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HEADQUARTERS
132d AIRCRAFT UNIT 132.4.2
Bergstrom Air Force Base
Austin, Texas

16 December 1952

INFO:

SUBJECT: ^{TPA} Final Mission Report

IVY

REF: C.4.5

TO: Commander
Task Group 132.4
Kirtland Air Force Base
Albuquerque, New Mexico

Transmitted herewith, for your information, is the Final Mission Report of Test Aircraft Unit 132.4.2 (Provisional), Bergstrom Air Force Base, Texas, prepared and submitted to Commanding General, Eighth Air Force in compliance with Eighth Air Force Operations Order 126-52, dated 29 August 1952.

FOR THE COMMANDING OFFICER:

1 Incl
Final Mission Report
(2 cys)

Jack H. Murray
for JAMES A. S. EMERY
Major USAF
Adjutant

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PHYLLIS C. HANSEN	NOV 7 1952
REVIEWED BY: <i>[Signature]</i>	DATE: 12-5-79

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DNA Chief 18cm
11/14/52

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- p1 - # A/c + pers in FLT A, B, C
- p3 - rehearsal
- p4,5,6 - MIKE SHOT specifics
- p7,8 - ICING
- p8 Rolling
- p9 → 13 Red Safe

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SECURITY INFORMATION

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1. GENERAL:

a. Project "Ivy" was an Atomic Energy Commission test conducted at the Eniwetok Proving Ground during the month of November 1952. It consisted of two tests, the first ("Mike" Shot) was a tower detonation of a nuclear device; the second ("King" Shot) was an air drop by B-36H of an atomic weapon. The training phase of Project "Ivy" was terminated on 13 August 1952 with the successful accomplishment of Operation "Texan", all crews and units having completed the training deemed necessary for the successful accomplishment of the assigned mission. Preparation for the movement of personnel and equipment to the operating area, Naval Station Kwajalein, Marshall Islands, were finalized and the actual move started on 2 September 1952 with the departure of the Test Aircraft Unit's advanced party consisting of four (4) officers and seven (7) airmen, representing Headquarters Test Aircraft Unit 132.4.2 and Flights "A", "B" and "C" of this unit.

b. Flight "A" consisting of seventy-nine officers, three hundred twenty-one airmen with ten (10) KB-29's (tankers), two (2) B-29 control aircraft and two (2) B-50 Instrumentation aircraft, departed Walker AFB on 22 September 1952, the move being completed on 27 September 1952 with the landing at Kwajalein of the last KB-29.

c. Flight "B", consisting of thirty-five (35) officers and one hundred eighteen (118) airmen with sixteen (16) F-84's, departed Bergstrom AFB on 4 September 1952 delivering the aircraft to Naval Air Station San Diego for water shipment to Kwajalein aboard the Aircraft Carrier USS Randona. The F-84's were prepared for shipment and loaded aboard the Randona on 12 September 1952. Sailing date was 15 September 1952, arriving at Kwajalein

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on 30 September 1952. Aircraft were uncrated, depickled and made ready for flight by 3 October 1952. All aircraft were test flown by 10 October 1952.

d. Flight "C" consisting of twenty-two (22) officers and sixty-six airmen with two (2) B-36H type aircraft departed Carswell AFB on 13 October 1952 arriving Kwajalein on 15 October 1952 having flown non-stop from Travis AFB California. All aircraft were in-commission and ready for flight on 17 October 1952. The B-36D Effects aircraft departed Carswell AFB on 21 September 1952 arriving Kwajalein on 25 September 1952. The B-47, operationally attached to this unit, arrived Kwajalein on 2 October 1952. All personnel and aircraft assigned to Test Aircraft Unit 132.4.2 were in-place and operational on 17 October 1952.

2. "MIKE" SHOT REHEARSAL:

a. Preparation for the first scheduled mission, "Mike" Shot Rehearsal, included orientation flights by all assigned aircraft. These flights were round robin flights of approximately 1000 miles, from Kwajalein to the Eniwetok Area, Bikini, Rongelap and return, all personnel becoming thoroughly familiar with all radio aids to navigation available in the area. This phase was concluded on approximately 16 October 1952 and all aircraft stood down for the scheduled mission on 18 October 1952.

