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FINAL REPORT

for

TESTS ABLE and BAKER

BUREAU OF AERONAUTICS
GROUP

DIRECTOR OF SHIP MATERIAL
JOINT TASK FORCE ONE

[redacted] 1948

Enclosure (C) to DSM Serial 001500

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DIRECTOR OF SHIP MATERIAL

JOINT TASK FORCE ONE

(6) OPERATION CROSSROADS, TESTS ABLE AND BAKER (U)-5

(7) BUREAU OF AERONAUTICS GROUP final rept.

FINAL REPORT FOR TESTS ABLE AND BAKER

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Director
Defense Atomic Support Agency
Washington, D. C. 20301

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DATE 18 Oct[redacted] 46

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SECRET

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BUREAU OF AERONAUTICS GROUP

FINAL REPORT ON TESTS ABLE AND BAKER

PART "A" SUMMARY

PART "B" TEST ABLE

PART "D" REPORT ITEMS

PART "A" - SUMMARY

Test data are summarized on airburst (Test Able) and underwater (Test Baker) nuclear explosion tests of naval aircraft.

I - GENERAL SUMMARY

1. TEST ABLE

The mission of Joint Task Force One was "to determine the effects of the atomic bomb upon naval vessels in order to gain information of value to the national defense." In support of this mission the Bureau of Aeronautics target aircraft exposure plans for Test ABLE had as their objective the determination of the effects of the atomic bomb upon aircraft as a function of distance from the center of the burst. →To page 8

BuAer Group plans involved technical and material support of certain operational plans, including a major development project in connection with the extensive Navy drone program.

The aircraft target array comprised seventy-three surplus, but substantially service type, aircraft embarked on target vessels in such a manner as to simulate the normal disposition of shipborne aircraft on combat vessels. Observation type seaplanes were embarked on the NEVADA, ARKANSAS, PENNSYLVANIA, NEW YORK, PENSACOLA and SALT LAKE CITY; carrier types on the SARATOGA and INDEPENDENCE; two carrier type airplanes on each of fourteen APA's of the GILLIAM class; and two Coronado seaplanes were moored in the target array.

Gasoline was omitted from all aircraft except two each fueled to capacity on the stern of the carrier flight decks. Ammunition was reduced to ten rounds per gun and pyrotechnics omitted. Those bombs, mines, rockets and torpedoes exposed on aircraft were inert, loaded and fused. Additional aviation materials were exposed throughout the target array by BuOrd, BuShips and the Army Air Forces. The BuAer Group plans called for coverage of ships' installations for handling aircraft such as arresting gear, catapults, airplane cranes and elevators.

The condition of target aircraft and aviation materials before and after the blast was determined by visual inspections supplemented as practicable by functional tests. Sample items exposed to the blast were also returned to continental laboratory facilities for detailed analysis.

The exposure of target aircraft was accomplished according to plan and Test ABLE was conducted on schedule with the bomb exploding shortly after 0900 on 1 July 1946, within 100 feet of the chosen altitude and several hundred yards west of the center, as shown on the chart in PART "D" of this report.

The most significant manifestations of the air burst showed themselves in the blast effects, resulting in damage to every aircraft topside in the target array and in considerable damage to ships' installations. There was little evidence of shock damage. Heat effects were confined to scorching of paint and charring of fabric at irregular distances from the center. Radioactivity persisted on target vessels and target aircraft for only a few hours in most cases to a few days near the center of the burst.

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As to overall damage the results may be tabulated as follows:

(1) *MISSING* - sunk with target vessel or blown overboard from target vessels.....	14 Airplanes
*(2) *MAJOR DAMAGE DUE TO BOMB BLAST*.....	23 Airplanes
*(3) *MAJOR DAMAGE RESULTING FROM FALLING SHIP DEBRIS* (Principally unsecured elements of hatch covers).....	7 Airplanes
(4) *LIGHT DAMAGE* - Damage readily repairable. All aircraft usable for Test BAKER.....	10 Airplanes
(5) *NO DAMAGE*.....	19 Airplanes
Total.....	73 Airplanes

*NOTE: Airplanes in categories (2) and (3) under usual operating conditions would require survey or major overhaul.

2. TEST BAKER

The mission and objectives for Test BAKER were the same as for Test ABLE.

Of the seventy-three aircraft originally provided for the air burst forty remained usable for the underwater bomb test. These forty aircraft comprised nineteen undamaged, ten lightly damaged and eleven moderately to heavily damaged aircraft which were considered, however, to be satisfactory test items.

Observation type aircraft were embarked on the NEW YORK; carrier types on the SARATOGA and INDEPENDENCE; twenty-three carrier types were embarked on sixteen APA's of the GILLIAM class, one each on a weather deck and one each in a cargo hold of seven APA's; one carrier type was secured on the main deck of the PENNSYLVANIA and two Coronado seaplanes were moored in the same positions as assigned for Test ABLE.

Aircraft were equipped to simulate normal combat ready condition in a manner similar to that prescribed for Test ABLE. Exposure of aviation equipment was carried out by BuOrd, BuShips and the Army.

Pre-blast and post-blast conditions of target aircraft and ships' installations were determined as in Test ABLE, by visual inspections accompanied by functional tests. Laboratory samples were also returned for detailed tests and analyses. Information on these inspections and tests is contained in reports, one volume per airplane and one volume per ship on ships' installations, contained in BuAer Group files. A one page summary of damage on each ship and each airplane is contained in part "D" of this report, together with illustrative photographs.

Test BAKER was conducted on schedule with the bomb, fixed at the target center, exploding at 0830 on 25 July 1946.

In the underwater burst the significant absence of severe air blast damage indicates that the bomb expended a good proportion of its released energy in hurling a large quantity of water into the air, which subsequently fell upon many targets, and in generating an intense underwater shock wave. Radioactive effects were extremely marked. The high residual radioactivity of target vessels and aircraft was more significant than physical damage and may be attributed to the fact that fission products were held in the column of water thrown up by the explosion, which subsequently fell back on most of the target vessels, and to the absorption of radioactive material in the water of the lagoon. This falling and sweeping water caused heavy structural damage. Shock damage, not readily discernible in Test ABLE was very pronounced in Test BAKER and resulted in damage to ships' installations as well as aircraft.

Overall damage results are as listed below:

(1)	***MISSING*** - sunk with target vessel or blown or washed overboard.....	11 Airplanes
*(2)	***MAJOR DAMAGE*** - Due to bomb blast or water thrown by bomb.....	16 Airplanes
#(3)	***LIGHT DAMAGE*** - Airplanes could be put in operating condition with field repair facilities and usual spare parts.....	2 Airplanes
(4)	***NO DAMAGE***.....	11 Airplanes
	Total.....	40 Airplanes

*NOTE: Where airplanes had previously sustained damage in Test ABLE it is estimated that an undamaged airplane in this group would have sustained major damage from Test BAKER.

#NOTE: Airplanes damaged in Test ABLE, which received little or no further damage are included in these categories.

II - CONCLUSIONS

1. TEST ABLE

These conclusions are based upon material damage to aircraft and ships' installations for handling aircraft and do not take into consideration the physiological effects on personnel.

(a) Primary source of damage to aircraft from the air burst was blast effect, with secondary damage from collisions with ship's structure or falling debris and minor damage from heat effects.

(b) Radiological effects were not significant and were not a source of damage to aircraft.

(c) Aircraft exposed topside within 1300 yards were demolished or blown overboard, between 1300 to 2200 yards received major to moderate damage and beyond 2200 yards suffered light to negligible damage.

(d) The effects of complete shielding, as in a well protected hangar deck or cargo hold, were very significant.

(e) Partial shielding and orientation of aircraft also had a significant effect in reducing damage.

(f) Relative order of vulnerability of aircraft components with weakest elements listed first was as follows: plexiglass (particularly flat plates), fabric surfaces, control surfaces, folded wings, monocoque and semi-monocoque sections of fuselage and nose cowling and external fuel tanks.

(g) No fire or explosion hazard was created directly by fueled aircraft, oxygen systems, hydraulic systems, CO_2 bottles or charged accumulators.

(h) Airborne equipment, instruments, etc., were equal or superior to the airplanes in resistance to damage.

(i) Aircraft power plants, propellers and accessories were considerably more resistant to damage than structural components.

(j) Armament equipment was inherently more rugged than the airplanes and other types of equipment.

(k) Electronic equipment, generally shielded by aircraft structure, was more resistant to damage than airplanes as a whole.

(l) The patrol seaplanes suffered somewhat more damage than carrier types under conditions of equal severity. The resistance of float type seaplanes was comparable to that of carrier types except observation types resting on cradles or catapult cars were more susceptible to capsize and secondary damage resulting therefrom.

(m) Securing of aircraft in accordance with the "Heavy Weather" method outlined in Aircraft Carrier Bulletin No. 13 was adequate.

(n) Ships' installations, with possible exception of aircraft elevators, exhibited a degree of ruggedness and resistance fully equal to or greater than comparable elements of the supporting vessel. Damage was frequently a more significant reflection of damage to adjacent elements of the ship's structure supporting these units rather than direct damage to the units themselves.

(o) The effect of shielding as provided by the continuous side shell plating on the SARATOGA was noted in protecting airplanes on the hangar deck as well as protecting the flight deck and ships' installations supported by the flight deck. This was in contrast to the lack of shielding afforded aircraft and the flight deck of the INDEPENDENCE by the open type of construction employed on that vessel.

(p) Ships' installations, structure and top-hamper did not make good a uniform degree of resistance to blast damage and inherent weaknesses were evident which would temporarily have immobilized vessels otherwise undamaged.

2. TEST BAKER

As in Test ABLE, these conclusions are based only upon material damage to target aircraft or vessels and radiological effects. Physiological effects upon personnel are not considered.

(a) Significant damage resulted from water blown against, falling upon or sweeping over aircraft, as well as from underwater shock transmitted through the ship's structure and the aircraft landing gear. Blast effect was considerably less than in Test ABLE. Secondary damage resulted from collision with ship's structure, flying debris and immersion in water in flooded compartments.

(b) Overshadowing the above effects and more significant than physical damage was the radioactivity persisting in the target are and on target aircraft, rendering the aircraft inaccessible for repairs or operational use for periods ranging from several days to an indefinite length of time.

(c) Aircraft topside within 700 yards of the burst were sunk, washed or blown overboard, or completely demolished; aircraft between 700 to 1500 yards from the center received major to moderate damage; aircraft beyond 1500 yards sustained light to no damage.

(d) Those aircraft in well protected hangar decks or cargo holds received considerable protection from the shielding afforded by the ships' structure.

(e) Some protection was noted to aircraft topside from partial shielding by the ship's structure or from orientation of the airplanes into the blast.

(f) Disregarding radioactivity and considering the overall effects, the order of vulnerability of aircraft components, with weakest elements listed first, was as follows: cockpit canopies, control surfaces, fuselage monocoque sections, folded wings, stressed skin, heavy structural components and landing gear struts (from side loads only).

