

Operation ~~\_\_\_\_\_~~

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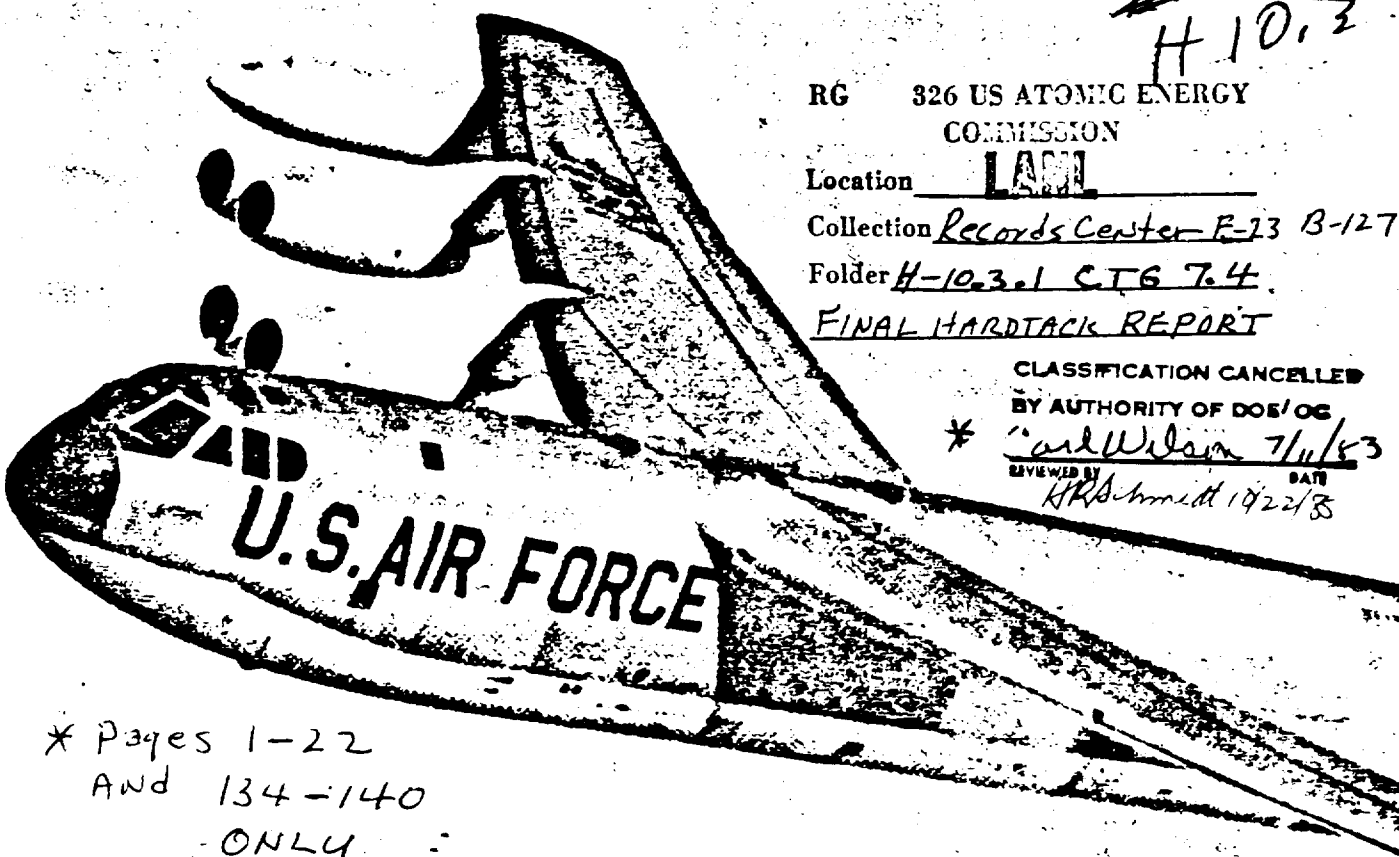
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# HARDTACK FINAL REPORT



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FINAL HARDTACK REPORT

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## TASK GROUP 7.4 ENIWETOK, MI