b. Task Group 132.4 published Operations Order 2-52, Mike Shot Rehearsal, with the coordination and assistance of Test Aircraft Unit 132.4.2 on 13 October 1952. The purpose of the Task Group Rehearsal was to test procedures and timing for "Mike" Shot. Due to the large number of aircraft involved (fifty-four) and the limited space available for taxiing and runup, a parking, taxi, runup and take-off schedule was devised. It was necessary to line up all aircraft nose to tail along the single taxiway and control

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take-offs from the tower. This schedule also assigned altitudes to each aircraft for departure and return in case IFR conditions were encountered.

c. Although this mission was a rehearsal for "Mike" Shot, which was to have an H-hour of 0715H, to insure recognition of any failings in the taxi and take-off schedule, the H-hour for "Mike" Rehearsal was set at 1100H, thus all operations would be conducted during day-light hours and any discrepancies would be readily apparent.

d. The scientific observers set down certain weather minimums which would have to be honored if the Sampling Mission was to succeed. Additional weather requirements were decided on by Task Group 132.4 and Test Aircraft Unit 132.4.2 to assure successful in-flight refueling of the Sampler Aircraft. Desired weather would be a maximum of 3/8 low cloud cover with a maximum of 1/8 - 2/8 high cloud. The forecast for "Mike" Shot Rehearsal was favorable, however the weather actually encountered was much worse than desired. Kwajalein was closed in by extremely heavy rain and low ceilings during the landing period, necessitating the return of the Sampler Aircraft to Eniwetok for landing.

e. The mission was a complete success with the exception of the weather forecasting and communications difficulties.

f. The next scheduled mission was to have been a Task Force Rehearsal for "Mike" Shot scheduled for 25 October 1952. This was to be a communications check as a result of the break down of VHF and HF communications on the previous mission, utilizing a minimum number of aircraft. Adverse weather cancelled this mission and all efforts were turned toward "Mike" Shot.

3. "MIKE" SHOT:

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a. Task Group 132.4 Operations Order 3777 "Mike" Shot was published on 24 October 1952. This order incorporated changes and revised procedures as determined by the Rehearsal. "Mike" Shot (a tower detonation of a thermo-nuclear device) was scheduled for 0715X on 1 November 1952. Weather was forecast to be favorable, from a scientific as well as operational standpoint.

b. The first aircraft (B-36D Effects Aircraft) was airborne on schedule at 0230M, with the remainder of the aircraft meeting their scheduled times off. The first two F-84G's were airborne at 0625M. Jato was utilized as one pylon tank was being carried in addition to the two specially modified sampling tip tanks, which contained approximately 130 gallons of usable fuel. The mission of these two aircraft was to measure the radiation intensity and physical size of various portions of the atomic cloud, from H / :15 to H / 1:00, so that proper time for sampling could be determined. No actual penetrations were made due to extreme radiation.

c. Two control aircraft were utilized in the sampling mission, a B-36H at 40,000 feet containing the scientific observers, for visual control of the actual sampling and a B-29 at 20,000 feet, with a back-up, for rendezvous control. The B-29 aircraft utilized airborne radar, modified to interrogate the Mark 10 IFF (APX-6) installed in all aircraft. This system enabled the B-29 control aircraft to vector the Samplers to the tankers or Control B-36 depending on the situation, giving an average coverage of 100 NM with excellent results. The command ship (USS Estes) was also radar equipped and capable of vectoring aircraft up to 150 miles out. It was discovered on this mission, however, that a radio active cloud blocks radar completely. It was found that if an aircraft went into or behind the radioactive cloud

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it was "lost" on the radar scope. This phenomena was a major cause factor in the loss of Captain Jimmy Robinson, an F-84 Sampler pilot, in this mission. The cloud sampling mission necessitated extremely high altitude flight, therefore a light fuel load was necessary to reach maximum altitude. Pilots were briefed to depart the Sampling Area with not less than 2000 pounds of fuel, thus allowing sufficient fuel to effect rendezvous with the tankers and return to Eniwetok if IFR was unsuccessful. It was planned to use Eniwetok as an emergency landing field in extreme emergency only, due to the fact that its condition following the "Shot" was unknown and it was expected to be heavily "contaminated".

d. The tankers were deployed as follows: Sampling Area - four (4) tankers in formation with the B-29 control aircraft, three (3) in formation at a point halfway between Eniwetok and Kwajalein as back-up in case of adverse weather or aborts in the Sampling Area. The remaining in-commission tankers were on alert at Kwajalein to supplement the airborne element if needed.