(g) Airborne equipment, generally shielded by the aircraft structure, suffered little damage and generally followed failure of the supporting structure. Shock damage to instruments was insignificant except where the airplane received major damage.

(h) No fire hazard resulted from Test BAKER.

(i) Damage to power plants, propellers and accessories was negligible as compared to structural damage.

(j) Electronic equipment, generally shock mounted and protected by aircraft structure, withstood effects which produced up to major damage to aircraft and functioned normally after Test BAKER.

(k) Patrol seaplanes suffered somewhat heavier damage than carrier types exposed at the same distance and under conditions of equal severity. The resistance of float type seaplanes was comparable to that of carrier types except for the tendency of observation planes resting in cradles or catapult cars to capsize.

(l) The standard "Heavy Weather" method of securing aircraft as outlined in Aircraft Carrier Bulletin No. 13 was adequate.

(m) Elements of ships' installations for handling aircraft, with the exception of aircraft elevators, exhibited a degree of ruggedness and resistance to damage fully equal to that shown by comparable elements of the ship's structure. Units of ships' installations supported on weather decks showed less shock damage than elements in machinery spaces below decks.

(n) Effect of shielding from blast was less pronounced than in Test ABLE.

(o) The necessity was still indicated, as in Test ABLE, for insuring that all critical components of the ship's structure make good a uniform minimum standard of resistance.

III - RECOMMENDATIONS

Based on the above results and conclusions it is recommended that:

1. The cognizant design sections of BuAer study this report with a view to improving the design of naval aircraft to withstand bomb blasts in general, insofar as these improvements do not adversely affect aircraft performance.

2. Action be initiated to develop methods of protecting shipborne aircraft, as well as aircraft or aviation materials in storage or parked on air fields, from the residual radioactivity resulting from atomic bombs. This work should be coordinated with BuShips in regard to protection of ship based aircraft.

3. Action be initiated to develop suitable and rapid means of decontamination of aircraft or aviation materials exposed to atomic bombs and the resulting radioactivity. This should also be coordinated with the studies already in progress in BuShips.

4. The cognizant design sections of BuAer coordinate with BuShips, studies to improve the construction of ships carrying aircraft to provide maximum protection to aircraft from bomb blasts in general, and in particular to those aircraft on hangar decks of aircraft carriers.

5. The cognizant design sections of BuAer coordinate with BuShips studies of ships' installations for handling aircraft as well as other critical structural components of vessels carrying aircraft to insure that they make good a uniform minimum standard of resistance to bomb blasts in general, measured in terms of the blast phenomena which the aircraft can successfully resist.

6. The cognizant sections of BuAer study the entire report on Operation Crossroads by Commander Joint Task Force One and particularly the reports of the following which contain information of interest to BuAer:

(a) Deputy Task Force Commander for Aviation.
(b) Deputy Task Force Commander for Technical Direction.
(c) Technical Director.
(d) Director of Ship Material.
(e) Army Ground Group.
(f) Bureau of Ships.
(g) Bureau of Ordnance.
(h) Bureau of Medicine and Surgery.
(i) Bureau of Supplies and Accounts.

7. BuAer participate in Test CHARLIE in accordance with the plans and recommendations of the BuAer Group, if that test is carried out.

8. One radioactive airplane be returned to the Naval Air Material Center at Philadelphia for:

(a) Decontamination studies.
(b) Structural tests and analysis to determine the effects of the atomic bomb on metals and materials.
(c) Continued radiological safety studies and plots of decay curves already initiated.
(d) Detailed study and analysis of the effects of radioactivity on aircraft power plants, armaments, airborne equipment, electronics and aviation materials.
(e) Familiarization of personnel with handling of radioactive materials.

9. BuAer set up a radiological section under Research Development and Engineering to coordinate action on the above recommendations, to carry on any future work of BuAer in connection with Operation Crossroads and to handle problems in connection with radiological safety.

PART "B" - TEST ABLE

I - OBJECTIVES

The Army, the Navy and the Manhattan District, as well as other branches of the government, jointly participated in Joint Task Force One for the conduct of Operation Crossroads. The first test, hereafter called Test ABLE, was an experiment to measure the effects of the Nagasaki type bomb dropped from an airplane against an array of Naval vessels and various other Army and Navy equipment such as airplanes, tanks, etc. It was intended to inflict maximum damage on some targets, minimum damage on others. There is no analogy to an attack by an aircraft carrying atomic bombs against a disposition of warships at sea or at anchor in a harbor.

Specifically, the mission of the task force was "To determine the effects of the atomic bomb upon Naval vessels in order to gain information of value to the national defense."

In support of this mission, and closely paralleling the plan for exposure of target ships and ships' materials, the Bureau of Aeronautics target aircraft exposure plans for Test ABLE had as their broad objective the determination of the effects of the atomic bomb upon aircraft as a function of distance from the center of the burst.

II - GENERAL PLANS AND PREPARATIONS

1. ORGANIZATION AND RESPONSIBILITIES

In order to carry out the above mission, the Bureau of Aeronautics Group was responsible under the Director of Ship Material:

(a) For all that pertains to the planning, correlation and implementation of the aircraft target exposure program.

(b) For the collection of data, analysis of results and preparation of reports pertaining thereto.

(c) For furnishing technical advice, liaison and assistance relative to standard and special aeronautical material, including pilotless aircraft and related equipment, in order to insure the full and proper execution of the responsibilities of the Bureau of Aeronautics to the Commander Task Force One and Operation Crossroads.

Careful consideration was given to the number of personnel, the special qualifications required and the most efficient organization of the BuAer Group to carry out the primary mission, to function as a target inspection team and to perform certain military duties. The results of this study were prepared in the form of an Organization Manual for the BuAer Group, copy of which is attached as Section VII of Part "D" of this report. This manual will be useful for future planning should Test CHARLIE be carried out at a later date.

2. SUPPORT OF THE OPERATIONAL PLANS

Commander Joint Task Force One Operation Plan No. 1-46 together with the supporting Annexes and Appendices covers all operational plans of interest to the Bureau of Aeronautics insofar as aeronautical material is concerned. The BuAer Group plans contemplated logistic, material and technical support of Naval aviation units participating in Operation Crossroads. The History of these elements will be fully covered by reports originating under the Deputy Task Force Commander for Aviation. Accordingly they will not be discussed in detail except to provide cross reference identification and to point out important material aspects in order to supplement the operational reports.

The major aircraft operational units of interest to the Bureau of Aeronautics are divided, for the purpose of this report, into two major classifications as follows:

Routine Activities - requiring only routine logistic, material and technical support by the Bureau of Aeronautics.

Drone Program - requiring extensive logistic and material support as well as new development programs.

In accordance with the JTF-1 Operation Plan 1-46 the mission of the Navy Air Group was to "Furnish aircraft and air facilities during Test ABLE and Test BAKER for photography and collection of physical data, air transport, patrol and air-sea rescue in accordance with the Air Plan (Annex "F"), Instrumentation Plan (Annex "G"), Photographic Plan (Annex "L") and Air-Sea Rescue Plan (Annex "Y")." The elements are discussed below:

(a) Routine Activities

(1) NAVAL AIR TRANSPORT SERVICE

Existing facilities of both NATS and the ATC were utilized for Crossroads traffic for continental and overseas air lift.

(2) OPERATION OF SEAPLANES, TRANSPORT SQUADRON VPB-32 AND AIR-SEA RESCUE SQUADRON VH-4

The Logistic Plan and Air Plan, Annexes "B" and "F" respectively show these squadrons based at Ebeye. VPB-32 with PBM-5 airplanes provided inter-island air transport between Kwajalein, Roi and Bikini. Turn-around and fueling service for this unit at Bikini were provided by the seaplane tender ORCA (AVP-49). VPB-32 also furnished three seaplanes for photographing the water wave travel as described in Annexes "F" and "L". One seaplane from this unit carried out radiological reconnaissance in support of the Safety Plan, Annex "E". BuAer Group participation in preparing this airplane is cited as an example of material support rendered to the Instrumentation Plan, Annex "G". At the end of March, the

Joint Bureau of Ordnance and Naval Research Laboratory Group concerned with radiation measurements informed Joint Task Force One that provisions for the installation of thermo radiation equipment in a plane was deemed necessary for Test BAKER. The Bureau of Aeronautics Group thereupon procured a PBM-5 airplane and had the equipment mocked-up at the Naval Air Material Center in Philadelphia. Plans of this installation were made. Since it was at that time planned to have VPB-32, based at Ebeye for the tests, do the installing at that location between Tests ABLE and BAKER, upon the delaying of the tests the Bureau of Aeronautics Group recommended to Joint Task Force One that the installation be made in the Pearl Harbor Area to enable a more thorough installation under more favorable conditions. One plane of VPB-32 was designated to have the installation mountings installed at the Naval Air Station, Kaneohe Bay.

VH-4, also operating PBM-5 airplanes, provided air-sea rescue facilities, described in detail in the Air Plan, Annex "F" and the Air-Sea Rescue Plan, Annex "Y". The Bureau of Aeronautics furnished logistic, material and technical support of these units.

(3) OPERATION OF THE U.S.S. SAIDOR (CVE-117)

The aircraft carrier SAILOR furnished photographic airplanes in support of the Air Plan and Photographic Plan, described in Annexes "F" and "L" respectively. Additional information, concerning types of aircraft and photographs, is contained in operational reports.

Two helicopters based on the SAIDOR were used for radiological reconnaissance and collection of earth samples.

(4) SUPPORT BY NAVAL AIR STATION AND OTHER FIELD ACTIVITIES OF BUAER

Air stations and activities under the Bureau of Aeronautics have felt the impact of increased activity in the accomplishment of priority programs in connection with Operation Crossroads. The BuAer Group assisted in coordinating these programs.

(b) Drone Program

(1) OPERATION OF THE U.S.S. SHANGRI LA (CV-38)

Operations of the drone unit based on the SHANGRI LA are outlined in the Air and Instrumentation Plans, Annexes "F" and "G" and further described in operational reports. The preparation and furnishing of drones, control planes and related technical equipment required a major development and manufacturing program, largely handled by the Naval Air Material Center at Philadelphia and the Pilotless Aircraft

Division of BuAer. The Navy drone operation was assigned to Experimental Utility Squadron Twenty-five, later designated as the VX-2 Detachment, and assigned as Task Unit 1.6.14 in the JTF-1 Operation Plan.

This program involved the accelerated production at the Naval Air Modification Unit, Johnsville, Pennsylvania, of a total of thirty F6F-3K drones and thirty F6F-5 control airplanes. Additional equipment required consisted of radio-control equipment, design and installation of radioactivity filters, installation of geiger counters and indicators, and installation of VGTA recorders in a number of the drone aircraft. Some photographic equipment with radio controlled circuits was provided. The BuAer Group furnished technical advice and assisted in the development and testing of equipment as well as the training of pilots in its use and operation.