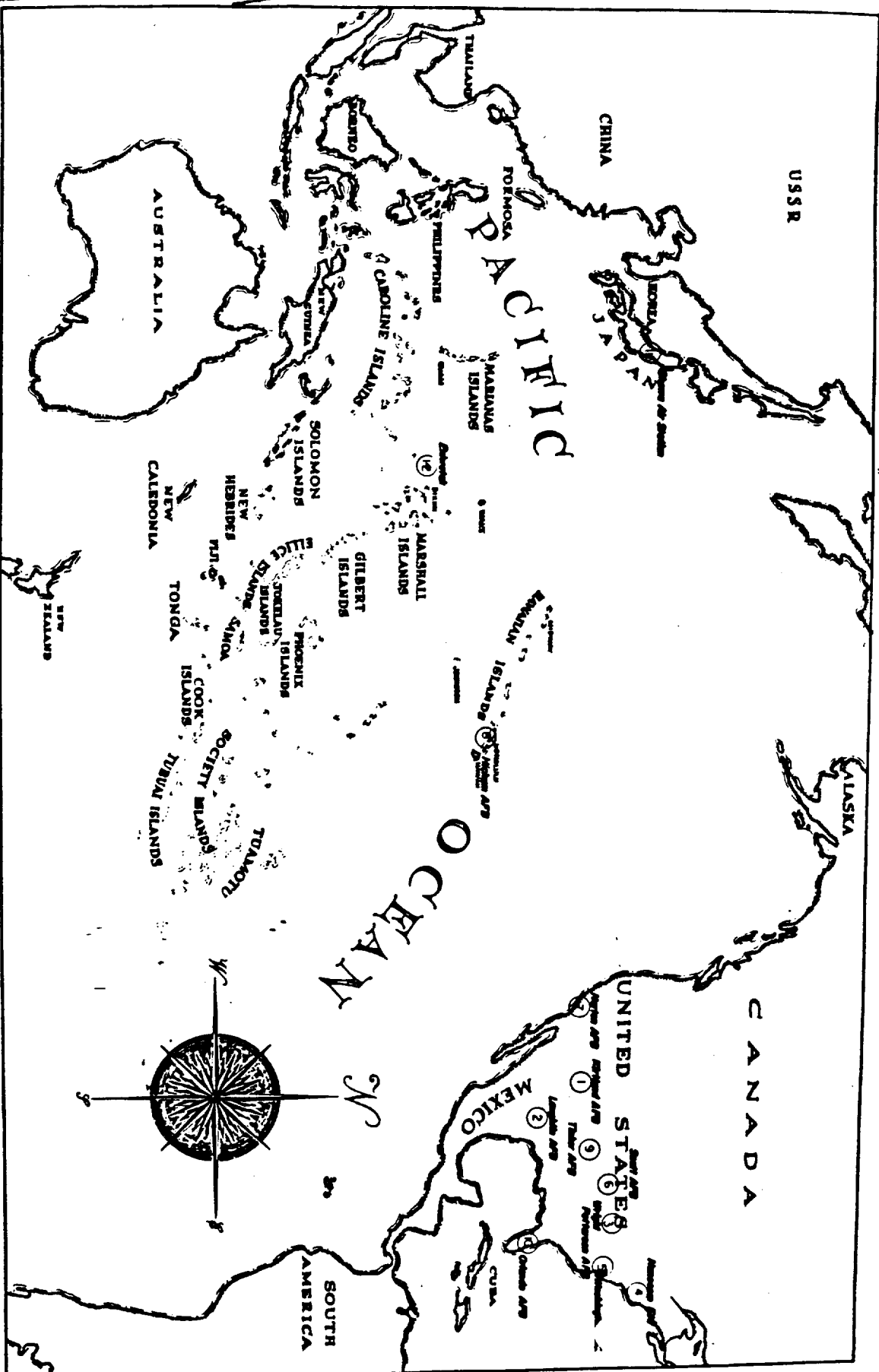
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~~RESTRICTED DATA~~  
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NO TASK GROUP 74 (PROV) HEADQUARTERS AFSC 1  
 TEST BASE UNIT 4804 W BARRON (TEST) 12  
 HELICOPTER ELEMENT 24th HELICOPTER SQDN 11  
 TEST AIRCRAFT UNIT HQ 4800th TEST GROUP (M) 1  
 CLOUD SAMPLING ELEMENT 4806th TEST SQDN (VMA) 2  
 VMA/VMA ELEMENT 4809th TEST GR (ATRONC) 1

AF EFFECT ELEMENT WADC HEADQUARTERS 3  
 NAVY EFFECTS ELEMENT NASIP 4  
 AFMC DOWNGRND ELEM AFMC 4  
 AFORT-1 ELEMENT HEADQUARTERS USAF 6  
 TEST SERVICES UNIT HEADQUARTERS MATS 6  
 SAN ELEMENT 64th AIR RESCUE SQDN 7  
 WEA RECON ELEMENT 57th WEA RECON SQDN 8