e. The actual Sampling mission was conducted by twelve F-34G aircraft operating in three flights of four aircraft with a separation of one hour and a half between flights. The first flight arrived in the Sampling area at H / 1:30, the last at H / 5:00. All aircraft refueled in the Sampling area prior to departure for Kwajalein. One aircraft (No. 51-1040), pilot Captain Jimmy Robinson, failed to make rendezvous with the tankers and run out of fuel enroute to Eniwetok; the pilot tried to ditch the aircraft but failed to get out after impact with the water (See AF Form 14, dated 12 November 1952 on this accident).

f. The weather encountered on this mission was not as forecast and

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barely operational being 5 to 6/8 swelling currents from approximately 1500 feet to 45,000 feet. This made sampling very difficult and the rendezvous problem critical.

g. "Mike" Shot, from a scientific standpoint, was a complete success, operationally it was marginal. The weather deteriorated during the Sampling Period, H / 1:30 to H / 6:00, to such a point as to make the operation hazardous. All aircraft completed their assigned mission, however, with the one exception mentioned above. It is evident that prescribed weather minimums must be honored in future missions of this type, if the overall mission is to succeed, scientifically as well as operationally.

h. It should be noted that maintenance-wise the mission was extremely successful, all aircraft assigned were in-commission and flew their assigned mission, with the exception of one F-84 which aborted approximately thirty minutes after take off, due to its inability to refuel in flight. This was the only abort on "Mike" Shot.

4. "KING" SHOT:

a. Task Group 132.4 published "King" Shot Operations Order 5-52 on 8 November 1952 incorporating changes and revisions made evident by "Mike" Shot. "King" Shot was scheduled to follow "Mike" by approximately fourteen (14) days, depending on re-entry of personnel into the Eniwetok Area. These recommendations and changes were compiled by Test Aircraft Unit 132.4.2 personnel, the following changes in procedure being made:

- (1) The Sampler aircraft would operate as two ship flights rather than four, so that total flight time would be shortened. On "Mike" Shot the scientific observers in the B-36H Control aircraft utilized one element at a time, thus the second element of each flight orbited for approximately thirty

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(30) to forty-five (45) minutes prior to their penetrations of the atomic cloud.

(2) Eniwetok was to be used for landing in the event an aircraft or element could not IFR or the weather was such that landing at Kwajalein was doubtful. The new H-hour was to be at 1130M which would require the last four Samplers to return to Kwajalein after dark. As air rescue capability was nil during hours of darkness, it was planned for these aircraft to land at Eniwetok for removal of their samples.

(3) Two additional tankers were to orbit Eniwetok for emergency refueling.

b. "King" Shot was scheduled for 13 November 1952, H-hour to be 1130M. Weather was forecast to be suitable and all preparations were completed for the mission as scheduled. All aircraft were in-commission and the Take-Off Schedule was met without exception, however the mission was first postponed 45 minutes by Joint Task Force 132 because of weather and then cancelled at 1150M due to unsatisfactory F-34 Sampling and rendezvous weather. This necessitated a seventy-two (72) hour delay.

c. The next two days were spent performing necessary maintenance and by the night of 15 November 1952 all aircraft were ready to go. The weather on 16 November 1952 proved to be ideal, the Eniwetok Area being clear. Take-offs were on schedule and all aircraft in position at H-hour. The "drop" was one second early with a circular error of approximately 300 feet which was well within tolerances as set down by Joint Task Force 132. The two B-50 Instrumentation aircraft had the following time errors at time of detonation:

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(1) Item One - One second early.

(2) Item Two - Zero error.

d. The Sampling promotion of "King" Shot was performed without incident. All aircraft were able to return to Kwajalein prior to darkness due to shortening of the Sampling Period by rapid deterioration and shearing of the cloud.

e. The mission was considered to be a complete success scientifically as well as operationally. Samples obtained were considered excellent.

f. The changes in procedures proved to be excellent, however, the weather was a major factor in the success of this mission as compared to "Mike" Shot, and must be considered as a major planning factor in future operations of this type regardless of equipment used.

