that were used by the Air Rescue Squadron from Nellis Air Force Base. H-21 types were also used during operations by the 21st Helicopter Squadron stationed at Indian Springs Air Force Base.

RECOMMENDATIONS:

5.4 That helicopters be made available for this maintenance operation. A truck carrying the acetylene cylinders could use an access road to the base of each mountain. Cylinders could be transferred to the helicopter for the flight to the top of the mountain and empty cylinders removed from the top of the mountain and transported to the truck. This would be a saving in man-hours and aviation fuel. There should also be advance planning for this operation to insure sufficient quantities of acetylene and bottles so that continuous maintenance could be performed. Individuals participating in the operation should be equipped with proper personal equipment, i.e. combat boots, gloves, first aid kits and water canteens.

PART III

SECTION D

FOOD SERVICE

PROBLEM 1

1.1 The only real problem for this section was personnel.

REFERENCE:

1.2 May, June and July 1957 Status Reports and DF to Personnel Officer in May 1957.

DISCUSSION:

1.3 The total number of personnel received was deemed adequate. The late arrival of some and especially S/Sgt or supervisory type personnel necessitated scheduling personnel to work on normal off duty time and utilization of A/1C level personnel as supervisors.

RECOMMENDATIONS:

1.4 That TDY personnel be scheduled earlier to allow for leaves or delays so as to arrive on base on or before scheduled operation.

CHAPTER IV

PARTICIPATING UNITS' REPORTS

CHAPTER IV

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CHAPTER IV

SECTION A

TEST AIRCRAFT UNIT

Test Aircraft Unit (Provisional)

Indian Springs Air Force Base, Nevada

1. The Test Aircraft Unit is a provisional organization functioning during test periods only. It provides operational supervision of all test aircraft based at Indian Springs Air Force Base, and limited administrative, engineering, and technical support to all of the diversified elements.

2. The Test Aircraft Unit is organized, as outlined in 4950th Test Group (Nuclear) Operation Plan 1-57, around the framework of the 4926th Test Squadron (Sampling). During Operation PLUMBBOB, the Test Aircraft Unit was to be composed of the following elements: 4926th Test Squadron (Sampling) (including the Air National Guard Element), WADC (Project 5.5), NASWF, NB-1 Element, 21st Helicopter Squadron, and the Cloud Tracker Element (Low Altitude). The Test Aircraft Unit, however, was never formally established by official orders. In addition to the above mentioned elements, numerous other agencies or projects required aircraft participation in the test series. These aircraft fell within the operational jurisdiction of the Test Aircraft Unit in varying degrees and for periods of time ranging from a single shot to the entire series. These were: Documentary Photo, Flash Blindness, ADC Cloud Penetration, Radio Relay, Army Nike Ajax Tracking, and various operations and training projects of the Army, Navy, Marine Corps and Air Force. Control of the varied units participating was effected as follows:

a. Conducting pre-shot general briefing on D-1 (Tab-1).

b. Publishing Mission Execution Charts.

c. Publishing flying schedules for non-shot days (Tab-2).

d. Monitoring radiation exposures for all personnel (Tab-3).

e. Operating fixed and mobile ground control UHF radios.

f. Maintaining a continuous display of aircraft status (in commission, AOCP, etc.), overlays of aircraft orbits and altitudes, and the latest weather.

g. Monitoring Effects Aircraft for damage.

h. Publishing flight orders for all elements.

i. Maintaining a 24 hour operations duty section to forward pertinent information to all elements.

3. In this report, each of the major TAU Elements will be discussed in a separate section. In these sections each element will be

treated as to its:

a. Mission and Responsibilities.

b. Organization.

c. Achievements.

d. Problems and Recommendations.

4. Since the organizational framework of the 4926th Test Squadron (Sampling) provided the functional basis of the TAU, the over-all TAU problems and recommendations will be included in the 4926th section of this report.

PART I

4926th Test Squadron (Sampling)

1. Mission and Responsibilities: The 4926th Test Squadron (Sampling) was formed in April 1953, for the purpose of collecting gaseous and particulate cloud samples following nuclear detonations to fulfill the requirements of the Atomic Energy Commission. Beginning with operation "CASTLE", conducted in the EPG in 1954, and continuing in all subsequent test operations, the 4926th Test Squadron (Sampling) has performed this mission and has provided the organizational framework for the Test Aircraft Unit.

2. Organization:

a. The unique mission of the 4926th Test Squadron (Sampling) is reflected in its organization. In addition to executing the normal functional sections of a Squadron operating two (2) different types of mission aircraft, the 4926th maintains a Nuclear Applications section, whose primary function is to instrument and prepare aircraft for nuclear cloud sampling. This section is also responsible for removing the cloud samples from aircraft and preparing them for shipment to the appropriate laboratories for analysis. In addition, the Nuclear Applications Section operates decontamination and personnel dosimetry facilities. The Squadron is required to operate independently on TDY for extended periods of time, to provide the personnel to fill out the TAU, and to furnish limited support to austerely manned elements participating in nuclear test operations.

b. During Operation PLUMBBOB, the 4926th Test Squadron (Sampling) operated on a dual base concept due to the lack of adequate maintenance space at Indian Springs Air Force Base. All periodic inspections and controlled major maintenance of F-84G and B-57B aircraft were performed at Kirtland Air Force Base. Unscheduled major maintenance at Indian Springs Air Force Base was held to a minimum through aggressive daily and preventive maintenance and sound programming of aircraft utilization. The average strength of the Kirtland Air Force Base detachment was one (1) officer and 40 airmen. The strength of the forward element at Indian Springs Air Force Base averaged 26 officers and 130 airmen.