WEA REPORTING ELEMENT 9th WEATHER SQDN (UNDEAD) 9  
 WEA CENTRAL ELEMENT MATS HEADQUARTERS 6  
 COMMUNICATIONS ELEMENT MATS HEADQUARTERS 6  
 DOC PHOTO ELEMENT 602nd MOTION PICTURE SQDN 7  
 AERIAL PHOTO ELEMENT 570th AIR PHOTO & CHART SQDN 8  
 MATS TERMINAL ELEMENT MATS HEADQUARTERS 6

9th WEATHER SQDN (UNDEAD) 9  
 MATS HEADQUARTERS 6  
 MATS HEADQUARTERS 6  
 602nd MOTION PICTURE SQDN 7  
 570th AIR PHOTO & CHART SQDN 8  
 MATS HEADQUARTERS 6

PREFACE

Our job in Task Group 7.4 was to provide air support to Joint Task Force SEVEN. The purpose of this report is to brief what we did in carrying out this job. Anyone interested in more detail than contained in this report is referred to the histories of the Task Group and of its units.

Although Headquarters Task Group 7.4 was not formally established for Operation HARDTACK until October 1957, plans and preparation for its participation in the operation started long before that within Headquarters, Joint Task Force SEVEN, and within the headquarters and squadrons of the 4950th Test Group (Nuclear) of the Air Force Special Weapons Center. Thus, this report covers activities starting as early as the Spring and Summer of 1957. The last shot of the HARDTACK series took place at the Eniwetok Proving Grounds on 18 August 1958. Roll-up activities, deactivation of provisional units, and reassignment of personnel will take place for several weeks to come. These matters are routine, however, and therefore this report has been cut off as of 18 August 1958 in order to permit early publication.

The report is organized into five parts as follows:

Part	I	Summary
Part	II	Command
Part	III	Personnel & Administration
Part	IV	Operations
Part	V	Materiel

I take this opportunity to express appreciation to all the officers and airmen who have served in Task Group 7.4 so faithfully and well. All

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of us are happy to have been able to contribute to the success of Joint Task Force SEVEN in the conduct of Operation HARDTACK.

*Wm B. Kieffer*

WM B. KIEFFER  
Colonel, USAF  
Commander

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14-18	Comdr AFSWC	SWO (cys 14-15) SWM (cy 16) SWP (cy 17) SWC (cy 18)
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20	Comdr 4926th Test Squadron (S) (TAU)	
21-22	Comdr 4951st Support Squadron (T) (TBU)	Lt Col Steinkrauss
23	Comdr 4952nd Support Squadron (T)	Maj B H. Cochrane
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25	Comdr AFCRC (Ionosphere Element)	
26	Comdr AMC	Mr. Douglas
27	Comdr SPAMA	(SMSIL)
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31	Comdr Weather Reporting Element	Lt Col Pusin
32	Comdr Weather Reconnaissance Element	Lt Col Conrad
33	Lookout Mountain Laboratory	
34	CINCSAC	Maj Weller
35-36	CINCPACAF	
37	PACAF Helicopter Element	Capt S. W. Hebert
38	Comdr AWS	
39	Comdr AACS	Maj Gikas
40	Comdr APCS	
41	BUAER	
42	Comdr NASWF	Comdr Bushner
43-44	Comdr 4080th Strat Reconnaissance Wing	Col Adams
45	Comdr AMC	MCFO
46	Comdr WESTAF	DCS/Plans
47	Mr. Ted Johnson, CAA, 6th Region, Honolulu Life Bldg, Honolulu, T. H.	
48-53	TG 7.4 (4950th TG (N))	Staff Agencies
54	Hunter AFB, Ga.	Col Kieffer
55-70	File	

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PART I

SUMMARY

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The mission of Task Group 7.4, Provisional, was to provide and operate certain aircraft and to provide weather and other services in support of Joint Task Force SEVEN during Operation HARDTACK in the spring and summer of 1958. The Group reached a peak strength of 2262. Although the Group manned some sixteen different operating sites, the bulk of the people served on FRED Island at Eniwetok Atoll. Some thirty-seven (37) Navy personnel served in Task Group 7.4, Provisional. All of the remaining people were members of the United States Air Force.