5. ROLL-UP:

a. Roll-ups were started immediately for all flights on 16 November 1952 as per Task Group 132.4 Operations Order 4-52, dated 6 November 1952.

b. Flight "B" was originally scheduled to fly the fifteen (15) F-84's to the ZI being supported by tankers and control aircraft of Flight "A", however, on recommendation of Joint Task Force 132, the USS Rendova was made available and it was decided by Task Group 132.4 to transport the aircraft by water to San Diego. This released Flight "A" on 16 November 1952 and all their aircraft departed Kwajalein on 17 November 1952 for the ZI via Hickam AFB and Travis AFB. All aircraft except one KB-29 arrived Walker AFB on 21 November 1952. This aircraft had an engine change at Hickam and arrived at Walker AFB on 24 November 1952. The remaining personnel and equipment were returned aboard the USS Morton and via MATS airlift. Flight "B" returned all personnel via MATS with the exception of three (3) officers and forty-four

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(14) airman who accompanied the aircraft and equipment aboard the USS Reno. All personnel and equipment arrived in the ZI on 5 December 1952. The fifteen (15) F-84G aircraft scheduled to be transferred to ARDC in their present configuration were flown from San Diego to Bergstrom AFB, the last aircraft arriving 16 December 1952, and are awaiting transfer instructions.

c. Flight "C" departed with all personnel and equipment via unit and support aircraft on 17 November 1952, arriving Carswell AFB on 21 November 1952 after a 72 hour lay over at Hickam AFB.

d. The entire move to the ZI of Test Aircraft Unit 132.4.2 was conducted without mishap, all movements being well coordinated and accomplished as scheduled. The only delays encountered were at Hickam AFB by personnel returning by MATS airlift. The system of handling passengers at Hickam was inadequate. Personnel were unduly delayed, with some aircraft departing "light" due to Passenger Service not giving proper notification to personnel awaiting airlift. Their method of notification and priority did not reflect the knowledge that is normally expected of a MATS Operation.

6. RADIOLOGICAL SAFETY:

a. This portion of the operation was extremely important due to the large number of personnel required to work around and on contaminated aircraft. Maintenance personnel in all flights were thoroughly briefed on the radiological aspects of the mission and proper precautions to be taken when working with aircraft which are contaminated radioactively.

b. Each multi-engine aircraft carried a rad-safety monitor to advise the aircraft commander of his aircraft's entry into radioactive areas. In spite of this precaution it was necessary for some of the tankers and control aircraft to enter areas of radio activity, however they were not heavily

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contaminated and no washing was necessary.

c. Of the fourteen (14) F-24's scheduled to fly on each shot, ten on "King" Shot and twelve on "Mike" Shot returned to Kwajalein in a radioactive contaminated condition. From previous experience (Tumbler Snapper) and by monitoring these aircraft, we found the two "hottest" spots were (1) dive brake and (2) leading edge of pylon rack. On "King" Shot the contamination on the pylon rack was reduced considerably by covering the leading edge with masking tape before take off and removing it as soon as the aircraft landed.

d. After landing the "hot" aircraft were taxied to a special parking area where they were immediately monitored and the pilot taken to the personnel decontamination station. The aircraft were then let stand till the next morning. The pilots, meanwhile, were monitored, took showers and were monitored again to make sure they were free of all radioactive particles, given clean clothing and released. As the aircraft were highly polished in the vicinity of the cockpit, radiation exposure to the pilots was very low.

e. The next morning the aircraft were again monitored and were moved to the decontamination ramp to be washed. Two aircraft were decontaminated simultaneously by six man crews and the aircraft with the lowest readings were worked on first. The decontamination was accomplished by first washing the aircraft with cold water and then two men with brushes and buckets containing a mixture of gunk and water scrubbed the aircraft thoroughly while a third washed the gunk off with a hose. High pressure was not used after "Mike" Shot as the aircraft had to be flown again in a few days and the excessive moisture caused trouble in the electrical systems. After "King" Shot however, water under 400 pounds of pressure was used. The aircraft were constantly

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being monitored and when they were "cool" enough for maintenance to be performed on them, they were released to the squadron. If the hottest part of the aircraft was below 7 mr/hr it was considered cool enough to work on indefinitely. Anything above that made it necessary to keep constant watch on the maintenance crews and to limit the time each one spent working on the aircraft or in the vicinity of the aircraft. The highest radiation exposure, any of the maintenance personnel of 132.4.2 received on the whole project was 145 mr. Most of the personnel were well below 50 mr. After "King" Shot the aircraft were released to be pickled before they decayed to 7 mr/hr, but maintenance personnel were carefully checked by rad-safety monitors. As the dive brake and pylon rack were the two "hottest" areas, and as their decay rate is indicative of the rest of the aircraft, the following is a list of the readings at specific times after exposure to each burst.