(2) COLLECTION OF WATER SAMPLES

On 2 April 1946 the technical staff of the Task Force had a conference to discuss a request by the Los Alamos group for use of radio controlled boats to take water samples and make radiological surveys of Bikini Lagoon after the tests. Previous to this time, it had been planned that the helicopter unit would take water samples and obtain low-altitude radiological safety data. The hazards in operating the helicopters over the "hot" water were discussed at great length, and at a conference on the following day the technical staff and the Radiological Safety Section ruled out their use for this purpose.

As an alternate method of water sampling, the Bureau of Aeronautics commenced studies of the feasibility of a water snatch from an aircraft and submitted the results to the technical staff. Later it was decided to abandon all efforts of this type and concentrate on the radio-controlled boats which the Bureau of Ships had meanwhile been investigating. It was determined that the drone boats would involve use of TBM aircraft based on SHANGRI LA exercising radio control with visual sighting of the boats. During the planning of this program, the Bureau of Aeronautics Group gave technical advice and assistance to the Bureau of Ships Group in matters relating to the use of naval aircraft.

(3) SUPPORT OF THE TARGET EXPOSURE PLAN

Closely paralleling the plan for exposure of target ships, the target aircraft exposure program is shown in the table below. This program was coordinated with the Army Air Forces representatives who agreed that the Navy plan adequately covered Army Air Force requirements for complete aircraft. Meanwhile the Army undertook the exposure of aircraft components and other aviation ground and flight equipment.

AIRCRAFT EXPOSURE PROGRAM

OPERATION CROSSROADS

TEST ABLE

NAME OF TARGET VESSEL	TYPE AIRCRAFT	BUAER NO OF AIRCRAFT	LOCATION ON TARGET VESSEL. F.D.-FLIGHT DECK H.D. - HANGAR DECK
USS SARATOGA CV-3	TBM-3E	69197	Stbd H.D. Frame 130
" " "	TBM-3E	69188	Port H.D. Frame 130
" " "	TBM-3E	69095	Stbd H.D. Frame 120
" " "	TBM-3E	69169	Port H.D. Frame 120
" " "	TBM-3E*	69080	Port F.D. Fantail
" " "	TBM-3E	69094	Center F.D. Frame 100
" " "	TBM-3E	69099	Port F.D. Frame 95
" " "	F6F-5N	77637	Center H.D. Frame 95
" " "	F6F-5N	78968	Stbd F.D. Frame 95
" " "	F6F-5N	78086	Stbd H.D. Frame 80
" " "	F6F-5N	77749	Center H.D. Frame 90
" " "	F6F-5N	77648	Port H.D. Frame 90
" " "	F6F-5N	77960	Port F.D. Frame 60
" " "	SBF-4E	31853	Center F.D. Frame 90
" " "	SBF-4E	31839	Port F.D. Frame 90
" " "	SBF-4E	31859	Stbd F.D. Fantail
" " "	SBF-4E	31889	Port H.D. Frame 100
" " "	SBF-4E	31850	Stbd H.D. Frame 100
" " "	SBF-4E	31894	Port H.D. Frame 110
" " "	SBF-4E	31840	Stbd H.D. Frame 110
USS INDEPENDENCE CVL-22	TBM-3E*	69124	Stbd F.D. Frame 140
" " "	TBM-3E	69063	Center F.D. Frame 80
" " "	TBM-3E	69239	Stbd F.D. Frame 90
" " "	TBM-3E	69116	Stbd H.D. Frame 92
" " "	TBM-3E	69275	Diagonal H.D. Frame 101
" " "	F6F-5N	77433	Port F.D. Frame 60
" " "	F6F-5N	77492	Stbd F.D. Frame 65
" " "	F6F-5N	77569	Port H.D. Frame 60
" " "	F6F-5N	77349	Port H.D. Frame 70
" " "	SBF-4E	31849	Diagonal H.D. Frame 83
" " "	SBF-4E	31843	Stbd H.D. Frame 80
" " "	SBF-4E	31852	Port F.D. Frame 70
" " "	SBF-4E	31856	Stbd F.D. Frame 70
" " "	SBF-4E*	31857	Port F.D. Frame 140

*-Indicates four aircraft with full allowance of fuel and lubricating oil on Fantail of aircraft carriers.

NAME OF TARGET VESSEL	TYPE AIRCRAFT	BUAER NO OF AIRCRAFT	LOCATION ON TARGET VESSEL. F.D.-FLIGHT DECK H.D. - HANGAR DECK
USS ARKANSAS BB-33	OS2U-3	09632	Top No. 3 Turret.
USS NEW YORK BB-34	XSC-1	35300	Catapult, Aft.
" " "	SC-1	35561	Port Deck near Turret #3
USS NEVADA BB-36	#OS2U-3	5765	Fantail Stbd Side
" " "	#OS2U-3	5742	Fantail on Catapult
USS PENNSYLVANIA BB-38	OS2U-3	5342	One on catapult and one
" " "	OS2U-3	5584	on deck
USS PENSACOLA CA-24	OS2U-3	5956	Port Catapult Mount Fr 65
USS SALT LAKE CITY CA-25	OS2U-3	09574	Stbd Catapult Mount Fr 60
APA 57 GILLIAM	FM-2	73535	Cargo Hold, 2nd Pltfm Dk
" "	F6F-5	71358	Main Deck Port Side Aft
APA-60 BANNER	FM-2	55299	Cargo Hold 2nd Pltfm Dk
" "	FG-1D	87847	Main Deck, Port Side Aft
APA-61 BARROW	FM-2	47238	Cargo Hold 2nd Pltfm Dk
" "	FM-2	56736	Main Deck, Stbd Side Aft
APA-63 BLADEN	FM-2	47265	Cargo Hold 2nd Pltfm Dk
" "	FG-1D	87896	Main Deck, Stbd Side aft
APA-68 BUTTE	FM-2	56901	Cargo Hold 2nd Pltfm Dk
" "	FG-1D	82433	Main Deck, Stbd Side Aft
APA-69 CARLISLE	FM-2	47336	Cargo Hold, 2nd Pltfm Dk
" "	F6F-5	71544	Main Deck, Stbd Side Aft
APA-70 CARTERET	FM-2	56954	Cargo Hold 2nd Pltfm Dk
" "	FG-1D	88040	Main Deck, Stbd Side Aft
APA-75 CORTLAND	FM-2	56756	Cargo Hold 2nd Pltfm Dk
" "	F6F-5	71753	Main Deck, Stbd Side Aft
APA-77 CRITTENDEN	FM-2	56945	Cargo Hold, 2nd Pltfm Dk
" "	FM-2	55266	Main Deck, Stbd Side Aft
APA-79 DAWSON	FM-2	73874	Cargo Hold, 2nd Pltfm Dk
" "	F6F-5	71553	Main Deck, Stbd Side Aft
APA-81 FALLON	FM-2	74203	Cargo Hold, 2nd Pltfm Dk
" "	FG-1D	88033	Main Deck, Stbd Side Aft

#The two aircraft on the NEVADA are painted International Orange.

NAME OF TARGET VESSEL	TYPE AIRCRAFT	BUAER NO OF AIRCRAFT	LOCATION ON TARGET VESSEL. F.D.-FLIGHT DECK H.D. - HANGAR DECK
APA-83 FILLMORE	FM-2	55449	Cargo Hold, 2nd Pltfm Dk
" "	F6F-5	71606	Main Deck, Stbd Side Aft
APA-85 GASCONADE	FM-2	74277	Cargo Hold, 2nd Pltfm Dk
" "	FG-1D	87882	Main Deck, Stbd Side Aft
APA-87 NIAGARA	FM-2P	74675	Cargo Hold, 2nd Pltfm Dk
" "	F6F-5	58662	Main Deck, Stbd Side Aft
VPB Coronado Seaplane	PB2Y-5H	7052	Moored in Target Area
" " "	PB2Y-5H	7085	Moored in Target Area

III - GENERAL PLAN AND METHOD OF TEST FOR TEST ABLE

1. AIRCRAFT

For Test ABLE the aircraft target array comprised 73 complete airplanes of surplus but substantially service types. These airplanes were embarked on vessels located at graduated distances from the center of the target array in such a manner as to simulate, as closely as practicable, the normal disposition of shipborne aircraft on combat vessels.

With the objectives indicated above, observation type airplanes were embarked in NEVADA, ARKANSAS, NEW YORK, PENNSYLVANIA, PENSACOLA and SALT LAKE CITY in accordance with the table above. Carrier type airplanes were embarked in INDEPENDENCE and SARATOGA. The aircraft complement of the latter vessel also included additional airplanes embarked for prospective use in Test BAKER, replacing airplanes, which it was estimated, would be lost in Test ABLE. Because of the limited number of combat vessels available, exposure of the remaining number of carrier type aircraft necessary to insure adequate coverage, from the center to the perimeter of the target array, was effected by embarking two airplanes in each of fourteen selected APA's of the GILLIAM class - one airplane secured on the weather deck and one airplane secured below on the second platform deck of the cargo hold - thus simulating carrier flight deck and hangar deck conditions as nearly as practicable. Embarked airplanes were secured by the standard "Heavy Weather" method as laid down in Aircraft Carrier Bulletin No. 13,

Included in the aircraft target array were two surplus Coronado Seaplanes - one anchored at the estimated minimum survival distance and a second anchored 600 yards farther out.

In order to permit obtaining complete information on the relative strength of all aircraft components and equipment, all target airplanes were selected and equipped to simulate normal combat ready condition, insofar as the availability of surplus material permitted. Certain highly inflammable or explosive material, ignition of which might cause the destruction of aircraft as a secondary effect, were omitted and separately tested. There were three principle items in this category as follows:

(a) Gasoline

Omitted from all aircraft except two airplanes fueled to capacity located on stern of flight deck of INDEPENDENCE and SARATOGA, each. Additional exceptions were the two Coronado seaplanes which carried approximately 1000 gallons each.

(b) Ammunition

Reduced in all airplanes to a test or indicator quantity of ten (10) rounds per gun secured in the receiver. This quantity was sufficient to disclose any tendency toward ignition or detonation, but was insufficient seriously to damage the airplane. To insure safety to personnel, with particular reference to unauthorized tampering with machine guns, bolts were omitted from all guns.

(c) Bombs, Mines, Rockets and Torpedoes

Where the installation of this material in airplanes was necessary for completeness of the exposure program of the Bureau of Ordnance, items were fuzed but blind loaded. This procedure permitted detection of any cases of detonation by the bomb blast without injury to the airplane in which loaded. In those cases where the program of the Bureau of Ordnance required exposure of aircraft live ammunition, bombs, mines, torpedoes and other explosives, such exposure was separately effected at stations sufficiently removed from airplanes as to prevent damage to the latter.

Information as to the location of all embarked and anchored target aircraft together with details of their pre-blast condition, configuration and loading are included in Part "D" of this report.