Planning for the participation of Task Group 7.4, Provisional, in Operation HARDTACK began within the Air Force Special Weapons Center at Kirtland Air Force Base, New Mexico early in 1957. In October of that year the Task Group and its operating Elements were formally established. Task Group personnel began moving into the Forward Area in December and continued at an ever increasing rate until 15 March 1958 when the Task Group Headquarters and all its Units and Elements became operational in the Eniwetok Proving Grounds (EPG).

During the five months that the Task Group participated in sustained support of HARDTACK, its flying and technical elements participated in 35 nuclear test events. Of these, 11 took place at Bikini, 22 at Eniwetok, and 2 at Johnston Island. . On four occasions it was necessary for the Group to participate in two events on the same day. In all, the test effects and sampler aircraft of the Test Aircraft Unit flew 257 sorties and 1982 hours in direct support of nuclear test operations.

The Group provided weather reporting, weather reconnaissance, and weather forecasting services to Joint Task Force SEVEN. Weather reporting stations were set up on eight islands ranging in distance from one hundred to eight hundred miles distance from Eniwetok. Weather reconnaissance

was accomplished with a unit of ten B-50 aircraft which flew daily out to distances of twelve hundred miles from Eniwetok and returned. The weather forecasting organization, of course, played an important part in providing the Task Force Commander with that weather information which he needed to determine whether or not to shoot.

Air support activities included the operation of C-54, SA-16, liaison and helicopter aircraft carrying passengers and cargo in the Forward Area.

At peak strength, Task Group 7.4 was assigned a total of 78 aircraft of 16 different types. Between 15 March and 18 August a total of 18307 flying hours were accomplished. Four major accidents were suffered involving one liaison aircraft and three helicopters. One life was lost as a result of these accidents.

All Units and Elements of Task Group 7.4, Provisional, were redeployed to their home stations as soon as they could be spared from the Forward Area. On 15 August the main Headquarters of the Task Group transferred back to Kirtland Air Force Base leaving only a small echelon to finish the roll-up of supplies and equipment.

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PART II

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Chapter 1 - General

Late in 1956 the 4950th Test Group (Nuclear) was established by Headquarters Air Research and Development Command as part of the Air Force Special Weapons Center at Kirtland Air Force Base. It is a permanent organization whose mission is to plan for and to provide direction of air support for full-scale nuclear test programs both in Nevada and the Pacific. The members of the Headquarters of this group, while participating in the PLUMBBOB exercise in Nevada in the Spring and Summer of 1957, concurrently initiated plans for Task Group 7.4 participation in HARDTACK. Upon activation of Task Group 7.4, Provisional, by Headquarters Air Research and Development Command on 1 October 1957, the Commander and other personnel assigned to the Headquarters of the 4950th, merely assumed similar titles within the newly formed Task Group 7.4 and continued doing the job at hand. Thus there was no time lost in organizing a new group of people to do the Headquarters Task Group 7.4 job.

During the period from 1 October until the opening of the operational phase of HARDTACK in the forward area on 15 March, the provisional units and elements of Task Group 7.4 were established and organized at their various ZI home bases. Commanders were assigned and planning proceeded under the guidance of the Commander, Joint Task Force SEVEN and the Commander, Task Group 7.4.

Although advance detachments were in the forward area as early as February, operational control of these units was not assumed by Task Group 7.4 and Joint Task Force SEVEN until their commanders arrived on 12 and 19 March respectively; this assumption of command was accomplished smoothly and without misunderstanding.

Command arrangements during shots varied depending upon the shot situation. At no time was there any serious difficulty in maintaining

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adequate communication between the various operating locations. Thus, it was possible for the Commander of Task Group 7.4 to command all the air operations while at the same time keeping the Commander Joint Task Force SEVEN fully informed of the situation and responding to his orders.

Flying Safety was a special subject at all levels within the Task Group. The accident rate achieved was 21.3 per one hundred thousand flying hours. This compares with an Air Force-wide rate during Calendar Year 1957 of 13.6 per one hundred thousand flying hours and for the first six months of calendar year 1958 of 10.8 per one hundred thousand flying hours.



## Chapter 2 - Mission

The mission of Task Group 7.4 during Operation HARDTACK was two-fold: to operate aircraft for the purpose of collecting data and samples and to provide certain of the air support services required by Joint Task Force SEVEN. This latter function included the operation of air base facilities at Eniwetok and Bikini Atolls, an inter-island and inter-atoll airlift system, weather reporting and forecasting services, air terminal, search and rescue and communication services.