3. Achievements:

a. During Operation PLUMBBOB, the flying time for B-57B aircraft was 796:05 hours; for F-84G aircraft 1,331:55 hours; and for T-33A aircraft 541:45 hours. Total flying time was 2,669:45 hours of which 175:45 hours were logged during test mission sorties. Total number of sorties flown was 1,821 which included 161 test mission sorties. A total of 1,932 take-offs and landings were recorded. There were seven (7) aborts due to reasons other than shot cancellation. An in commission rate of 88% was sustained while the AOCP rate was held to less than one (1) percent. In preparing for and successfully completing Operation

PLUMBBOB, the 4926th Test Squadron (Sampling) established an enviable flying safety record. The Squadron won the Air Force Special Weapons Center 1st quarterly flying safety award, was runner up for the second quarter and at the time of this writing, was a strong contender for the third quarter. There were no accidents or incidents throughout the Operation.

b. In addition to the accomplishments of the primary mission during Operation PLUMBBOB, ten (10) project "Crew Cut" missions were conducted to provide data for USAF directed sampling requirements. In the accomplishment of these missions, a total of 30 sorties were flown. Three (3) of these missions were conducted in the Panama Canal Zone, two (2) in the Minneapolis area, two (2) in the Phoenix area and three (3) at Indian Springs Air Force Base. Missions in the Panama Canal Zone and the Minneapolis area required the movement of equipment and support personnel to the respective bases for operational periods of up to ten (10) days.

c. At the request of Headquarters USAF, each of fourteen (14) Air National Guard Squadrons having secondary sampling missions was given special training. Four (4) officers and six (6) airmen from each squadron were ordered on active duty for two (2) weeks and were integrated into the Operations, Maintenance, and Nuclear Applications sections of the 4926th Test Squadron (Sampling). Orientation and familiarization lectures were given and an on the job training program conducted to provide practical experience in aircraft instrumentation, particulate sampling, sample recover, aircraft decontamination, and personnel dosimetry.

d. In the course of normal sampling mission operations, orientation, indoctrination, familiarization, and special studies were conducted for various USAF and RCAF personnel.

(1) Personnel from the 4935th Air Base Squadron and from the Test Aircraft Unit, were trained in personnel dosimetry and precautionary measures.

(2) Strategic Air Command pilots from Laughlin Air Force Base, Texas, were given lectures on nuclear cloud sampling techniques and radiological safety. Twelve (12) pilots participated on actual cloud sampling missions as observers.

(3) RCAF personnel, in three (3) groups of twenty-five (25) each, were indoctrinated in radiological procedures pertaining to the sampling mission. They observed the various phases of the operation and actually participated in aircraft decontamination operations.

(4) Various other USAF personnel, including representatives of AMC and ADC, were given lectures and demonstrations on the phases of the operation that were of particular interest to them.

(5) A special decontamination study was performed on a T-33 jet aircraft. The aircraft flew five (5) shot missions in June and July without the benefit of normal aircraft decontamination processes. Decay curves indicated the extent of residual contamination. The amounts of removable contamination were also documented and included in a special report.

4. Problems and Recommendations:

a. Jurisdiction and Authority of the Test Aircraft Unit Commander:

(1) References:

(a) Documentary Photo Element

(b) Flash Blindness

(c) ADC Cloud Penetration

(d) Radio Relay

(e) Army Ajax Nike Tracking

(2) Discussion:

(a) Each of the projects above, had a specific mission which required aircraft participation in Operation PLUMBBOB. Aircraft and crews were furnished by various bases and commands throughout the ZI, while different agencies both military and civilian were responsible for the technical aspects of the several missions. To meet technical requirements, flights and other activities were often scheduled without going through TAU channels.

(b) On D-2 days, each element was required to submit current information concerning aircraft orbits, altitudes, and take-off times, etc. Late changes were to be forwarded immediately to the TAU for proper coordination with other flights and to insure proper separation. Neither the required information nor late changes were promptly relayed to the TAU. Follow-ups had to be made, resulting in costly delays and reduced efficiency.

(3) Recommendation: That the jurisdiction and authority of the Test Aircraft Unit Commander be clearly defined and/or expanded to include all test aircraft projects and agencies to insure the efficient accomplishment of the mission.

b. Finance:

(1) References: None.

PART II

Wright Air Development Center (Projects 5.5 and 53.7)

1. Mission and Responsibilities: The mission of the WADC Element during Operation PLUMBBOB was to determine the structural response of F-89D aircraft, in flight, to the blast and thermal effects of a nuclear detonation. This information was required primarily for the purpose of correcting or verifying the weapons delivery handbook for the aircraft and to define its delivery capability.

2. Organization: The WADC Element was composed of two (2) F-89D aircraft, six (6) pilots (of which only two (2) were at the Nevada Proving Ground at a given time), one (1) enlisted man (supply sergeant), and seven (7) civilian maintenance men.

3. Achievements:

a. Both of the aircraft participated in most of the shots up to and including shot "Smokey" (31 August 1957). Total flying time for the period 12 April 1957 to 31 August 1957 was 125:00 hours, of which 30:30 hours were flown on actual shot missions. A total of 134 sorties were flown, of which 39 were shot mission sorties. There was only one (1) abort during the entire period, it occured on the "Stokes" event (7 August 1957).

b. No accidents or incidents occurred during the operation.

4. Problems and Recommendations: None.

PART III

Naval Air Special Weapons Facility

1. Mission and Responsibilities: The mission of the NASWF Detachment in Operation PLUMBBOB was to obtain data on aircraft response to nuclear blast and thermal inputs for the A4D, FJ4, and HSS-1 aircraft. Since these aircraft represent three (3) general types not previously investigated (i.e., FJ4, extremely thin swept wing aircraft; A4D, very low aspect ratio; and HSS-1, rotary wing), basic effects data was obtained in addition to specific data on these aircraft types. Generally the effects prediction systems utilized were proven to be reliable and data was obtained to establish the delivery capabilities of the A4D and FJ4 aircraft for low yield weapons.