"MIKE" SHOT

All Readings in MR/Hr

ACFT #	M/3 hr	M/24 hr	M/48 hr	M/72 hr	M/96 hr	M/120 hr	M/144 hr
	DB Pylon	DB Pylon	DB Pylon	DB Pylon	DB Pylon	DB Pylon	DB Pylon
055	8000	7000	600	400	360	255	185 180 170 120 120 180 100 60
028	8000	5500	500	360	320	240	200 180 160 120 120 68 100 60
046	4000	2000	200	280	115	160	70 95 60 80 40 60 25 45
038	1200	800	120	180	60	105	30 80 20 50 20 38 17 30
033	450	600	60	140	60	120	40 80 25 55 18 42 15 35
049	460	500	70	110	65	100	40 60 35 45 25 35 15 25
053	200	250	50	100	50	90	30 60 25 40 22 33 14 22
045	210	220	70	80	40	60	20 25 20 20 18 18 12 14
043	200	210	60	80	60	80	25 40 20 35 18 26 12 15
030	-	-	-	-	-	-	- 60 100 40 80 22 50

All Readings in MR/hr

AIRCRAFT #	K / 3 hr			K / 24 hr	
	Dive Brake	Pylon with Tape	Pylon with Tape Removed	DB	Pylon
049	3000	4200	3900	12	10
054	5000	3700	3500	14	7
043	3200	2600	2400	33	19
055	3150	2600	2380	40	29
051	3000	2100	1960	30	11
046	2400	1700	1530	34	24
053	2200	1700	1550	26	24
028	1600	1100	850	42	22
030	1100	900	300	42	64
032	1000	850	700	28	32
033	600	400	300	22	30
037	290	270	150	10	14

f. It is of interest to note that by removing the masking tape from the leading edge of the pylon rack, the radiation intensity was reduced on the average of 185 mr/hr.

(1) Problems:

- (a) Dive brake picks up highest amount of radiation and maintains it for the longest time due to the difficulties encountered in decontaminating this area.
- (b) Radiac instruments are highly sensitive to the extremely damp climate encountered in the Marshall Island area.

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- (c) ~~SECRET~~ **UNCLASSIFIED** Removing masking tape from pylon racks as large amounts of Beta particles are present and severe burns can result. Disposal of the highly contaminated tape is also of prime importance and a problem as it must be buried and the spot marked and isolated.

(2) Recommendations:

- (a) Leading edge of pylon racks should be covered with masking tape before take off and removed as soon as practicable after landing.
- (b) Aircraft should definitely be polished before flying in cloud in order to reduce exposure to pilot. On both of the "Ivy" shots the F-34 aircraft were highly polished in the vicinity of the cockpit and only one plane had more than a 7 mr/hr reading in the cockpit upon landing.
- (c) Radiac instruments should be moisture proof to prevent electrical shorts from occurring.

7. SECURITY:

a. Initial security clearance requirements were that all aircraft commanders and crew members, loading crews of drop unit, and staff personnel be "Q" cleared. All other personnel to have at least a National Agency Check. It was found at the forward area that "Q" clearances were not absolutely necessary for the tanker unit of Flight "A", however, the majority of their personnel were in frequent contact with AEC contract representatives.

b. All personnel were indoctrinated as to security regulations of Operation "Ivy" prior to departure from their respective stations. Aircraft

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and parking area security access masters of personnel were submitted to Task Group 132.4 Headquarters and to the Kwajalein Provost Marshal. Appropriate security badges were produced by Joint Task Force 132 Headquarters but were distributed to the appropriate cleared personnel at such a late date that they did not serve the purpose intended as operations were not hampered prior to their issuance.

c. SAC aircraft were guarded at all times by armed guards plus a roving motorized patrol. There were no instances or evidences of attempted sabotage while at Kwajalein. These guards were supplied by the Marine Garrison stationed at Kwajalein supplemented by airmen from Task Group 132.4.

d. All personnel required to have "Q" clearances for Operation "Ivy" were granted subject clearances prior to the completion of the operation. Security lectures were given all personnel after K-Day or prior to their departure from Kwajalein for home station. Also, security certificates were signed by all personnel and termination certificates were signed by all Quebec cleared personnel.