### Chapter 3 - Organization

Headquarters Task Group 7.4 was organized into three directorates (Personnel and Administration, Operations, and Materiel) and a small special staff reporting directly to the Commander and consisting of the Flying Safety Officer and the Flight Surgeon. The operating personnel were organized into three units: the Test Aircraft Unit, Test Services Unit, and Test Base Unit. The organization structure and the general functional areas of responsibility of each of the three operating units are indicated in Figure 1.

The Commander of the Task Group was formerly assigned as Deputy Commander of the Air Force Special Weapons Center and, thus, has been associated for some time with the atomic weapons research and development program. On 15 July 1957 he was reassigned to the post of Deputy Commander for Overseas Tests in preparation for his subsequent assumption of command of the Task Group. This arrangement made it possible for him to participate in the field phase of Operation PLUMBBOB, the 1957 atomic test series conducted in Nevada. He assumed command of the 4950th Test Group and Task Group 7.4 on 1 October 1957. The former commander of the 4950th Test Group became his deputy, a move which served to insure the continuity of that unit's operations.

With the activation of Task Group 7.4 on 1 October 1957, the various staff officers of the 4950th Test Group assumed like staff positions within Task Group 7.4, an arrangement which proved particularly effective. In the case of two officers making up the Commander's special staff it was necessary to request manning from resources other than that of the Air Force Special Weapons Center. The services of a Flight Surgeon with experience in the biological effects of radiation was obtained by arrangement with Headquarters Joint Force SEVEN and Headquarters United States Air Force.