2. Organization: The NASWF Detachment during Operation PLUMBBOB, consisted of the following: two (2) A4D aircraft, two (2) FJ4 aircraft, one (1) AD-5, one (1) HSS-1, and one (1) TV-2, thirteen (13) officers, forty-five (45) enlisted men, and forty-three (43) civilian contractor personnel.

3. Achievements: The NASWF Detachment accomplished its mission during Operation PLUMBBOB without any accidents or incidents. An average of 214:00 hours were flown each month from 15 April 1957 to 31 August 1957. Of this total, 118:00 hours per month (average) were logged during mission or practice mission flights. There were seven (7) aborts during the test period; one A4D standby mission due to aircraft control difficulties, and three (3) A4D and three (3) FJ4 missions due to radar malfunction or interference from other radar stations.

4. Problems and Recommendations: Problems encountered were generally of a technical nature and therefore, are not included in this report.

c. Incidental to the rocket delivery was a demonstration that crew escape from the effects of an MB-1 was certain.

d. No accidents or incidents occurred during the period of the project.

4. Problems and Recommendations: None.

PART IV

MB-1 Element (Genie)

1. Mission and Responsibilities: The mission of the MB-1 Element was to scientifically test a "live" air-to-air nuclear rocket and collect radiation data for operational and scientific planning.

2. Organization:

a. Project Personnel (Permanent)

(1)	Project Commander	1 Officer
(2)	Air Crews	4 Officers
(3)	MSQ Controllers (Mercury)	2 Officers
(4)	Loading Officer	1 Officer
(5)	Loading Crew	3 Airmen
(6)	Project Supply	1 Airman
(7)	Maintenance Crew	10 Civilians (Northrop)

b. Project Personnel (On-site two (2) weeks or less)

(1)	Operational Analyist	1 Officer (AFSWC)
(2)	Loading Officer Instructor	1 Officer (4925th)
(3)	Loading Crew Instructors	2 NCO's (4925th)
(4)	Douglas Field Engineer	1 Civilian
(5)	Hughes Field Engineer	1 Civilian
(6)	Northrop Field Engineer	2 Civilians

3. Achievements:

a. The first fighter delivery of a live nuclear device as well as the delivery of the first ballistic rocket in U. S. history, was achieved on 19 July 1957.

b. During the period 28 May 1957 to 26 July 1957, the two (2) F-89J aircraft assigned to the project flew a total of 170:00 hours. From 14 June to 26 July 1957, each aircraft and crew flew two (2) sorties per day. An aircraft in commission rate for scheduled missions of 99.25% was achieved. Only one (1) practice mission was aborted.

(2) Discussion: Personnel in the 4926th Test Squadron (Sampling) have attempted to submit travel and per diem vouchers to the finance section, Kirtland Air Force Base, New Mexico. They have consistently found that the best service required from five (5) to seven (7) days for payment. Since the personnel could only be at Kirtland for limited periods of time, the vouchers had to be re-submitted elsewhere. The finance section at Nellis Air Force Base, Nevada, repeatedly gave prompt, courteous service throughout the test series, in spite of an increased work load and a shortage of personnel.

(3) Recommendations: That the finance section, Kirtland Air Force Base, New Mexico, be properly staffed and prepared to support personnel on extended TDY or that personnel from the finance section, Kirtland Air Force Base, be placed on TDY with the finance section, Nellis Air Force Base, to absorb this additional work load and insure prompt payment of all personnel.

c. Crew Rest:

(1) References: None.

(2) Discussion:

(a) During test operations air crew personnel must rest while other personnel, billeted in the same areas, are otherwise occupied. Noise and commotion can never be entirely curbed and it is difficult to get sufficient rest when it is needed most.

(b) During Operation PLUMBBOB, as in the past, the folding steel cot served as a bed. These cots are entirely inadequate even when they are in the best of condition. Those used during this operation were so completely unservicable that it was necessary to place plywood panels between the mattresses and the frames of the beds. When the AIO became reluctant to issue plywood for this purpose, special authorization from the flight surgeon was obtained.

(3) Recommendations: That adequate beds be provided for all air crew personnel who are required to remain on extended TDY during nuclear test operations.

d. Aircraft Separation:

(1) References: Report of near mid-air collision, 19 June 1957.

(2) Discussion: Navy aircraft were practicing for Priscilla under AOC and MSQ control. Another TAU aircraft was cleared into the test area VFR but under AOC control. While the Navy aircraft were apparently monitoring MSQ frequencies, a collision course was established with no warning given by the AOC.

(3) Solution: All aircraft cleared into the test area through TAU Operations were required to submit diagrams of intended

orbits and altitudes to the TAU Duty Officer who, in turn, briefed all subsequent flights.

(4) Recommendation: That the AOC monitor all aircraft positions and altitudes even though the aircraft are under MSQ control and that sufficient warning be given when collision courses are established.

e. Hangar Space:

(1) References: None.

(2) Discussion: Dock or other maintenance requiring that an aircraft be jacked up must be performed in a closed or protected area. The 4926th Test Squadron (Sampling) was not provided with any hangar space at Indian Springs Air Force Base, Nevada. Consequently, all dock maintenance had to be performed at Kirtland Air Force Base, New Mexico. In addition, minor maintenance requiring retractions could not be satisfactorily accomplished.