8. RECOMMENDATIONS:

a. The following recommendations for future operations, as a result of experiences gained in Operation "Ivy" have been made to Joint Task Group 132.4:

- (1) Command and Administration recommend that:
 - (a) Messing facilities utilized by Air Force Personnel be under the direct control and supervision of the using agency (in this case the Task Group);
 - (b) Proper diets compatible for high altitude flights be considered in future plans with more consideration given to mess facilities.

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- (c) All disciplinary action against or concerning Air Force personnel will be administered by responsible Air Force commanding officers.
- (d) Flights or sub-units maintain separate orderly room but reduce administrative personnel requirements to a bare minimum. If the administration of the flights or squadrons are placed under one orderly room or headquarters, it should be divided into sections for each flight in order that pay records, morning reports and other action requiring immediate attention can be handled expeditiously.
- (e) All personnel performing duty with Test Aircraft Unit or like unit operationally, should be assigned to that particular headquarters for operations, administration and housekeeping.
- (f) Appropriate headquarters of authority to formulate iron clad SOP's that personnel selected for similar operations in the future will not be discriminated against on promotion quotas and AFSC upgrading by parent organization at home station. Normally those selected for an operation of this nature are above the average personnel and have been hand-picked by respective commanding officers. Their promotion quotas should be based on the man's past performance and TO assignment with parent organization.
- (g) Airmen's quarters be adequate to allow 50 square feet

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per man. Officers' quarters to allow 60 square feet per man.

- (2) Maintenance and Supply recommendations:
- (a) Mistakes made during the modification of test aircraft in preparation for this mission have become objective lessons in coordination. Requirement planning was made by an activity of the Atomic Energy Commission while physical modification was made by NOAMA. Failure of the designing engineers to adequately inspect the test installation has been felt in the expending of approximately 500 additional man hours at the forward area correcting their error. Requirement for modification or installation of special equipment be entirely completed at the home base at least two (2) months prior to ZI departure. One Task Group officer be project Officer for all modifications on all Test aircraft while in ZI.
 - (b) Maintenance stands used for deck inspection of B-29 type aircraft must be provided. Type C-2 on a basis of four (4) each for six (6) aircraft.
 - (c) Operation of the flight line has been seriously handicapped by the lack of parking space. The space allocated for the parking of aircraft does not allow room for start and taxi operations. Navy restrictions prohibit engine run-up in certain parking places. All movements in and out of parking area require the use of

tugs, which in turn require extra personnel. In effect we have been trading ramp space for personnel and losing valuable maintenance time in the bargain.

- (d) Change Maintenance Control from the Special Staff of Commanding General, Task Group, to a section under Task Group Director of Material office and appropriately changed to a Maintenance Coordinator.
- (e) Additional wash rack facilities are needed for aircraft washing other than decontamination. The wash ramp is splendid, but there is no water available except that which is furnished by decontamination pump trucks. Normal requirements demand that such a restriction be removed in the future.
- (f) Commands furnishing aircraft should be advised to deploy with historical record and allied papers on all aircraft participating.
- (g) Radiological Safety Section to be under Support Unit and completely responsible for complete decontamination of aircraft to include all washing, etc. Sample removal should be the responsibility of the Scientific Unit and personnel of the Tactical Unit should only be concerned with the removal of the pilot.
- (h) All Base Maintenance Shops be manned by Support Unit. All specialized shops, such as boom shop, be manned by tactical unit.
- (i) A complete inventory of aircraft spares and equipment to be available in forward area be conducted and a

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copy of subject inventory be made available to commander of each element furnishing aircraft for the test at least four (4) months in advance.

- (j) In case unit commanders consider it necessary to deploy with aircraft spare parts in addition to those listed on the inventory, that arrangement be made for unit to deploy with Flyaway Kit instead of requisitioning thru Task Group, which requires numerous critical items to be stored at the forward base and used for only 45 days per year.
- (k) That shipment be started on in-place items requested by different organizations in sufficient time to insure that all equipment arrives at least three (3) weeks prior to the arrival of aircraft when Flyaway Kits are not used.
- (l) Ground handling equipment issued on Memorandum Receipt was not properly pickled, therefore, not readily usable. An Advanced Party from each unit should arrive at least three (3) weeks prior to the aircraft to check out M/R equipment, etc.
- (m) Procedures for submission of Unsatisfactory Report, AF Form 54, be published and all elements so indoctrinated prior to departure from ZI.