2. NON-BUAER AVIATION EQUIPMENT

In addition to the program outlined above for the exposure, examination, analysis and report of aircraft and related equipment under the cognizance of the Bureau of Aeronautics, the program also made comprehensive provision for the inclusion, on a cooperative basis, of airborne equipment under the cognizance of other bureaus but of great interest to the Bureau of Aeronautics. This mutually beneficial and coordinated program included material from four principal sources outside of the Bureau of Aeronautics.

(a) Bureau of Ordnance Airborne Equipment

In addition to the exposure program indicated above which armed and equipped certain aircraft with test samples of ammunition, bombs, mines, rockets, and torpedoes, Bureau of Ordnance representatives in cooperation with those of the Bureau of Aeronautics provided installations for the exposure in aircraft of certain bombsights and gunsights not normally carried on all missions of the airplane concerned.

(b) Bureau of Ships (electronics) Equipment

Similarly, representatives of the Electronics Coordinating Officer of the Bureau of Ships, working in close cooperation with Bureau of Aeronautics representative, executed an extended program for the exposure in airplanes and for subsequent detailed examination and report on all aircraft electronic material of both bureaus.

(c) Army Aeronautical Material and Aviation Fuels and Lubricants

In order to avoid unnecessary duplication of effort, agreement was reached in the early planning for Operation Crossroads for close coordination of effort between the Navy Bureau of Aeronautics, the Army Air Forces and the Army Ground Forces relative to a program for the exposure of target aeronautical material. Broadly speaking, the Navy's program was found to meet the requirements of the Army Air Forces for the exposure of *complete aircraft* while the Army undertook the responsibility for exposure of a wide variety of aeronautical material, components, and airborne and ground equipment including sample wing panels, fuselage, fire extinguishers, instruments, and field vehicles and equipment. Display of this material, described in detail in Op-Plan No. 1-46 (Annex N, Appendix VII) was executed by the Air Unit of the Army Ground Group.

Supplementing the program for the exposure of general aeronautical material just described, and in accordance with agreements reached between representatives of the Bureau of Aeronautics, the Army Ground Forces, the Army Air Forces and the Working Committee of the Aeronautical Board, the program for the exposure of aviation and motor fuels, lubricating oils and greases was handled by the Quartermaster Unit of the Army Ground Group. The fuels and lubricants display also included, under the caption "Collapsible Container", five cylindrical 1000 gallon synthetic rubber tanks. A list of the complete display is contained in Tab 3 Appendix II Annex N, Op-Plan 1-46.

3. SHIP'S INSTALLATIONS FOR HANDLING AIRCRAFT

In addition to complete aircraft, other target exposure material under the cognizance of or of primary interest to the Bureau of Aeronautics included certain items of ships' installations intended for arresting, handling and launching of aircraft, principally arresting gear, barriers, catapults, airplane cranes and elevators. The target program was arranged to include exposure to and analysis of the effects of the bomb blast upon this vital equipment.

IV - PROCEDURE FOR TEST ABLE

1. PRE-BLAST INSPECTIONS

The initial condition and configuration of target airplanes and other target aeronau ical material was established by directives issued by Commander Joint Task Force One to supplying agencies. The pre-blast condition was confirmed thereafter by detailed inspections accomplished by the Bureau of Aeronautics Group, both at the port of embarkation and subsequently upon arrival of the airplanes and related target material at Bikini. Air delivery, by which means the majority of target aircraft reached their respective embarkation points, constituted a valuable demonstration of their airworthiness and general condition. Functional tests of other material and equipment were conducted by Bureau of Aeronautics Group to supplement visual inspection insofar as practicable. The engines of fueled airplanes in SARATOGA and INDEPENDENCE, and the two Coronado seaplanes were tested under their own power immediately before Able Day. Similar visual and operational tests were conducted of all electronic material, using standard test equipment and methods. Parallel procedure, employing both inspection and functional tests (where possible), was used to determine the pre-blast condition of ships' installations for handling aircraft. Catapults in NEW YORK and NEVADA were tested by two no-load shots prior to departure from the United States. Two no-load shots were fired on SARATOGA and INDEPENDENCE catapults shortly before Able Day. Elevators of the latter two carriers were tested by routine operational use as were airplane cranes in SARATOGA, INDEPENDENCE, NEW YORK, NEVADA, ARKANSAS, PENSACOLA, and SALT LAKE CITY.

2. POST-BLAST INSPECTIONS

The post-blast condition of target aircraft and aeronautical material was established by another series of inspections and limited functional tests beginning on Able Day as soon as local radiological conditions permitted access to each test station. Engines in fueled aircraft in SARATOGA were tested under their own power. Coronado seaplanes were taxied under their own power from their target exposure moorings to service moorings in the lee of Bikini Island. Tests similar to these of the pre-blast inspection program were conducted on electronic equipment where the mechanical and electric conditions warranted. Catapults on SARATOGA and NEW YORK were tested by no-load shots. SARATOGA's elevator was employed in lifting airplanes from hangar deck to flight deck, using manual control after removal of certain elements of the automatic control system. Airplane cranes on SARATOGA, INDEPENDENCE, NEW YORK, ARKANSAS (port side only), PENSACOLA and SALT LAKE CITY were tested by routine operational uses, although the latter two cruisers and INDEPENDENCE required repairs before being placed in limited service.

3. REPORTS

The results of all pre-blast and post-blast inspections and tests were recorded in a series of comprehensive reports, supported by adequate photographic coverage, describing in detail the exact condition of all target aeronautical material. A condensed standardized form of presentation was utilized which facilitated ready comparison of the before-and-after con-

dition of the items under consideration. Data and record material in detail was combined in two categories:

(a) Airplanes

One volume per airplane, reporting the material condition of each airplane, sub-divided by principal groups of components and equipment.

(b) Ships' Installations for Handling Aircraft

One volume per vessel, reporting the material condition of each of the following installations: arresting gear and barriers, catapults, airplane cranes and elevators. Information on each unit was sub-divided into principle components.

V - SUMMARY OF DAMAGE; TEST ABLE

1. AIRCRAFT

(a) General

The exposure of target aircraft was accomplished according to the above plan. Test ABLE was conducted on schedule with the bomb exploding shortly after 0900 on 1 July 1946, within 100 feet of the chosen altitude and several hundred yards west of the target center as shown on the chart in Section II, Part "D" of this report.

The most significant manifestations of the air burst showed themselves in the blast effects, resulting in damage to every aircraft topside in the target array and in considerable damage to ships installations from distortion and failure of the supporting structures. There was little evidence of shock damage.

Heat effects were minor and confined to scorching of paint or charring of fabric, local in nature and at irregular distances from the center of the burst. Radioactivity persisted on target vessels and aircraft for only a few hours to a few days after which it dissipated to the extent that target crews were returned to their vessels.

Detailed information relative to the post-blast condition of all aircraft is supplied in Part "D" of this report. As to overall damage, the results set forth therein may be summarized in general terms as follows:

(1) MISSING

Sunk with target vessel or blown overboard from target vessels.....14 Airplanes

*(2) MAJOR DAMAGE DUE TO BOMB BLAST..... 23 Airplanes

*(3) MAJOR DAMAGE RESULTING FROM FALLING SHIP DEBRIS (Principally unsecured elements of hatch covers)..... 7 Airplanes

(4) LIGHT DAMAGE

Damage readily repairable. All aircraft usable for Test BAKER..... 10 Airplanes

(5) NO DAMAGE..... 19 Airplanes

Total..... 73 Airplanes

*(NOTE - Airplanes in categories (2) and (3) under usual operating conditions would require survey or major overhaul.).

Of the 30 airplanes in categories (2) and (3), ten airplanes were subsequently utilized as targets in the Baker Array.

(b) Structures

(1) SOURCE OF DAMAGE

The damage which was received by airplanes in Test ABLE arose from three principle sources - the primary effect of the bomb blast, and the secondary effects of violent collision with ships' decks and bulkheads, and the impact of falling debris. Except in the case of INDEPENDENCE it was usually possible clearly to distinguish between the three agencies. Unless noted to the contrary, the airplane damage summaries which follow refer to damage resulting from the primary effect of bomb blast.

(2) GENERAL SURVEY

From the viewpoint of severity of damage sustained by aircraft, the target array may be divided into three concentric areas centered on the point of detonation of the bomb. The inner circle includes target material within 1300 yards of the point of detonation. The intermediate zone includes target material between 1300 and 2200 yards from the point of detonation, while the outer zone includes all target material more than 2200 yards from the point of detonation of the bomb.

Inner Circle - In this area, aircraft on weather decks exposed to the bomb blast were blown overboard or sustained extreme damage. Light components such as cockpit canopies, control surfaces and fairings were demolished or suffered heavy damage. Structural components of intermediate strength such as monocoque and semi-monocoque sections of the fuselage were heavily damaged, being buckled and broken by the blast alone. Heavy structural components backed up by truss type

framing, including metal skinned airfoil components such as wing structures, sustained significant damage to a varying extent, depending upon the strength of the individual structure and the local force of the blast. Components such as landing gear strut attachments were essentially undamaged except in those cases where secondary failures occurred when tie-down cables failed and aircraft were damaged by collision with ship's structure.

Intermediate Zone - In the intermediate zone, aircraft exposed to the direct force of the blast sustained moderate to major damage. Light structural components (cockpit canopies, control surfaces, and fairings) suffered moderate to heavy damage in this zone. Intermediate structural components such as monocoque and semi-monocoque sections were moderately damaged, being slightly dished in (with bowing of framing), sometimes buckled, but rarely broken. Damage to metal skinned airfoils was, in general limited to occasional instances of moderate dishing of skin, without damage to framing. Engine cowling remained intact with occasional cases of light dishing. Cowl flaps were blown off in some instances from model FG airplanes. Heavy structural components backed up by truss type framing were essentially undamaged. In this zone, properly secured control surfaces and spread wings sustained much less damage to attachment fittings and actuating mechanisms than was found in the case of loosely secured control surfaces and folded wings. In contrast, overall damage to airplanes in the inner circle was so severe as to make insignificant any difference between folded and spread wings.

Outer Zone - In the outer zone, aircraft exposed to the direct force of the blast sustained generally light damage. Light structural components suffered generally moderate damage. Cockpit canopies were universally damaged to the extent that one or more plexiglass panels were cracked, broken or blown in except in one isolated case. Intermediate and heavy structural components suffered little or no damage in this zone.

(3) BLAST PROTECTION

Airplanes which were enclosed in compartments surrounded completely by continuous shell plating were undamaged by the primary manifestations of the bomb detonation, though in many cases they were damaged by falling debris and elements of the ships' structure. Specifically, this was the case in the transport (APA) types, in which airplanes were placed on the second platform decks in the number two cargo hold, and on the hangar deck of the SARATOGA. In the case of INDEPENDENCE, on the hangar deck, the steel roller curtains forming the side wall closure were blown in on the side facing the blast. Airplanes stored therein were completely demolished, in part from blast effect and in part from violent collision with the lee hangar bulkhead and flying debris. Regarding airplanes

on weather decks, the partial shielding afforded protection to a slight but discernible degree. For example, INDEPENDENCE and CRITTENDEN were at approximately the same distance from the point of detonation. In the case of the former, the blast had an unobstructed sweep across the flight deck and blew airplanes over the side, whereas on the latter, the airplane, partially shielded by the superstructure, though demolished, were still secure on board.