(3) Recommendation: That hangar space be provided in future test operations.

f. Electrical Power:

(1) References: Informal report to the AIO Officer, Indian Springs Air Force Base, Nevada, 15 June 1957, Subject: Inadequate Power.

(2) Discussion: During extremely hot weather, the load on the commercial power line was so great that communications equipment could not be operated properly. The AIO was informed and had the tabs on the transformers moved to the top load position. This brought the voltage to twenty-two (22) volts, which is still insufficient. It became necessary for communications personnel to work during the early morning and late evening hours when the load was at a minimum.

(3) Recommendation: That booster transformers be installed to permit continuous operation of communications equipment.

g. Communications Personnel:

(1) References: None.

(2) Discussion: The Communications Section of the 4926th Test Squadron (Sampling) was responsible for the field maintenance and IFF maintenance on all aircraft under TAU jurisdiction. Each element or unit was responsible for its own line maintenance . Several of the elements, however, did not bring their own line maintenance personnel. The 4926th was thereby compelled to perform line maintenance on aircraft for which it had not equipment or technical knowledge. Much time and

effort were spent in trying to locate power plugs, adapters, headsets, helmets, etc.

(3) Recommendation: That the various commands and bases which furnish aircraft and crews in support of nuclear test operations be made fully aware of the requirement for, and the importance of, line maintenance communications personnel or that the 4935th Air Base Squadron be given the responsibility of performing line communication maintenance on other jet aircraft.

h. Supply Depots.

(1) References: None.

(2) Discussion: Undue delay in the receipt of essential items resulted from the failure of depots to recognize and take appropriate action on the intital request. In some instances materiel was shipped immediately after contacting an AMC project monitor which indicates that the items actually were available for shipping at the time of the initial request.

(3) Recommendation: That all AMC Area Depots be furnished clear cut instructions as to their support requirements for each test operation.

i. Personal Equipment:

(1) References: None.

(2) Discussion: During Operation PLUMBBOB, the Personal Equipment section of the 4926th Test Squadron (Sampling) was the only complete unit of its type and was therefore required to support, to some degree, all of the aircrew personnel at Indian Springs Air Force Base, both military and civilian. Because of the heavy demand for personal equipment during periods of maximum activity, sampler aircrews whose equipment becomes contaminated during the course of nearly every shot mission must resort to the use of inferior or worn out equipment until the standard issue items have been decontaminated.

(3) Recommendations:

(a) That the 4926th Test Squadron (Sampling) be allowed a twenty percent (20%) overage on all personal equipment in order to meet the requirements of the various elements during test operations.

(b) That sampler aircrew personnel be issued three (3) flying suits so that adequate equipment will be available at all times.

j. Administrative work-load during Test Operations:

(1) References: None.

(2) Discussion: During test periods the operations and administrative sections of the 4926th TESTRON have a vastly increased administrative workload due to the accelerated pace of primary mission activities and the assumption of duties related to TAU functions. During these periods the administrative capabilities of the unit are stressed very nearly to their limit. During the preparation period for Operation PLUMBBOB, just prior to departure for Indian Springs Air Force Base, it was necessary to devote many hours to research for preparation of a justification for T-33 aircraft. Some two and one half ($2\frac{1}{2}$) months later, at the approximate mid point of the operation, the same requirement was made again, necessitating the expenditure of time which was urgently needed for Test Operation activities.

(3) Recommendation: That vital administrative requirements, not related to tests in progress, be handled where possible, during the interim periods.

k. Wind Data:

(1) Reference: None.

(2) Discussion: During Operation PLUMBBOB repeated efforts to obtain current and accurate upper wind data for use by the airborne controller during sampling operations were generally unsuccessful. In many cases only forecasts based on the previous evening's observations were available at take-off time. In other instances the observations taken at shot time minus two (2) hours were relayed to the control aircraft while airborne after shot time. Timely and accurate wind data is essential to the proper conduct of the sampling mission.

(3) Recommendation: That a firm requirement be established to furnish observed ground zero and time zero upper air data to TAU Operations on shot days for the use of the sampler control aircraft.

PART V

21st Helicopter Squadron (Detachment #1)

1. Mission and Responsibilities: The mission of this unit during Operation PLUMBBOB has been the conduct of radiation surveys at the test site, rocket recoveries in remote and otherwise inaccessible areas, taxi service in support of nuclear tests, search and rescue service as required, and any other necessary special helicopter flights within operational capabilities.

2. Organization: The 21st Helicopter Squadron is a unit of the 314th Troop Carrier Wing, Medium, Sewart Air Force Base, Tennessee. Operation PLUMBBOB was the first nuclear test operation in which the Squadron has participated as a unit. The Squadron consisted of the following: an average of seven (7) H-21 helicopters, eleven (11) officers, seventeen (17) airmen and one (1) civilian.

3. Achievements:

a. During Operation PLUMBBOB squadron aircraft and crews flew a total of 737:40 hours of which 695:05 hours were logged during mission sorties. A total of 745 mission sorties were flown. Total aircraft flying time on a thirty (30) day average was 143:35 hours. There were only two (2) aborts during the operation; one (1) due to carburetor failure at Pad #1, and the other due to a jammed clutch accuator at Pad #2. An average in commission rate of 86% was maintained.

b. No accidents or incidents occurred even though the flying was performed under extremely critical conditions requiring maximum performance in nearly all cases. An example was the frequent use of the "high hover" at altitudes from 100 feet to 1,000 feet above the terrain. Numerous take-offs and landings were executed at density altitudes of 10,000 feet. An aggressive flying safety program, in which the TAU, AOC, and the 4935th SUPPRON were completely cooperative, and the professional ability of the pilots contributed immeasurably to this safety record.