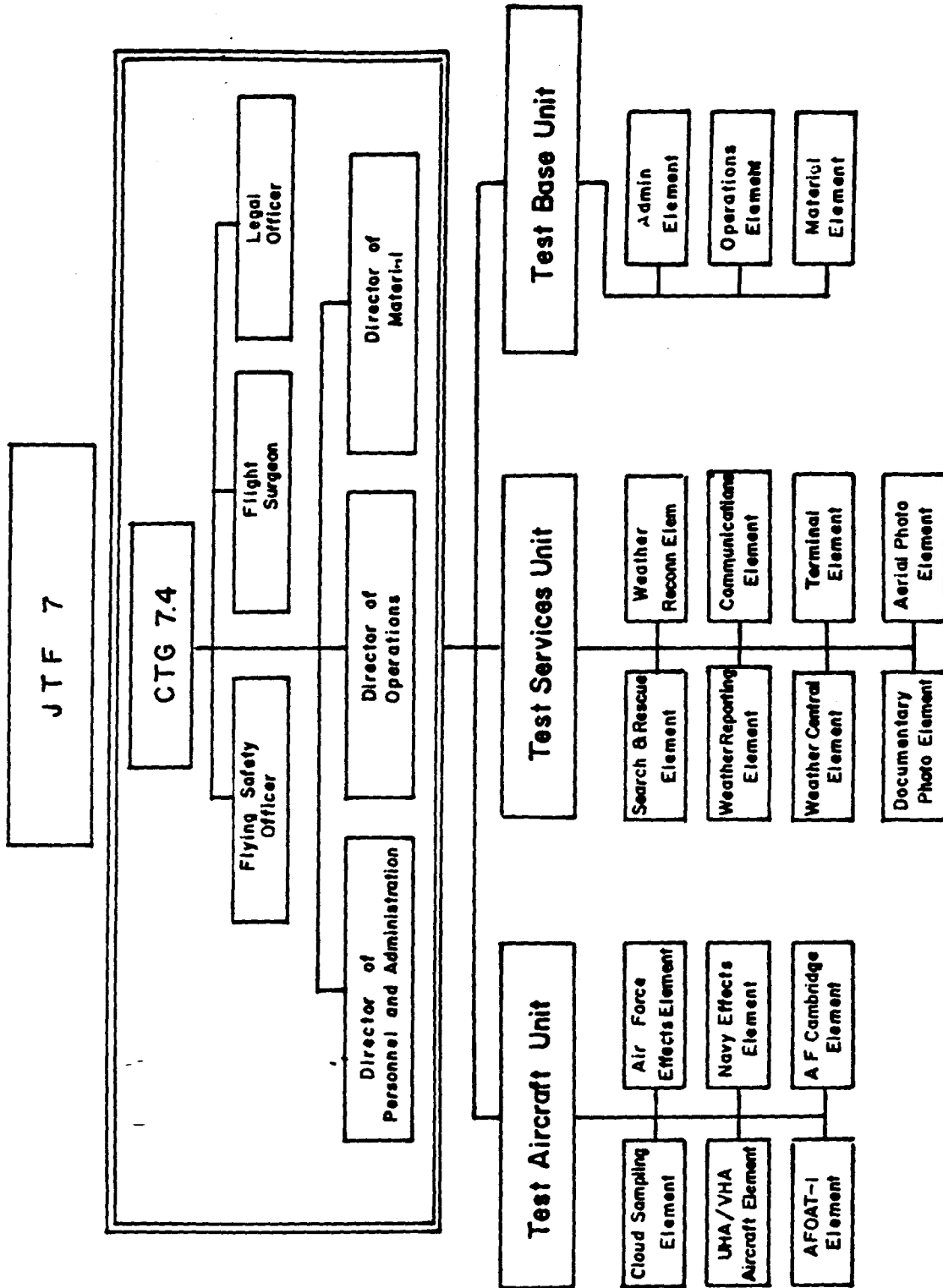


FIGURE 1 18

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During the period when Task Group 7.4 was operating at Kirtland Air Force Base, assistance was provided by the Staff Judge Advocate of the Air Force Special Weapons Center. Arrangements were made with the Commander Pacific Air Forces to provide legal assistance when needed at Eniwetok by placing a qualified officer of his staff on TDY with the Task Group. It proved necessary to request such assistance on three occasions during the on-site phase of the operation.

The Test Aircraft Unit included the data and sample collection aircraft. Its commander was formerly the Deputy Commander of the 4950th Test Group. Therefore, he well understood the problems connected with flying aircraft in the vicinity of nuclear detonations and through nuclear clouds. His deputy was the Commander of the 4926th Test Squadron (Sampling), one of the units assigned to the 4950th Test Group. This latter officer and his unit were experienced, through participation in previous operations, with all aspects of nuclear cloud sampling. The remaining Elements assigned to the Test Aircraft Unit were provided by various Air Force and Navy commands and came under our operational control when they arrived at the Eniwetok Proving Ground.

The Test Services Unit was manned and organized by the Military Air Transport Service to provide normal MATS services to the Joint Task Force. Its commander was an officer with experience in many phases of MATS operations. Coincident with the arrival of the Commander Test Services Unit in the forward area he assumed command responsibility for all MATS units based in the Proving Ground.

The Test Base Unit, whose task was to provide air base facilities and local airlift, had as its nucleus the 4951st Support Squadron (Test), and a detachment of the 24th Helicopter Squadron, PACAF, whose permanent homes are at Eniwetok. These units were augmented as needed to meet the test requirements by their parent commands, the 4950th Test Group and PACAF respectively.

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In addition it was necessary to request all participating units to make a pro-rata contribution of additional personnel needed to augment the field maintenance shops.

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Planning for Task Group 7.4 participation in Operation HARDTACK commenced in late 1956 coincident with the roll-up of that year's nuclear test at Eniwetok, Operation REDWING, and with the planning for the 1957 continental test, Operation PLUMBBOB. The first efforts were directed at the preparation of aircraft, supply, construction, transportation, and budget requirements. These studies led to the development of the data which was presented at the Joint Task Force SEVEN planning conference in February 1957 as being our needs for the conduct of our test mission. By mid-1957 a Schedule of Events and a Communications Plan had been published and our officer and airmen personnel requisitions had been forwarded to higher headquarters for action. As has been mentioned previously, the activation of the various Task Group 7.4 agencies occurred early in the month of October 1957. Immediately thereafter the Task Group held its Logistics Planning Conference which brought the test participants together with representatives of the various Air Materiel Areas and the Task Group Materiel staff for the purpose of outlining requirements and the steps necessary toward meeting those needs. Meanwhile, the Task Group staff published its first planning directive outlining the general operational concepts, undertook rehabilitation of the air control equipment, the AN/USQ 12, arranged for the modification of additional sampling aircraft, and prepared supplemental budgets necessary to reflect the changing requirements. By the end of the year the Operations Plan and a draft of the Movement Directive had been completed and the Commander and his deputy had completed staff visits to the forward area. One of the principal purposes of these visits was to make mutually satisfactory arrangements with the Army Task Group, 7.2, for the support they would provide during the operational period.

In early 1958, the Task Group staff directed its efforts to the preparation of detailed plans necessary for carrying out each facet of the mission. An advance echelon led by the Deputy Commander arrived at Eniwetok during the first week in February to monitor and expedite completion of the construction program, establishment of weather island stations and off-island sites, and preparation of base facilities for incoming units.