(3) MATERIALS

Though it is obvious that design considerations from the point of view of materials will be predicted to operational criteria rather than to relative vulnerability to the atomic bomb, the following observations on materials of construction are presented.

Metals - In general, sheet, extruded, and forged metal construction were more durable than other constructions. In many cases, metal frame and skin construction showed great resistance to blast effects. Much of the damage to this type of construction consisted of "dishing" of metal skin between frames, with no damage to the latter, which would not necessarily put the airplane out of commission.

Fabric covering - Fabric covering sustained damage from blast and from the heat flash at irregular distances from the point of detonation in all three zones. In some instances, damage was limited to rupture of fabric. In a limited number of instances, again at irregular distances, rupture of fabric was accompanied by scorching of paint and charring of fabric. Charring was strictly local in nature, not extending beyond the boundary defined by the adjacent structural frame.

Plywood construction - This type of construction is utilized on Corsair ailerons. The two aircraft embodying this type of construction and located closest to the center of the burst sustained completely shattered ailerons. Other plywood ailerons on airplanes stationed at distances greater than 1500 yards were undamaged. The Army Air Forces Group reported a significant finding on NEW YORK where they had exposed a complete plywood wing panel. A first cursory examination indicated no damage to the structure, but later dissection revealed complete collapse and splintering of internal framing with the partially flexible covering springing back to shape after the subsidence of the blast.

(c) Equipment and Components

(1) CANOPIES

Plexiglass canopies were damaged in all aircraft where structural damage occurred. In one case (on USS NIAGARA) the

F6F canopy was shattered while the remainder of the aircraft received no significant damage.

(2) INSTRUMENTS

Instruments showed blast damage only in those airplanes which received major structural damage. Three groups of aircraft instruments exposed in Test ABLE were submitted for examination and tests by the National Bureau of Standards for serviceability.

Of the panel instruments from NEVADA, the altimeter and the inclinometer were inoperative owing to broken parts. The airspeed indicator functioned, but with excessive scale error owing to a zero shift caused by a collapsed diaphragm capsule. The magnetic compass operated satisfactorily. The luminous paint and paint on the dial of the airspeed indicator were scorched.

Of the instruments on the CRITTENDEN the altimeter and manifold pressure gage each had a broken part in the mechanism which made their indications unreliable. The oil pressure of the engine gage unit read 8 psi low, otherwise functioned satisfactorily; the thermometer element and fuel gage operated properly with reasonable scale errors. Both the airspeed indicator and compass transmitter were in satisfactory operating condition. The radium paint on the altimeter was erratically discolored and perhaps slightly blistered at some points. Otherwise there was no evidence of scorching or blistering.

Of the instruments on the PENNSYLVANIA, the engine gage unit had loose pointers on the pressure gages, which functioned with small scale errors after installing the pointers; the thermometer element functioned with reasonably small scale errors. The airspeed indicator had an excessive zero shift, and consequently excessive scale errors, but functions properly,, as did also the compass. Part of the paint on the main dial of the altimeter was blistered and also the radium paint which was discolored as well. The luminous paint on the temperature pointer of the engine gage unit was badly blistered and discolored at its tip and the laminations of the cover glass of this instrument seem to have separated over about 60 percent of the outer area.

Damage to instruments is considered to be due to shock and heat. There was no evidence of unusual damage to instruments as a result of Test ABLE.

(3) PILOT SEAT AND HARNESS.

Pilot seat and harness were undamaged except in demolished airplanes aboard [illegible]

(4) BULLET RESISTING GLASS

Bullet resisting glass sustained no damage except where cracked by flying debris on INDEPENDENCE.

(5) LIFE RAFTS

There was no evidence of damage to life rafts.. There was no evidence of exploding CO2 bottles, and such bottles retained their charge after the blast. One life raft, complete with accessories was returned to the Naval Air Material Center for study. The data obtained from the study of the returned life raft will be the subject of a supplementary report.

(6) OXYGEN SYSTEMS

Oxygen bottles remained intact and remained fully charged after test. Oxygen system lines failed only in those airplanes which were demolished or severly damaged. All line failures resulted from failure of the supporting airplane structure. Only on failure of an oxygen demand regulator occurred. This resulted from blast damage to the diaphragm.

One AN6004-1 oxygen demand regulator removed from FM-3 BuNo. 55266 aboard USS FALLON was returned for test by the National Bureau of Standards. Tests indicated that the suction flow characteristics were in the specified range. Dilution at altitudes of 30,000 to 34,000 was not as specified; the percent oxygen was lower than required. The diluter aneroid cut-off point was 34,500 feet; higher than specified. This appeared to be due mainly to the improper length of the barrel supporting the aneroid capsule. In the absence of data on performance before the blast there was no clear indication that the poor diluter performance can be ascribed to any blast effect. There was a small area of discoloration, apparently scorched, in the fabric diaphragm near the opening in the face of the regulator. It appeared to have been caused by radiation through the opening. There was no evidence of radioactivity in the regulator.

(7) HYDRAULIC SYSTEMS

Charged accumulators remained intact, retaining their air charge. All reservoirs were filled to normal capacity (approximately 3/4 full) and remained undamaged except in the case of demolished airplanes in INDEPENDENCE where the reservoirs sustained heavy damage from impact of the airplanes with hangar bulkheads. There were no files from hydraulic fluid. Valves, fittings, hoses, metal lines and actuating cylinders showed damage only where supporting structures failed. Hand pump pressure was available on all airplanes except those receiving major structural damage.

(8) FUEL AND OIL SYSTEMS

In all cases where blast effect was sufficiently severe as to cause major damage to the airplane, *external* fuel tanks also sustained major damage, generally in the form of distortion and collapse but did not leak, as evidenced by subsequent water tests of representative tanks. Slight structural damage in airplanes was paralleled by slight dishing and minor damage to external tanks. Internal metal tanks (oil and ADI tanks) benefitted by the protection afforded by the skin of the airplane and indicated only light dishing, except where structural distortion of the airplane folded the tanks. Self-sealing tanks showed no damage directly attributable to blast effect. Fuel and oil lines failed only as a result of failure of the supporting structures. There were no fires or explosions from empty or full gas tanks.

(9) LANDING GEAR

Landing gear was relatively unaffected by the blast. Landing gear was intact on three airplanes on INDEPENDENCE which were otherwise demolished. No tire blow outs were caused by the blast. Tire failures resulted in some instances from rim cuts caused by high side loads and from cuts from flying debris. Most tires on the demolished airplanes on the hangar deck of INDEPENCENCE were intact.

(d) Power Plants

(1) CONDITION PRIOR TO BLAST

All power plants were in operating condition, as were the aircraft, when assigned to Operation Crossroads, the majority having been flown to their embarkation points. Most engines, propellers, accessories and components had only light internal and external preservation and some parts, on visual external inspection, showed evidence of light corrosion and deterioration from long exposure to the elements without maintenance. The power plants in two four-engined VPB Coronado Seaplanes and in two aircraft on the flight deck of each aircraft carrier were not preserved and were operated under power just prior to Test ABLE.

(2) GENERAL SUMMARY OF DAMAGE TO POWER PLANTS

In general aircraft power plants showed a high degree of overall resistance to damage even within a radius of 1300 yards from the center of the blast. Where aircraft power plants sustained serious damage, the source was largely violent collision with ships' structures or from flying debris, rather than primary blast effects. In those cases where the power plants escaped damage from collision or debris, other damage was light. The most significant example was noted in a

model F6F-5 airplane embarked on weather deck of DAWSON and oriented to receive the blast effect from directly ahead. In this case, failure occurred in the engine attachment lugs which support the nose cowl and the cowl flap ring.

(3) PROPELLERS

There was no evidence of damage to propellers except from secondary causes, i.e., collisions and falling debris. There was no evidence of any propellers having been rotated by the blast.

(4) POWER PLANT ACCESSORIES

Installations sheltered within the power plant section by engine cowling and fuselage skin showed no damage except that resulting from secondary effects or severe distortion of the airplane structure. Elements of power plant installations, such as fuel, lubrication, water injection and control systems likewise escaped significant damage except from secondary effects or from failures and distortions of the airplane structure supporting power plant installations. Sample carburetors and control units disassembled and examined visually showed no damage to diaphragms from blast pressure and no internal distortion or derangement from blast or shock, even though the aircraft sustained major damage. Engine nose cowls and cowl flaps are further discussed under Structures.

(5) FUELS AND LUBRICANTS IN AIRCRAFT

Fuels and lubricants in the tanks of exposed airplanes showed no blast effects discernible in the field. The post-blast condition of the flight deck of INDEPENDENCE suggests that the two fueled aircraft and the drip pans in which they were anchored were blown overboard as a unit by the blast and that no fire on board the INDEPENDENCE resulted from this material. The target display of bulk fuels and lubricants is discussed in the report of CTG 1.4 forming Enclosure (B) to Director Ship Material Interim Report, and will be covered in the Army final technical reports.

(6) CONDITION OF OPERATING POWER PLANTS

Power plants on the two four-engine Coronado Seaplanes and the two aircraft on the stern of SARATOGA operated satisfactorily in all respects after the blast.

(7) MISCELLANEOUS EFFECTS

There were no apparent heat or radiological effects on power plants. Selected generators, magnetos, instruments, and other devices depending upon magnetic principles were returned for laboratory examination by the Bureau of Aeronautics and by the Army Air Forces. Reports received to date from the

laboratory tests and analysis show no unusual effects, normal operation and electrical output, and no deterioration other than from normal wear and corrosion resulting from lack of maintenance during the long period of exposure to tropical weather conditions.

(e) Armament

Armament material incorporated in target aircraft was intended to be representative of all equipment necessary to establish a "combat ready" condition. Towards that end, the aircraft installations included not only armament items under the cognizance of the Bureau of Aeronautics but also certain items of aviation ordnance equipment and stores under cognizance of the Bureau of Ordnance. In addition to Bureau of Ordnance items usually carried by aircraft of the models used as targets, the items listed below were also selected by the Bureau of Ordnance for exposure in target aircraft. While these items are included in the general summation of damage to ordnance equipment and conclusions which follow, the listed items are also being made the subject of a separate report of damage to the Bureau of Ordnance by the Aviation Ordnance Representative of the Bureau of Ordnance Inspection Group.

Reports have been received on laboratory tests and analyses of a number of the items listed below as well as other armament equipment returned to the Naval Air Test Center, Patuxent River, Maryland. Guns fired normally and other items of equipment showed no unusual effects other than corrosion from long exposure without upkeep.