4. Problems and Recommendations:

a. High Hover:

(1) References:

(a) Section 111, T.O. 1H-21B-1, dated 15 December 1956.

(b) Letter, Headquarters, 63rd Troop Carrier Wing, Heavy, dated 20 March 1957, Subject: "Waiver Under Paragraph 6e, AFR 62-14 For H-21B Aircraft".

(c) Message, Commander, TAC, Langley Air Force Base, Virginia, 06/1531E May 57.

(d) Message, Commander, 4950th Test Group, Kirtland Air Force Base, New Mexico, 06/2303Z May 57.

(2) Discussion: A requirement was generated for missions involving a high altitude hover from 100 feet to 1,000 feet above the terrain. This type of flight is hazardous and is in direct violation of Section 111, T.O. 1H-21B-1 cited above, but was considered by the 4950th Test Group to be of sufficient importance to justify the hazards involved. Waiver was requested under paragraph 6e, AFR 62-14 for these flights in support of Operation PLUMBOB. While hovering at these relatively high altitudes and under certain conditions of air density an occurrance known as "settling with power" may take place, resulting in a rapid loss of several hundred feet of altitude before recovery can be effected. In view of this, an attempt was made to schedule all high hover missions in the early morning with cool calm air and minimum pay load. The deadline for high hover missions was arbitrarily established by the Detachment Commander as 0715 hours PDT each day. Working inside that limit, three (3) instances of the above described condition were experienced by our crews. In spite of these occurrances, frequent and continued requests for high hover work were made by various groups for all hours of the day and with passenger loads up to six (6) people. In practically every case a discussion with the project head revealed that a slow fly by would do just as well as a hover.

(3) Recommendations: That in future tests, all project supervisors be thoroughly briefed on the limitations of the H-21B as applies to high hover missions and that they be made aware of the extreme hazards involved in this type of flight. It is further recommended that all such work, if required, be scheduled for early morning and that no deviations from the established cut-off time be requested or permitted.

b. Pay Load:

(1) References: Letter, Commander, 20th Helicopter Squadron, Sewart Air Force Base, Tennessee, dated 12 February 1957, Subject: "Performance Data of H-21B".

(2) Discussion: On numerous special missions more passengers than were cleared for the flight would show up. When pay load limitations were explained the passengers were obliged to decide among themselves which ones would remain behind. If advance notice had been given, additional aircraft would have been provided to support the given mission.

(3) Recommendations: It is strongly recommended that AOC maintain strict and absolute control, by name, of all passengers to be carried on helicopter flights and that project heads be advised to adhere to established passengers lists.

c. Mission Assignments:

(1) References: None.

(2) Discussion: Many cases have arisen where missions were requested after the arrival of the helicopters at the C.P. Pad. These last minute assignments have frequently made it extremely difficult to accomplish all assigned missions with the number of helicopters and crews available.

(3) Recommendations: That every effort be made to anticipate all mission requirements prior to publication and distribution of mission schedules and definitely prior to the time the helicopters depart their base camp for the shot area.

d. Supply:

(1) References: None.

(2) Discussion: The 21st Helicopter Squadron was advised of Operation PLUMBBOB early in March with an in-place date of 15 April 1957. Most Helicopter Squadrons are small units assigned or attached to a base where sufficient spare parts are not usually stocked. Consequently, an extremely long lead time is required to get the necessary parts to support a mission of this scope. Without the excellent supply support of the 4935th SUPPRON, the high in-commission rate would not have been possible.

(3) Recommendation: That four (4) to six (6) months lead time be given helicopter squadrons in order to allow them to stock-pile sufficient parts.

e. Helicopter Landing Sites:

(1) References:

(a) This unit's monthly reports for July, August, and September 1957.

(b) DF from this unit to the TAU, 1 August 1957, Subject: "Oiling of Helicopter Pad #2".

(c) Letter from 4950th Test Group. 12 February 1957, Subject: "H-21 Helicopter Pads at Nevada Test Site".

(2) Discussion: Early planning (see reference No. 3 above) was apparent in terms of one (1) helicopter on the pad at any one time. The pads are very satisfactory for this, however, the large number of missions that required an H-1 hour take-off made it necessary to have four (4) helicopters on the pad at one time. This involved take-offs and landings from the untreated portion of the pad, resulting in heavy dust and blowing sand. Considerable blade errosion occurred, requiring in many cases, replacement of the full set of three (3) blades. In

September a large area was treated by spraying tar over the crushed rock. This proved to be quite satisfactory.

(3) Recommendations: That whenever H-21 helicopters are to be operated continuously from other than grass sites, that the area be treated to prevent blowing dust and sand. As well as a maintenance problem, it is also a flying safety hazard and a ground safety hazard for personnel on the ground.

ATTACHMENTS

BRIEFING GUIDE

FLYING SCHEDULE

STATISTICAL SUMMARIES

TEST AIRCRAFT UNIT BRIEFING GUIDE

1. Shot name, expected yield, type (ballon, tower, etc.)

2. Verbally go over execution chart, altitude chart, orbit overlay.

3. Weather forecast presented by 4935th Weather Detachment.

4. Stress meeting taxi and takeoff times.

5. Cover taxiing, takeoff runway, and parking procedures with aid of ramp and runway chart.

6. Ground abort procedures.

7. IFF - Standby after start engines, normal after takeoff. 4926th Communications will pre-flight IFF in all Test Aircraft Unit aircraft D-1. Also provide replacement sets.