Chapter 8 - Radsaf <sup>2</sup> Blast Damage Responsibilities

A rigorous program was conducted throughout HARDTACK to insure maximum data gathering support without sacrifice of human safety. This program dealt chiefly with the radiological safety of personnel but also embodied considerations of possible damage to equipment from blast, heat and water wave action. The program included the following:

1. Dosimetry for Task Group 7.4 personnel.
2. Pre-shot planning.
3. Cloud sampling.
4. Sample return.
5. Post-shot monitoring

The most difficult problem in this area was the control of exposure to radiation of air and ground crews associated with the nuclear cloud sampling program. In the end it was necessary to obtain replacement personnel in order not to exceed maximum permissible exposures on large numbers of people in this program.

Dosimetry provided for continuous monitoring of the exposure of each HARDTACK participant to ionizing radiation through the use of a film-badge. These film-badges were issued to all personnel and at a frequency dictated by the person's duties. Men engaged in activities not requiring regular exposure to radiation were issued film-badges at six (6) week intervals, while personnel working in hazardous environments received film-badges as often as twice weekly. The badges were collected and read and bi-weekly reports were published listing the total radiation exposures. Through this means, the radiological health of all personnel could be monitored and

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exposures exceeding the maximum ~~permissible~~ precluded.

Pre-shot safety planning was accomplished for each event to insure that men, material and facilities would not be subjected to avoidable hazards. Of prime consideration was the threat of radioactive fall-out resulting from the detonations. Prior to each test event a predicted fall-out area was established and only when this area was clear of inhabited locations was the detonation executed. Of the shot delays encountered during Operation HARDTACK, more than ninety per cent were due to undesirable fall-out indications. These fall-out areas were posted in the Air Operations Center so that controllers could keep aircraft clear of the danger areas. Pre-shot planning also dealt with damage predictions concerning blast, heat and water action. On two (2) events at Eniwetok and one (1) event at Bikini it was necessary to evacuate liaison type aircraft to preclude blast damage and on one (1) event it was necessary to require complete body covering for all personnel to preclude the possibility of burns. A constant program was pursued to insure that no one observed detonations with his naked eyes. The possibility of retinal burns constituted a continual threat through the entire operation. Through damage predication and the precautionary measures dictated by these predictions, no unplanned damage occurred to aircraft and only minor damages were inflicted on base facilities.

The most difficult Task Group 7.4 radiological problems of the operation existed in the support of the cloud sampling program. Prior to the operation and based on the scheduled number of detonations planned for HARDTACK, maximum permissible exposures of ten (10) roentgens equivalent man (rem) for cloud sampling and effects aircrews and five (5) rem for all

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other personnel were established by the Commander, Joint Task Force SEVEN. As the test series progressed, additional events were introduced and the personnel exposures mounted rapidly toward the established maximum. Not only the aircrews but the aircraft maintenance personnel and the crews who recovered and packaged the collected samples were approaching their exposure limits. To alleviate this problem, the Commander, Task Group 7.4 requested and was granted permission to extend the maximum exposure limit of the maintenance and sample recovery crews from five (5) rem to eight (8) rem and ten (10) rem respectively. No extension beyond ten (10) rem was authorized; so additional cloud sampling aircrews were obtained and selected flying personnel at Eniwetok were trained to perform the duties of cloud sample observers. By careful scheduling of all cloud sampling aircrews and support personnel it was possible to complete the operation with no serious cases of over exposure. (See Figure 22 , Chapter 8, "Exposure of TAU Nuclear and Maintenance Personnel to Ionizing Radiation" and Figure 5, Chapter 4, "Cloud Sampler Aircrew Exposure".)

In support of the rapid delivery of radioactive cloud samples to laboratories in the Zone of the Interior, military couriers were instructed and briefed by the Task Group 7.4 Nuclear Research Officer, who also monitored the loading and securing of the samples aboard the return aircraft. He also established an isolation area within each of the sample return aircraft to insure the safety of the passengers and crew. This isolation area was established by marking the cargo floor of the aircraft at a location between the cloud samples and the passengers where the radiation intensity was ten (10) milliroentgens per hour. Personnel remaining outside this line could expect to receive no more than one (1) weeks tolerance dose of

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IONIZING RADIATION EXPOSURES

Test Aircraft Unit Nuclear Applications Personnel: \*

1 April - 1 August 1958

-----6576 mr  
-----8293 mr  
-----3776 mr  
-----6983 mr  
-----4579 mr  
-----4038 mr  
-----1009 mr  
-----3173 mr  
-----2276 mr  
-----7310 mr  
-----0058 mr  
-----2731 mr  
-----3378 mr  
-----2452 mr  
-----6763 mr  
-----6645 mr  
-----2786 mr  
-----7225 mr  
-----7132 mr  
-----7145 mr  
-----0556 mr  
-----3107 mr  
-----3888 mr

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

\* HARDTACK Maximum Permissible Exposure: 10,000 Milliroentgens.