(3) Operations recommendations:

- (a) The operating base be as close as practical to the scene of the tests. Operations such as "Ivy" become extremely complicated and marginal when operating

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distances and as gradients from Kujalein to Inuvik. Operating at lesser distances would not only provide a greater margin of flight safety but would materially reduce or eliminate entirely tankers requirement to support the Sampling Operation.

- (b) If an AOC is planned, a staff should be provided for in the T/O for the Task Group. This staff should be trained in the ZI prior to arrival in the Forward Area.
- (c) A more adequate and reliable communication net be provided for future operations to insure success. Lack of proper and reliable communications has hampered Operation "Ivy" from the start, at times creating situations that were extremely hazardous.
- (d) The operating limits of aircraft involved must be understood and honored by scientific personnel connected with the operation.
- (e) Weather minimums must be adhered to if the safe accomplishment of the mission is to be expected.
- (f) Overall requirement for aircraft be reduced to minimum with sufficient aircraft of each type available so that only slightly higher than normal in-commission rates need be maintained. In the case of "Ivy", over 95% of aircraft available were committed, any one of which would have materially affected the overall mission had it aborted.
- (g) Requirements as to flight patterns, positions, timing,

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SECURITY RECOMMENDATIONS

tolerances, etc. be finished as soon as possible, so that the ZI training could be used to the best advantage.

- (h) That the Test Aircraft Unit be assigned or given operational control of several weather reconnaissance aircraft, (WB-29) for use in obtaining weather data in direct support of the assigned mission instead of relying entirely on forecast weather as was the case in Operation "Ivy".

(4) Security - recommend that:

- (a) Laminated passes be made available to required personnel before or immediately upon arrival at Kwajalein or the operation site.
- (b) Aircraft access lists be published prior to arrival at the operation site.
- (c) Better security control at briefings be exercised, at no time did any one check security badges at the general briefings held in conjunction with this project.
- (d) That censorship of personal mail be established. If this is not considered advisable, all personnel be given exact information as to what can or cannot be written in personal letters, in sufficient time to be effective. In addition, personnel should be advised as to when the public release is to be made on any test activities.

9. CONCLUSIONS:

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a. This entire operation was planned on the basis that Eniwetok would be untenable. Therefore to get the F-84 samplers to and from the test area from Kwajalein, a tanker and control requirement came about. It now appears that the entire scientific estimate of the situation was erroneous and this error resulted in a superfluous B-29 Tanker and Control element. This was approximately two-fifths of the Test Aircraft Unit effort which need not have participated in the mission.

b. It is recommended that ARDC be required to man and equip a Test Aircraft Unit in accord with a realistic estimate of the situation and to the extent AEC and ARDC can finance. This unit can then participate in all ZI and overseas tests using the same equipment and personnel skilled in their particular specialties. Replacements need only be made on the basis of exposure. It is recommended that overall program supervision lie in AEC and operation control rest with the ARDC commanding officer.

c. It is further recommended that all aircraft be stationed at Eniwetok with the possible exception of four (4) and six (6) engine aircraft which may be based at Kwajalein. Presently with the requirement for four (4) engine aircraft reduced to a reasonable figure so as not to show a 100% back up, parking facilities may be sufficient at Eniwetok.

d. If all operational aircraft are stationed at Eniwetok the requirement for weather would be greatly reduced. Presently each operation has been handicapped by the inability of the present weather facilities to arrive at an accurate forecast. This requirement of the operational units is complicated because Kwajalein is under the influence of the inter-tropical front considerably more than Eniwetok.

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e. The total flying time accomplished by Test Aircraft Unit 132.4.2 during the period covered by this report is considerably less than originally planned. Several group rehearsals in the forward area were cancelled due to the unit's high state of training, as evidenced by Operation "Texan". Two Task Force rehearsals originally scheduled for participation of all aircraft, were modified to a minimum effort for the purpose of checking communications only. These modifications of schedule plus excellent maintenance which cut test flights to a minimum, contributed to the low total time logged. Flight "B"s total time was further lowered by the fact that the aircraft were transported by water to and from Kwajalein rather than the unit flying them as originally planned. A break down of flying time by flight is as follows:

Flight "A"	1226:00 hours
Flight "B"	431:35 "
Flight "C"	341:55 "
Total	2149:30 hours

This time does not include any ZI training.

William E. Bertram
WILLIAM E BERTRAM
Colonel USAF
Commanding

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