8. Air Abort criteria. Should have been cleared up at position conference.

9. Misfire procedures.

10. Miscellaneous information, target lighting, rockets, ballons, radar reflectors.

11. Communication prodecure - minimize transmissions.

12. Navigational aids, AOC primary aid. GCI ("Hammer" available for emergencies).

13. Count down, guard channel - misfire one-one-one.

14. Rad-Safe - Film badges, goggles (procedures for preventing flash blindness) Rad-Safe monitors meet all aircraft. Thumbs up - clean, thumbs down - hot.

15. Flying Safety - local hazards, overruns, field lighting, etc. given by Major Young.

16. Use caution driving vehicles on ramp at night.

17. Barrier - up for all except F-89D.

18. Use check lists at all times.

19. Hot weather takeoffs.

20. L-20's and helicopters drive on right side of road.

Attachment #1

21. Weather hazards.

22. Partying held to minimum D-1.

23. File clearances following briefing.

Attachment #1

TEST AIRCRAFT UNIT FLYING SCHEDULE FOR 12 JULY 1957 IN EVENT OF NO SHOT
Indian Springs Air Force Base, Nevada

ATE	ACFT TYPE	NUMBER	CALL SIGN	CREW	ETD	ETE	ETA	MISSION	FUEL	REMARKS
2 Jul 57	F-89J	545	Pine Knot 2	Culpepper/Jones	0505	1/00	0605			
2 Jul 57	F-89J	547	Pine Knot 1	Hutchinson/Dr. Johnson	0520	/50	0610			
2 Jul 57	F-89D	411	Sore Thumb	Moore/Gee	0524		0608			
2 Jul 57	T-33A	105	Rainbow 1		0515	1/30	0645	Chase	150 tips	
2 Jul 57	2/F-84G	028/038	Tiger Red 1 & 2	Wright/Kelley	0745	1/15	0900	1	100 tips	
2 Jul 57	2/F-84G	043/051	Tiger White 1 & 2	Brandt/Krull	0745	1/15	0900	1	100 tips	
2 Jul 57	F-84G	053	Tiger White 3	Moore	0745	1/15	0900	1	100 tips	
2 Jul 57	B-57B	500	Hot Shot 1	Price/Goekerman	0745	1/00	0845		Internal	
2 Jul 57	B-57B	504	Hot Shot 2	Bounds/Powers	0745	1/00	0845		Internal	
2 Jul 57	B-57B	495	Hot Shot 3	Albright/Lippert	0745	1/00	0845		Internal	
2 Jul 57	HSS-1	024	Chalkline	Wickwire/Trandem	0805		1030	5.1	Fwd&Ctr Full	
2 Jul 57	FJ-4	467	Stovebolt	Mackay	0808		0910	5.3	Full Int	
2 Jul 57	A4D-1	827	Rockwool	Miears	0821		0915	5.4	Full Int	
2 Jul 57	FJ4	310	Stovebolt	Lane	0908		1010	5.3	Full Int	
2 Jul 57	A4D-1	831	Rockwool	Wynn	0921		1015	5.4	Full Int	
2 Jul 57	T-33A	105	Rainbow 1	Herry/Kelley	1000	1/15	1115		150 tips	Instrumer
2 Jul 57	2/F-84G	028/038	Tiger Red 1 & 2	Harrison/Hennessy	1030	1/15	1145	1	100 tips	
2 Jul 57	2/F-84G	043/051	Tiger White 1 & 2	Utterback/Hall	1030	1/15	1145	1	100 tips	
2 Jul 57	F-84G	053	Tiger White 3	Logsdon	1030	1/15	1145	1	100 tips	
IS NOT CANCELLED AT 2300 BRIEFING, BUT IS CANCELLED LATER, THE FOLLOWING SCHEDULE WILL BE FLOWN:										
2 Jul 57	HSS-1	024	Chalkline	Wickwire/Trandem	0335		0500	5.1	Fwd&Ctr Full	
2 Jul 57	FJ-4	467	Stovebolt	Mackay	0340		0440	5.3	Full Int	
2 Jul 57	A4D-1	827	Rockwool	Miears	0351		0442	5.4	Full Int	
2 Jul 57	FJ-4	310	Stovebolt	Lane	0440		0540	5.3	Full Int	
2 Jul 57	A4D-1	831	Rockwool	Wynn	0451		0542	5.4	Full Int	

All times Daylight Saving Time.

MALCOLM S. BOUNDS
Major, USAF
Operations Officer

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WRIGHT AIR DEVELOPMENT CENTER

STATISTICAL SUMMARY

(2) JF-89D	Total Time	Mission Time	Av Time/Acft	Mission Sorties	T.O. & Landings
April	15:25		7:42		17
May	26:10	2:00	13:05	2	24
June	28:20	8:30	14:10	9	31
July	29:35	12:00	14:50	11	37
August	25:40	8:00	12:50	7	25
Totals	125:10	30:30	-	39	134

MB-1 PROJECT

STATISTICAL SUMMARY

28 May to 26 July 1957

(2) F-89J

Total Flying Time	85:00
Total Mission Time	2:30
Pro-Rated Average Monthly Time/Acft	22:00
Total Sorties	62
Mission Sorties	2
Practice Sorties	60
Total Take-offs and Landings	62

DOCUMENTARY PHOTO ELEMENT

STATISTICAL SUMMARY

RC-47 (1)	April	May	June	July	August	September	Total
Total Time	8:00	24:50	30:50	22:35	47:00	33:40	162:55
Mission Time		5:25	18:20	7:45	4:10	16:50	52:30
Take-offs & Ldgs	- - -	- - -	- - -	- - -	- - -	- - -	47

Attachment #3

U. S. NAVY SPECIAL WEAPONS FACILITY

STATISTICAL SUMMARY

Average Monthly Flying Time		Total Time For Test
35:00		157:30
45:00		202:30
38:00		171:00
58:00		261:00
38:00		171:00
	TOTAL	963:00