FIGURE 22A

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IONIZING RADIATION EXPOSURES

Test Aircraft Unit Aircraft Engineering Personnel **PRIVACY ACT MATERIAL REMOVED**

1 April - 1 August 1958

-----5653 mr	-----3260 mr
-----2200 mr	-----2138 mr
-----5476 mr	-----6917 mr
-----2299 mr	-----3972 mr
-----6431 mr	-----5376 mr
-----1850 mr	-----5861 mr
-----2379 mr	-----2910 mr
-----5410 mr	-----2480 mr
-----1717 mr	-----2774 mr
-----4475 mr	-----3054 mr
-----4832 mr	-----7737 mr
-----2954 mr	-----1904 mr
-----2294 mr	-----4310 mr
-----2381 mr	-----5302 mr
-----2511 mr	-----5491 mr
-----3500 mr	-----2586 mr
-----2146 mr	-----2970 mr
-----1470 mr	-----1921 mr
-----1930 mr	-----2582 mr
-----6355 mr	-----3077 mr
-----2218 mr	-----3020 mr
-----2156 mr	-----2264 mr
-----5229 mr	-----4177 mr
-----2671 mr	-----2350 mr
-----2291 mr	-----4782 mr
-----2414 mr	-----3587 mr
-----8471 mr	-----2484 mr
-----2509 mr	-----3947 mr
-----2763 mr	-----3059 mr
-----2744 mr	-----2774 mr
-----1498 mr	-----2678 mr
-----5098 mr	-----5141 mr
-----4649 mr	-----1996 mr
-----3851 mr	-----2961 mr
-----1875 mr	-----4812 mr
-----7415 mr	-----3748 mr
-----2025 mr	

\* HARDTACK Maximum Permissible Exposure: 8,000 Milliroentgens.

FIGURE 22B

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**PRIVACY ACT MATERIAL REMOVED**

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radiation during the approximately thirty hour flight.

Post shot monitoring was accomplished by various activities within the Task Group to insure the earliest possible detection of radioactive fall-out or damage produced by the detonations. Rad-safe teams conducted island monitoring on Eniwetok immediately following each event and continued their checks for forty-eight hours or until the danger of fall-out had passed.

Task Group 7.4 provided personnel to man four (4) off-atoll weather rad-safe sites. These sites at Kuasie, Kapingamarangi, Nauru and Tarawa maintained a continuous fall-out surveillance program to insure earliest possible detection of this hazard. The personnel assigned to these sites were trained in the United States and were selected carefully to insure a favorable relationship with the native population. Their equipment included a continuously recording geiger instrument and they submitted periodic radio reports concerning their observations. There were no cases of adverse fall-out encountered during the test series. Monthly inspection visits were made to these rad-safe activities to assist with instrument maintenance and calibration and to evaluate the collected data.

All multi-place aircraft flying in the Eniwetok area during or within twenty-four hours following an event were provided with a Rad-Safe Monitor whose duty was to keep the aircraft commander advised concerning radiation encountered on the flight. Those aircraft positioned in the test array were required to radio their safe condition immediately following shock wave passage.

Approximately one (1) hour after each detonation a helicopter was dispatched to transport a rad-safe re-entry team to or near ground zero to

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establish a safe time for personnel to recover instruments and test data near the burst. At about six (6) hours after the detonation a second helicopter transported a rad-safe team around the shot atoll to accomplish a more detailed radiation check and to assess the damage to airstrips and helicopter pads.

Following test events, all aircraft returning to Eniwetok which could possibly be contaminated were monitored and those requiring decontamination were isolated. The aircrews were immediately sent to the personnel decontamination center, checked thoroughly and decontaminated when necessary. Contaminated aircraft were allowed to decontaminate themselves in isolation by radioactive decay when time permitted. This technique insured a minimum of radiation exposure to the decontamination personnel since the contamination intensities approximately halved themselves each seven (7) hours. After decay the remainder of the contamination was removed from the aircraft through normal washing with chemicals, water and high pressure hoses.

Many activities under Task Group 7.4 participated in the accomplishment of a successful and a safe nuclear test. Through the planning and administering of a conservative yet realistic radiological safety program, Operation HARDTACK was completed with no radiation injuries occurring within Task Group 7.4

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