ITEM	NAME	LOCATION	DISPOSITION
FIRE CONTROL EQUIPMENT			
1.	Mk 1 Mod 2 Bomb Director (3 units missing)	SBF-4E BuNo 31853 USS SARATOGA	Naval Ordnance Plant Indianapolis, Ind.
2.	Mk 15 Bomb Sight	TBM-3E BuNo 69099 USS SARATOGA	do
3.	Mk 23 Mod 0 Gun Sight	F6F-5N BuNo 78068 USS SARATOGA	do
4.	Mk 23 Bomb Sight	TBM-3E BuNo 69080 USS SARATOGA	do
BOMBS AND FUZES			
1.	100 lb. inert GP Bomb AN-M 30	OS2U-3 BuNo 5765 USS NEVADA	Jettisoned
	Nose Fuze AN-M 103 A1		NAD Fallbrook, Cal.
	Tail Fuze AN-M 100 A2		do

ITEM	NAME	LOCATION	DISPOSITION
BOMBS AND FUZES			
2.	100 lb. Inert GP Bomb AN-M 30 Tail Fuze AN-M 115 A1	OS2U-3 BuNo 5742 USS NEVADA	Missing Missing
3.	100 lb. Inert GP Bomb AN-M 30 Nose Fuze AN-M 103 A1 Tail Fuze AN-M 100 A2	OS2U-3 BuNo 09632 USS ARKANSAS	Missing Missing Missing
4.	100 lb. Inert GP Bomb AN-M 30 A1 Nose Fuze AN-M 103 A1 Tail Fuze AN-M 115	XSC-1 BuNo 35300 USS NEW YORK	Retained for Test B NAD Fallbrook, Cal. NAD Fallbrook, Cal.
5.	100 lb. inder GP Bomb AN-M 30 Nose Fuze AN-M 103-A1 Tail Fuze AN-M 100-A2	OS2U-3 BuNo 5584 USS PENNSYLVANIA	Jettisoned with A/C NAD Fallbrook, Cal. NAD Fallbrook, Cal.
6.	100 lb. Inert GP Bomb AN-M 30 Nose Fuze AN-M 103 A1 Tail Fuze AN-M 100 A2	OS2U-3 BuNo 5342 USS PENNSYLVANIA	Jettisoned NAD Fallbrook, Cal. NAD Fallbrook, Cal.
7.	(2) 500 lb. Inert GF Bombs AN-M 64 A1 Not fuzed	SBF-4E BuNo 31839 USS SARATOGA	Retained for Test B
8.	(2) 500 lb. Inert GP Bombs AN-M 64 A1 Nose Fuze AN-M 103 A1 Tail Fuze AN-M 101 A2	SBF-4E BuNo 31853 USS SARATOGA	Retained for Test B NAD Fallbrook, Cal. NAD Fallbrook, Cal.
ROCKETS AND FUZES			
1.	11.75" AR Inert with base fuze MK 164 Mod 0	F6F-5N BuNo 77960 USS SARATOGA	Retained for Test B Retained for Test B
2.	(6) 5.0" HVAR Inert with Nose fuze Mk 149 Tail fuze Nk 164 Mod 0	F6F-5N BuNo 78068 USS SARATOGA	Retained for Test B NAD Fallbrook, Cal. Retained for Test B

UNDERWATER ORDNANCE

ITEM	NAME	LOCATION	DISPOSITION
1.	Mk 24 Mine	TBM-3E BuNo 69099 USS SARATOGA	Removed and returned to USS FULTON for analysis and report by 014L6
2.	Mk 13 Aircraft Torpedo	TBM-3E BuNo 69094 USS SARATOGA	do
3.	Mk 13 Aircrafc Torpedo	TBM-3E BuNo 69239 USS INDEPENDENCE	Aircraft missing. Torpedo found on flight deck, inert warhead missing, assembly bolts sheared. Flask and tail section taken for analysis and report by 014L6.
4.	Mk 24 Mine	TBM-3E BuNo 69063 USS INDEPENDENCE	Aircraft missing; mine missing except for tail section and part of motor. Photograph taken for report by 014L6 and wreckage jettisoned

(1) GUNS AND CANNONS

Aircraft machine guns and cannon, inherently rugged structures. were not damaged directly by the bomb blast but only as a secondary effect resulting from the collapse or distortion of airplane structures in which they were mounted. There were no instances in which the 20mm cannon recovered were inoperable mechanically. There were two instances in which the barrel and barrel jacket of the .50 cal. fixed machine guns(mounted in F6F's) were bent, and one in which the feed cover was bent out of line as a result of collapse of the inboard transverse bulkhead of the wing in which it was mounted. These parts could have been changed and the guns made operable. In one case a .50 cal. gun in an airplane which was not destroyed was shaken off its mount by the blast, but the rear mount was found defective, and would not lock. It is believed that the condition existed prior to the blast and was not discovered in the preliminary inspection. In another instance, where the airplane sustained major damage, the rear mount was pulled out of its fitting in the wing. Of the .30 cal. free guns mounted in OS2U and SBF-4E airplanes, four were found with bent barrels and jackets and one with a bent receiver which rendered it inoperable. These damages evidently were incurred when the guns were thrown clear of the

aircraft, landing on deck or striking some other object, and not caused primarily by the blast. Where there was some major damage to, or destruction of the airplane, the rear cockpit ring mounts were carried away. Damage sustained by fixed .30 cal. guns in OS2U airplanes consisted of dislodgment from mounts in two cases and disconnection of the trigger motor in one.

(2) AMMUNITION SUPPLY SYSTEMS

Feed chutes, link chutes and ammunition boxes suffered no damage except where the wing structure was distorted in wav of the equipment. Two instances of this kind resulted in bent and misaligned feed and link ejection chutes.

(3) BOMB RACKS AND SHACKLES

Bomb racks carrying external stores within the six-hundred yard circle had the stores pulled out of them with resultant misalignment of working parts in two cases. These were MK 41 and MK 50 racks carrying 100 lb. bombs, plaster loaded with live fuses. The heavier MK 51 racks withstood the wrenching effect of the blast on the radar equipment and auxiliary tanks installed in TBM, SBF and FG model airplanes and were undamaged. Protected shackles in the bomb bays of the TBM's carrying no load were undamaged. Those on the center line of the F6F's and in the pylons of FG-1D aircraft withstood the twisting effects imposed by auxiliary tanks, except in one case where the tank was badly bent and torn off. The working parts of this shackle were so badly distorted as to render it inoperable.

(4) BOMB BAY DOORS

This part of the airplane structure remained substantially intact in the exposed airplanes recovered, being protected by the wing center sections and heavy construction in the vicinity of the landing gear. There was evidence to indicate that airplanes fully exposed, such as those on the flight deck of INDEPENDENCE, had the bomb bay doors pulled open. Bomb bay doors on two anchored PB2Y-5H's were dished in.

(5) INTERVALOMETERS, BOMB STATION DISTRIBUTORS AND BOMBARDIERS' PANELS

This equipment was affected only in those TBM airplanes which sustained major damage or demolition. The equipment remained substantially intact but was rendered inoperable through collapse of the structures in which it was mounted.

(6) ROCKET EQUIPMENT

Station distributors and pylon mountings were unaffected by the blast and were undamaged in cases where the airplanes

received major damage. Rocket launchers were undamaged except where the wings on which they were mounted received major damage.

(7) FIRE CONTROL EQUIPMENT

No fire control equipment recovered was damaged by the blast. Several instances occurred in which MK 8 sights were broken off, sun filters and reflectors broken by flying debris and collapse of cockpit canopy. MK 9 sights were pulled out of their mounts in turrets and rear cockpits where the airplanes sustained major damage or destruction. Special fire control equipment installed by Bureau of Ordnance, such as MK 23 Mod 0 Gunsights, MK 1 Mod 2 Bomb Director, MK 15 Bombsight and MK 23 Bombsight was apparently undamaged, but the items were removed from the aircraft and returned to Naval Ordnance Plant, Indianapolis, Indiana, for examination and report. Results of this analysis will be reported by the BuOrd Group.

(8) TURRETS

Where the airplanes suffered major damage such as occurred on the hangar deck of INDEPENDENCE, the turrets were torn out of the aircraft and found lying in the wreckage, badly bent and crumpled and with the ring gear and roller assemblies torn away from the turret. Where the airplanes suffered minor damage, the turrets were unaffected except for two instances of broken plexiglass panels in the dome.

(9) ORDNANCE STORES - AMMUNITION, PYROTECHNICS, BOMBS, ROCKETS, FUZES

Three float lights in the rear cockpit of one OS2U in the NEVADA were unaffected. No live bombs or rockets were exposed on airplanes but fuzes in the nose and tail of bombs and in the nose and base of rockets were unexploded, including cases where the bombs were pulled out of the racks and had fallen to the deck, causing the fuze caps and vanes to be broken off. No ammunition in the receivers of the guns or in the ammunition chutes was exploded. A torpedo which had been mounted in a TBM on the flight deck of INDEPENDENCE was found on deck with its inert head missing but with the air flask charged. A MK 24 mine, also loaded in an airplane on the flight deck of INDEPENDENCE, was destroyed, only a badly wrecked tail section remained on the flight deck. In both cases the airplane was missing.

(f) Electronics

As indicated above, pre-blast and post-blast inspections of aircraft electronics equipment was accomplished under the direction of the Electronics Coordinating Officer and the results of these inspections will be included in his report.

The following summary of damage to aircraft electronic material is extracted for completeness of the aircraft report:

Zone of Major Damage - Within a radius of 1000 yards from the approximate center of the bomb burst, the electronic equipment in 23 of 27 target airplanes exposed in this area was so completely demolished (or missing in the case of those airplanes lost overboard) as to permit salvage of only isolated units and parts on a small scale. Vessels in this category were GILLIAM, CARLISLE, SALT LAKE CITY, PENSACOLA, ARKANSAS, NEVADA, INDEPENDENCE. Electronic equipment in the remaining four airplanes located within the 1000 yard radius (in CRITTENDEN and DAWSON) showed no irreparable change in pre-blast performance attributable to any atomic blast phenomena.

Zone of Light to No Damage - Outside the 1000 yard radius, electronic equipment in airplanes escaped, in general, without material damage and remained substantially unchanged from its pre-blast condition, insofar as concerns damage attributable to the bomb.

Representative samples of items of electronic equipment were returned for detailed laboratory tests and analyses. Reports on these are not yet available. However, additional samples tested in the laboratory facilities available on the USS AVERY ISLAND showed those units not physically destroyed by the blast to be operable and electrically and mechanically intact.

(g) Non-BuAer Airborne Equipment

Damage to this equipment resulting from the bomb blast closely paralleled damage sustained by other aircraft components and equipment of comparable mechanical strength. No explosives in any recovered aircraft were fired by the blast. Information on the post-blast condition of Bureau of Ordnance and Bureau of Ships (Electronic) equipment is summarized in paragraphs 1(e) and (f) above and furnished in detail in Aircraft Damage Reports, in Part "D" herewith, of this report of Bureau of Aeronautics Group. Information on the Army Air Force display and the Aviation Fuels and Lubricants display will be found in the report of CTG 1.4.

2. SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

Detailed information is furnished in Part "D" of this report relative to damage sustained by all arresting gear, barriers, catapults, airplane cranes and elevators exposed to the bomb blast. A summary of such damage is tabulated below. To facilitate consideration of the subject under discussion, there is also included a brief summary of damage sustained by the vessel concerned, insofar as ship damage is of significance in connection with damage to airplane handling installations. A more extended report

on all aspects of damage to ships will be found in the Bureau of Ships section of Director Ship Material Report:

(a) Saratoga (CV-3)

(1) GENERAL

Bomb blast damage to this vessel was negligible except in the case of the forward elevator as described below.

(2) ARRESTING GEAR AND BARRIERS

Undamaged.

(3) CATAPULT - *Starboard (H-2, Mod 1)*

Undamaged, tested by two no-load shots shortly after Able Day.

(4) CATAPULT - *Port (H-2, Mod 1)*

Undamaged, tested by two no-load shots shortly after Able Day.

(5) AIRPLANE CRANE

Undamaged, tested by routine operational use including discharge of 10 airplanes over the side shortly after Able Day.

(6) ELEVATOR *(Forward)*

This elevator, secured in the "up and locked" position for the blast, was found after the blast to be slightly dished downward in the approximate center of the elevator platform, with broken welds, in a small number of instances, in structural members on the underside of the platform. Distortion of the platform resulted in displacement and misalignment of the fore and aft equalizing shaft and pinions, for a distance of approximately 1/4 inch. All three equalizing pinions appeared to be sprung downward and towards the center of the platform. As a result, the main pinion fouled and gouged pieces of metal from the auxiliary rack forming part of the automatic control system of the elevator. Pending execution of the major repairs which would be necessary adequately to correct the damage indicated, the auxiliary rack was removed and the elevator restored to limited operating condition under manual control. This work required the time of two men for approximately two hours. Under these operating conditions the elevator operated satisfactorily in the lift of a total of six airplanes from the hangar deck to the flight deck. The maximum load under these conditions was two F6F's (empty).

(7) ELEVATOR *(After)*

This elevator had been removed and decked over some time prior to Operation Crossroads.

(b) Independence (CVL-22)

(1) GENERAL

INDEPENDENCE sustained very severe structural damage abaft the forward elevator and above the hangar deck as a result of bomb blast and of subsequent fires and explosions abaft the after elevator. Forward of the forward elevator the force of the bomb blast caused a deflection of the bow to starboard, as evidenced by a vertical buckle on the starboard side, approximately 40 feet abaft the stem. Aft of the forward elevator, the overall damage to ship's structure included severe upward distortion and pronounced centerline fracture of the flight deck and of port side bents supporting same together with extremely severe distortion of all structure from water line to flight deck. All flight deck and hangar deck galleries, arresting gear, operating mechanisms, ducts, piping and wiring were demolished, blown overboard or severly mangled. Blast pressure within the hangar deck relieved itself in part by blowing overboard both the forward and after elevator platforms. The damage to airplane handling equipment appears to be primarily a reflection of this distortion of the flight deck and related structure.

(2) ARRESTING GEAR AND BARRIERS

Seven arresting gear engines were broken loose from the overhead by the violent upward distortion and fracture of the flight deck and thrown to the deck below. Cylinder support frames on all engines were twisted and distorted. Purchase cables were broken on three units and badly burned on the after two units. High pressure piping of all units was torn loose and distorted. Accumulators remained in position on the badly distorted ship's skin and bulkheads. Only number three unit retained its air pressure. Deck sheave assemblies were in position and showed no evidence of direct damage due to the blast. Deck pendants were intact with the exception of number four, missing. Yielding elements were intact but inoperable due to severe distortion of the flight deck which parted control cables. Arresting gear controls in station number one were intact but inoperative. Station number two was damaged by distortion of the port catwalk which was folded by the blast around elements of the control station. The barrier stanchions were intact and operable by hand with actuating cylinders in good condition. Barrier cables on barriers one and two were blown over the side. Barrier cable number three was intact on deck.

(3) CATAPULT - *Starboard, (H-2, Mod 1)*

In spite of tilt of flight deck, trackway was substantially straight with no damage to shuttle, towing or retrieving cables. Damage to catapult engine was comparatively limited. Crosshead rails were undamaged. The high pressure manifold suffered slight distortion due to an upward dislocation of the airflask sufficient to shear retainer strap bolts. Connections to the gravity tank were snapped off at their junction with the tank. Oil pumps and motors were intact and could be rotated freely by hand. The accumulator air charge (2700 psi prior to the blast) had leaked away due to loose connections. Overall condition of this catapult was good with the exception of broken connections and it could be placed in commission in approximately four days.

(4) CATAPULT - *Port (H-2, Mod 1)*

Track and shuttle system, towing and retrieving cables were substantially undamaged. Compartment housing this catapult engine (arranged longitudinally to port of center line) sustained considerably more damage than starboard engine compartment. This damage included port side emergency hatch blown in and port side bulkhead dished, the greater blast damage, as compared with the starboard side, was reflected in greater damage to the port catapult engine. The central portion of the crosshead rails abreast the sump tank were distorted by a twist to port of about three or four inches through a fore and aft distance of eight feet. The sump tank was dislodged from its base and shifted outboard approximately six inches shearing anchor bolts and pipe connections. Oil gear sump and motors were intact except for fracture of electrical leads. Oil lines to the gravity tank were fractured. The pump selector control panel was bent by the force of the blast entering through the port emergency hatch. Over all condition of this catapult was poor and would require a very extensive overhaul.

(5) AIRPLANE HANDLING CRANE

Entire rotating structure of the crane was lifted partly clear and tilted outboard about 15°, with the king post disengaged from its bearings. Hydraulic training motor and brake were broken loose from foundation. King post and rotating structure were subsequently reseated by ship's force and crane restored to condition of limited operation (power hoist and manual train by head guys) and utilized for hoisting aboard two airplanes of the Baker Day target array.

(6) ELEVATORS *(one forward and one aft)*

Elevator platforms were blown completely out of the flight deck and overboard by the blast. Guide rails on port side of after elevator were bent. Hoisting cables were parted, but

hydraulic engines and crosshead system of the elevator hoist below hangar deck were substantially intact.

(c) Arkansas (BB-33)

(1) GENERAL

ARKANSAS sustained a heavy blast which struck from approximately 120° relative and from about 30° above the horizon. Insofar as concerns airplane handling equipment the most significant resultant damage was dishing of the main deck aft of turret six and in the vicinity of turret three, buckling of superstructure plating, and damage to masts, stacks and superstructure, dislodging much light structure.

(2) CATAPULT

This unit, formerly mounted on turret three had been removed prior to Operation Crossroads. As of possible significance as a catapult foundation, it was noted that turret three trained freely starboard and port after Able Day bomb blast.

(3) AIRPLANE CRANE *(Starboard)*

Upper leg of boom bent inward. Training mechanism and crane foundation sustained significant damage including distortion of rotating platform and displacement from rollers.

(4) AIRPLANE CRANE *(Port)*

This crane sustained no significant damage, and was available for operational use shortly after Able Day.

(d) New York (BB-34)

(1) GENERAL

Except for dislodging of minor ship's electronic material, superficial dishing of light structure and minor scorching, NEW YORK suffered no damage of concern in connection with airplane handling equipment.

(2) CATAPULT *(Centerline turret No. 3 (P-4))*

Undamaged except the carriage sustained a fractured retaining plate on the after slipper, port side. The catapult was tested satisfactorily after Able Day by two no-load shots.

(3) AIRPLANE CRANE *(Starboard)*

Undamaged. The crane was tested subsequent to Able Day by routine operational use in connection with handling of stores and removal of Army target exposure material.

(4) AIRPLANE CRANE *(Port)*

Undamaged. The crane was tested subsequent to Able Day by lifting SC-1 airplane from weather deck to catapult.

(e) Nevada (BB-36)

(1) GENERAL

Insofar as relates to the integrity of airplane handling equipment, the most important damage sustained by NEVADA was a general deflection of the main deck, particularly abaft Turret No. 4, where the deflection reached several inches. Hull side plating, extreme stern, port and starboard quarters, was slightly dished. Since the catapult and airplane crane are both located in the extreme stern of the ship, the effect of distortion of ship's structure in the area was of special significance.

(2) CATAPULT *(Centerline Aft (P-6))*

Roller path was distorted. Catapult girder was tilted up clear of forward segment of roller path due to pull of girder hold-down cables exerted by distorted weather deck. Track was substantially straight. Catapult launching mechanism was intact. Catapult centering pivot was inaccessible for inspection but probably sustained damage.

(3) AIRPLANE CRANE

Lower leg of boom was collapsed in a sharp bend of approximately 70° about half way between crane footing and elbow of boom. Upper leg of boom substantially intact.

(f) Pennsylvania (BB-38)

(1) GENERAL

PENNSYLVANIA suffered no ship structural damage of significance in connection with airplane handling equipment.

(2) CATAPULT *(Centerline Aft (P-6))*

This catapult was inoperable prior to Operation Crossroads as a result of previous battle damage to catapult electrical equipment, and minor mechanical damage to the catapult. The condition of the catapult was not changed as a result of Able Day bomb blast.

(3) AIRPLANE CRANE

Circumstances the same as for the catapult, namely: inoperable as result of previous battle damage to electrical

equipment. The condition of the crane was not changed as a result of Able Day bomb blast.

(g) Pensacola (CA-24)

(1) GENERAL

PENSACOLA sustained severe blast from slightly above and approximately 165° relative. The most serious structural damage occurred to the main deck in the well between the forward and after deck structures at about frame 65 where the main deck was dished downward to a depth of about three feet at the centerline. The main deck aft was severely dished in and in some places ruptured. Light superstructure enclosures were extensively battered. Stacks were crushed and blown forward to port.

(2) CATAPULTS

Catapults had been removed from PENSACOLA prior to Operation Crossroads. Of possible significance in this connection, the seven foot towers or pedestals installed starboard and port as foundations for catapults remained intact and substantially undamaged by the Able Day bomb blast.

(3) AIRPLANE CRANE

This equipment sustained only moderate damage principally the distortion of the crane foundation due to distortion of the deck, resulting in misalignment of the fairlead sheave at the base of the deck, resulting in misalignment of the fairleave sheave at the base of the crane and damage to the remote mechanical control. Limited repairs by the ship's force enabled this crane to be placed in commission shortly after Able Day.

(h) Salt Lake City (CA-25)

(1) GENERAL

Damage to SALT LAKE CITY, which received the blast from about 240° relative followed the same pattern as that of PENSACOLA, but was somewhat reduced in extent. Dishing of the main deck and distortion of superstructure bulkheads closely resembled that on PENSACOLA but was less pronounced. The forward stack was missing and the after stack was crushed down to starboard.