Practice Time per Month	118:00
ractice Time for Test	531:00
per Month	214:00
ndings per Month	162
ings for Test	729
Month	143
est	644
Mission Practice Sorties per Month	94
ssion Practice Sorties for Test	423

4926TH TEST SQUADRON (SAMPLING)

STATISTICAL SUMMARY

	TOTAL SORTIES	MISSION SORTIES	TOTAL TIME	AV TIME PER ACFT	MISSION TIME	OTHER SORTIES	T.O. AND LANDINGS
MAY							
(11)JF-84G	168	5	191:30	17.5	6:25	163	168
(6)B-57B	76	4	136:45	22.7	7:35	72	76
(2)T-33	69	1	115:15	57.6	1:15	68	76
Total	313	10	443:30		15:15	303	320
JUNE							
JF-84G	254	15	335:15	31.9	16:20	239	254
B-57B	99	11	198:30	33.1	18:45	88	99
T-33	94	1	154:35	77.3	1:10	93	136
Total	447	27	686:20		36:15	420	489
JULY							
JF-84G	210	12	282:45	25.7	10:30	198	210
B-57B	84	16	156:30	26.1	30:25	68	84
T-33	42	3	70:50	35.4	3:20	39	59
Total	336	31	510:05		44:15	305	353
AUGUST							
JF-84G	237	19	299:25	27.2	16:50	218	237
B-57B	92	16	173:00	28.8	28:20	76	92
T-33	67	1	121:30	60.7	1:50	66	92
Total	396	36	593:55		46:50	360	421
SEPTEMBER							
JF-84G	169	30	212:25	19.3	10:40	139	169
B-57B	94	17	122:55	20.5	5:55	77	94
T-33	54	2	79:35	38.7	2:20	52	74
Total	317	49	414:35		18:55	268	337
To OCT 7							
JF-84G	8	6	10:35		8:05	2	8
B-57B	4	2	8:25		6:10	2	4
T-33	0	0	0		0	0	0
Total	12	8	19:00		14:15	4	12
4926th TS Totals for Test	1821	161	2669:45		175:45	1660	1932

Attachment #3

TEST AIRCRAFT UNIT

TOTALS FOR OPERATION PLUMBBOB

	T. O. & Landings	Total Flying Time
* 4926th Test Squadron	1932	2669:45
NASWF	729	963:00
Documentary Photo	47	162:55
MB-1 Project	62	85:00
WADC Element	134	125:10

* Total F-84G Time
Total B-57B Time
Total T-33 Time

Attachment #3

CHAPTER IV

SECTION B

4935TH AIR BASE SQUADRON

4935th Air Base Squadron

1. Mission and Responsibilities:

a. During Operation PLUMBBOB, the 4935th Operations section furnished normal air base operations services to aircraft participating in or supporting the test. In addition, flying time was furnished to attached reated personnel, and aircraft and crews were furnished for security sweeps, rocket nose cone search, sampler control, sample return, cloud tracker and photo missions. The 4935th participation in each of these types of missions varied according to need.

b. The Base Communications section, which is a part of operations, provided long distance, Kirtland Hotline, Teletype, Western Union, Commercial TWX and crypto facilities for test and test support units.

c. Charts are appended to this report which show the flying activity of 4935th aircraft during Operation PLUMBBOB and the communications activity during the same period. Charts are included in Chapter II of the basic report showing the operating activity and L-20 utilization during the test.

2. Problems and Recommendations:

a. Invitational Travel Orders:

(1) References: None.

(2) Discussion: Civilian personnel from AEC, DOD and government contractors were sometimes refused military airlift because proper invitational travel orders were not possessed by the personnel concerned. Many times this involved a last minute rush to obtain the necessary orders. This caused emberassment to the USAF and to the individuals involved.

(3) Recommendation: That future planning directives include instructions to non-military agencies on requirements for Invitational Travel Orders.

b. Operation of Yucca Airstrip:

(1) References:

(a) Headquarters 4950th Test Group (N) Planning Directive 3-56.

(b) Headquarters 4950th Test Group (N) Operations Plan 1-57.

(2) Discussion: This organization was given the responsibility for establishing an operations facility at Yucca airstrip to

control L-20 shuttle between ISAFB and Yucca. L-20 operations at Yucca proved to be infrequent and there was no need for the planned facility. In lieu thereof, a system of control by the AOC was established. Manifests and flight plans were filed at JSAFB operations. Any changes or delays were furnished to the AOC.

(3) Recommendations: That future planning place the responsibility with AOC for control of aircraft operating into Yucca airstrip.

c. Radio Relay and Low Level Cloud Tracker Aircraft Maintenance:

(1) References:

(a) Headquarters 4950th Test Group (N) Planning Directive 3-56.

(b) Headquarters 4950th Test Group (N) Operations Plan 1-57.

(2) Discussion: The 4900th Air Base Group Operations Officer was given the maintenance responsibility for Radio Relay and Cloud Tracker (B-25) aircraft. Since he had no facilities at ISAFB to discharge this responsibility, it was necessary to call on the 4935th or 4926th for actual support. This was an unsatisfactory arrangement and caused some difficulty during the test.

(3) Recommendation: That Radio Relay and Low Level Cloud Tracker aircraft be attached to the TAU for operations control, maintenance and logistical support.

d. Daily Kirtland Air Force Base - Indian Springs Air Force Base Shuttle:

(1) References:

(a) Headquarters 4950th Test Group (N) Planning Directive 3-56.

(b) Headquarters 4950th Test Group (N) Operations Plan 1-57.

(2) Discussion: Directives establishing the daily shuttle between ISAFB and KAFB did not provide sufficient guidance for the Indian Springs terminal operations. No manifest cut off time was established, requirements coordination between bases was poor and afternoon departures from ISAFB severely lowered the payload of the aircraft because of the high temperatures.

(3) Recommendations:

(a) That a detailed SOP be prepared by the ISAFB shuttle coordinator to include a 1400 cut off time on the previous day for the cargo and passenger manifest.

(b) That a daily call be made to KAFB at 1500 to coordinate airlift requirements for the following day.

(c) That shuttle aircraft be staged from ISAFB during the final stages of operation and during the roll-up. Early morning departures from ISAFB with lower runway temperatures will result in increased cargo carrying capability.

e. Personnel Requirements for L-20 Operations, Sample Return Coordination and Shuttle Coordination:

(1) References:

(a) Headquarters 4950th Test Group (N) Planning Directive 3-56.

(b) Headquarters 4950th Test Group (N) Operations Plan 1-57.

(2) Discussion:

(a) During the first 3 months of Operation PLUMBBOB, the 4900th Air Base Group provided two (2) officers on a rotating basis to coordinate the shuttle and sample return flights. They also provided one (1) L-20 pilot for security flights. Los Alamos Scientific Laboratory also provided one (1) officer to coordinate sample return requirements. During August the functions of the L-20 pilot and shuttle coordinator were combined, thereby saving one (1) officer.

(b) These functions do not require a full time officer for each. There are sufficient pilots assigned and attached during a test period to conduct the L-20 security sweeps; the sample return duties consist only of supervising the loading of samples and telephone notification of the Los Alamos Scientific Laboratory UCRL laboratories of EAT's on shot days.

(3) Recommendations:

(a) That the L-20 security sweeps be conducted by the assigned and attached pilots.

(b) That the functions of the sample return coordinator and the shuttle coordinator be combined.

f. Lack of Advance Information for Telephone Requirements, Location arrangement and Listings.

(1) References:

(a) Headquarters 4950th Test Group (N) Planning irective 3-56.

(b) Headquarters 4950th Test Group (N) Operations lan 1-57.

(c) Planning Conference February 1957.

(2) Discussion:

(a) In order to provide telephones and an adequate elephone directory in place upon arrival of test units the following nformation must be provided to the Base Communications Officer at east 30 days in advance of arrival at Indian Springs Air Force Base:

1. Building number.

2. Number of main lines.

3. Number of extensions.

4. Physical location of telephones in relation o floor plan and furniture layout.

5. Listing of personnel, section and unit for ach telephone.

6. Special equipment such as buzzers, bells, old buttons, etc.

7. Quarters assignment for key personnel.

(3) Recommendation: That a form similiar to Attachment 1 be used and submitted to Base Communications along with floor plan of building at least 30 days prior to arrival at Indian Springs Air Force Base. This information could be obtained at the planning conference.

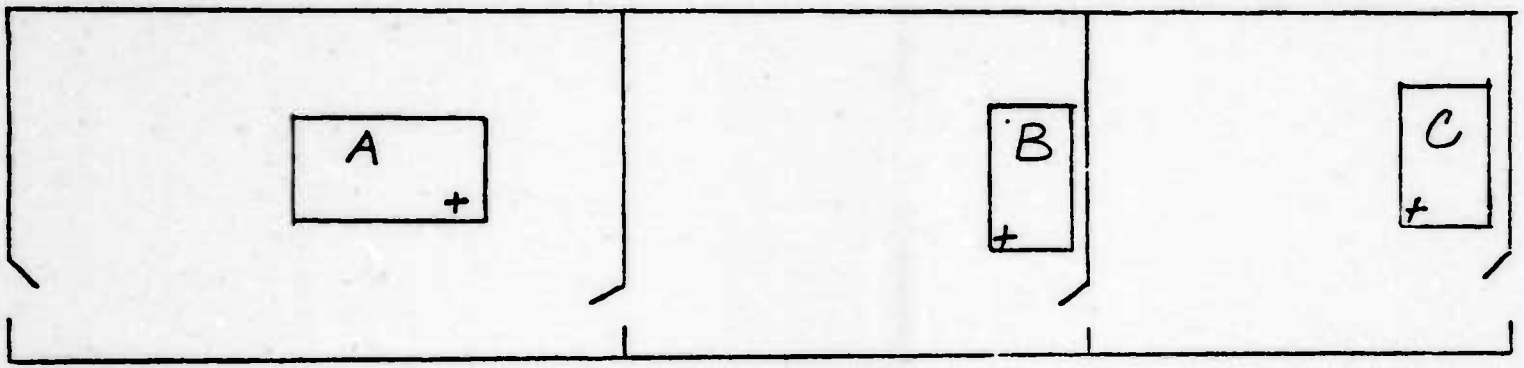
ATTACHMENT

FORM FOR TELEPHONE REQUIREMENTS

Attachment #1

BUILDING LAYOUT AND DESIRED TELEPHONE FACILITIES
FOR

ORGANIZATION: _____



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A. NAME: Major Robert E. Jones LISTING: Comdr, 3951st Recon Sqdn TYPE TELEPHONE AND EQUIPMENT 2 Main lines, 1 Buzzer.

B. NAME: Captain John Smith LISTING: Adj, 3951st Recon Sqdn TYPE TELEPHONE AND EQUIPMENT 2 Extension associated with station A, 1 Buzzer

C. NAME: M/Sgt Joseph P. Andersen LISTING: First Sgt, 3951st Recon TYPE TELEPHONE AND EQUIPMENT 2 Extensions associated with Station A, 2 signals

QUARTERS ASSIGNMENTS FOR PERSONNEL: _____

REMARKS: _____