(2) CATAPULTS

Catapults had been removed from SALT LAKE CITY prior to Operation Crossroads. Like PENSACOLA, pedestals for catapults sustained no significant damage.

(3) AIRPLANE CRANE

Minor damage. The crane was placed in commission by the ship's force shortly after Able Day.

3. RADIOLOGICAL EFFECTS

(a) Target Aircraft

The radioactivity, which persisted in the target area for only a few hours in some cases to a few days in the extreme cases, was not a source of damage. Aircraft receiving only light or no damage were immediately accessible, insofar as radiological effects are concerned, for repairs or for operational use. Those aircraft not accessible because of radioactivity for several days were confined to the inner zone where major structural damage rendered them useless for further operations.

(b) Drone Aircraft

On Able Day the television equipment on the three Navy and four Army drones functioned normally. All block operators reported useable presentation of the television screen even while the drone aircraft were within the radioactive cloud. But in the case of an Army drone at 24,000 feet the image of the cloud was burned into the surface of the iconoscope. The radar jamming equipment AN/APT-5, operating between 1000 and 1800 megacycles, became inoperative immediately after detonation. This condition continued for ten minutes.

One Navy drone was swept upward, in passing through the cloud, from 20,000 to 26,000 feet. This was the greatest change in altitude recorded of any drone set through or above the cloud, and it may have been caused partially by a tilt of the aircraft when released by the mother. The drone was recovered with some difficulty but was safely landed.

There was considerable variation in the recorded intensity of radioactivity of the drone aircraft. The drones which were at high altitude and which passed through the edge of the cloud were but slightly affected. Those which passed through the center of the cloud remained lethal for several days.

No aircraft in the flight were permanently affected or injured by the blast on Able Day.

VI - CONCLUSIONS, TEST ABLE

1. GENERAL

Selection, disposition and exposure of target aircraft was accomplished in accordance with the approved plan. Displacement of the point of

bomb burst and the inevitable and expected loss of a small number of ships and embarked aircraft were compensated by the planned scope of the exposure program and resulted in no serious curtailment of technical data obtained. An adequate number of different aircraft received damage in graduated amounts ranging from total demolition to none, and the objective of the test, namely the determination of the effect, upon aircraft of an atomic bomb burst in the air as a function of distance from the center of the burst, was successfully accomplished.

2. AIRCRAFT, COMPONENTS AND EQUIPMENT

(a) Sources of Damage

Aside from secondary or induced sources of damage such as collision with ships' structures and falling debris, the principle source of damage from exposure to the air burst of the atomic bomb was the blast effect. Heat effects from the bomb burst were, in general, insignificant, and were confined to scorching of paint and charring of fabric, local in nature, in a limited number of instances at irregular distances from the center of burst. Radiological characteristics of target aircraft after the bomb blast did not differ significantly from the characteristics noted in surrounding material and were not a source of damage. In all other respects, the damage to aircraft and equipment was comparable to that which would have been produced by a conventional explosive of equivalent blast effect.

(b) Relation of Damage to Distance

The damage sustained by aircraft as a direct result of the bomb blast was a reasonably consistent function of distance from the point of detonation. An analysis of the relation of damage sustained to distance from the bomb burst leads to the conclusion that aircraft of current types, if exposed topside to the direct effect of the blast within 1300 yards from ground zero, will be completely demolished or blown overboard. Within an intermediate zone of 1300 to 2200 yards radius, aircraft exposed topside will receive major to moderate damage sufficiently severe as to require major overhaul, at the very least, and jettisoning in the case of the majority of carrier based airplanes thus exposed. Outside of the 2200 yard circle the effects of topside exposure to the bomb blast diminish rapidly with distance and will be limited to damaged plexiglass, control surfaces and folded wings.

(c) Effect of Shielding

The conclusions just stated relate to aircraft exposed topside to the direct effect of the blast. In contrast thereto, the beneficial effects of shielding are of exceptional value. In general, it may be concluded that aircraft parked on protected hangar decks and in holds with protection equivalent to that provided by unbroken shell plating on the side

of the ship will receive little damage from blast effect down to the minimum distance from the bomb burst at which the ship can survive. There are two considerations of great importance to be noted here. First, the necessity for complete, unbroken integrity of the ship's skin and decks since extremely violent blast effects are introduced in internal compartments by openings of even moderate size, as, for example a cargo port blown inward by the blast effect on the exposed side of the ship. A second important consideration is the paramount necessity that ship's fittings and the structure of the compartment remain strictly intact and in place since falling debris, dislodged or thrown about by shock or distortion of the ship's structure, constitute an extremely serious menace to the safety of aircraft stowed below decks.

(d) Effect of Partial Shielding and Orientation

In contrast to the excellent protection afforded by unbroken shell plating, partial shielding by the shadow effect of deck structures such as turrets, bridges, and stacks will provide protection to a significant degree, but not in proportion to the amount of shielding. At short ranges where the blast effect appears to be accompanied by a wind of high velocity, the facility of the shadow effect to prevent aircraft from being blown over the side has been noted. At intermediate distances where damage appears to result from the concussion of the blast effect rather than a sweeping wind, anything short of complete shielding appears to have little or no effect on the damage sustained by the airplane. This is certainly true in the outer zone where wind velocities accompanying the blast are insufficiently great in themselves to damage aircraft. There is an intermediate point where partial shielding begins to cause a discernible difference in degree of damage, but the point is so near the point of detonation that damage is probably major in either case. An important corollary is that the resistance of ships' top-hamper to dislodgment shall be sufficient to insure that it remain intact under blast conditions at least as severe as those which shielded aircraft can survive, in order that falling debris may not destroy aircraft otherwise lightly damaged, and that the ship may not be rendered inoperable, where aircraft survived.

Orientation and configuration of aircraft have a pertinent bearing on the degree and nature of damage sustained. If oriented to face the blast, with wings spread and locked, it may be expected to sustain minimum damage at any given distance from the point of detonation.

(e) Relative Vulnerability of Aircraft Components

Study of the nature, severity and frequency of damage sustained by the various significant components of aircraft

exposed to the bomb blast shows the following order of vulnerability, weakest elements listed first:

(1) Plexiglass, (particularly flat plates) and canopies.
(2) Fabric surfaces, (susceptible to both rupturing and burning).
(3) Control surfaces, particularly when aircraft are tailed into or broadside to the blast.
(4) Folded wings, most vulnerable at wing hinge fittings and jury locks when blast is approximately normal to flat surface.
(5) Monocoque and semi-monocoque elements of fuselage and nose cowling.
(6) External tanks.

(f) Equipment

Damage from the bomb blast sustained by this material was comparable in nature and extent to that which would be caused by the detonation of a conventional explosive of sufficient intensity to cause equivalent structural damage. In regard to specific equipment items, no hazard may be expected to be created by the bomb blast in the form of exploding oxygen or CO2 bottles or charged accumulators. Hydraulic fluids and gasoline present no more than their usual hazards.

Damage to hydraulic systems, oxygen systems and fuel systems resulted only from failure of supporting aircraft structure. Internal metal and self sealing tanks shielded as they are by airplane skin, will be relatively unaffected by the blast and will be usable except where the blast is of sufficient intensity to cause major damage to the airplane. Damage to instruments arising primarily from mechanical shock pressure effects was limited generally to those airplanes which received major structural damage. With the exception of plexiglass canopies which were not of the latest high speed type and the further exception of external fuel tanks, airborne equipment is equal or superior to the airplane structure in bomb blast resistance. No special design criteria need be established for airborne equipment to provide against exposure to atomic bomb blasts, except for those requirements which improve the resistance of canopies and external tanks to bomb blasts of any nature.

(g) Power Plants

Aircraft power plants and components are considerably more resistant to atomic bomb damage than structural components. In general, it may be expected that aircraft will not be put out of commission solely because of damage to power plants. Outside the inner zone (1300 yards radius) aircraft

engines, propellers and accessories may be expected to withstand the bomb blast with minor or no damage. Within the 1300 yard radius, power plants will receive extensive damage only under bomb blast conditions sufficiently severe to demolish the airplane.

Failure of the supporting aircraft structure is the element limiting successful operation of power plant installations such as fuel, lubricating, induction and water injection systems rather than failure of the individual units under bomb blast conditions.

Fuels, lubricating oils and greases will not be ignited as a direct result of bomb blast, except as a secondary effect associated with rupture of the fuel tanks and piping in conjunction with major damage to the aircraft.

(h) Armament

In general the inherent ruggedness of this equipment is such as to warrant the conclusion that serious failures or damage will be sustained only in those cases where the intensity of the bomb blast is sufficient to cause major damage to the supporting aircraft. Ignition of current types of aircraft ammunition, bombs, mines, rockets, and torpedoes appears to be unlikely even under atomic bomb blast conditions which would cause destruction of the supporting vessel.

(i) Electronic Equipment

Electronic equipment installed in exposed aircraft is substantially resistant to bomb blast beyond a radius of 1000 yards. Where damage directly attributable to the bomb occurred, it resulted from blast effects with no evidence of damage from heat or radiation phenomena. Mechanical shielding afforded to installed electronic equipment by the aircraft provided a highly significant measure of protection. Electronic equipment survived in excellent condition in several cases where airplanes sustained major structural damage. As regards protected stations below decks, electronic equipment shared with airplanes the benefits of shielding afforded by the structure of the vessel in which embarked. Except in the case of INDEPENDENCE, electronic equipment in airplanes located below decks sustained no damage directly attributable to bomb blast. Similarly, explanation of the survival of electronic equipment in badly damaged airplanes on weather decks of CRITTENDEN and DAWSON appears to lie in the partial shielding afforded by the superstructure of the vessels concerned, in addition to that inherent to the aircraft.

(j) Comparison of Seaplanes and Carrier Types

The PB2Y-5H patrol seaplanes sustained somewhat more damage than carrier based types under exposure conditions of comparable severity.

The resistance of the structure of *float type seaplanes* to blast damage was comparable to that of carrier types. However, the unstable foundation provided by the floats of observation planes resting in launching cars or cradles, as compared with the wider tread and far more stable wheel type landing gear of carrier types, greatly increased the vulnerability of the former type to capsize on deck and damage.

(k) Securing of Aircraft

The standard "Heavy Weather" method of securing aircraft (Aircraft Carrier Bulletin No. 13) utilized throughout Test ABLE, provided tie down strength adequate to secure the airplane under local blast or wind conditions sufficiently severe as to cause the loss or destruction of numerous minor components (control surfaces, cockpit enclosures, etc.) and up to the point of failure of major cable attachment areas in the airplanes. Standard methods of anchoring patrol seaplanes (100 fathoms 3/4" wire rope) were also adequate.

3. SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

(a) General

As indicated in the summary of damage to ships and in Reports of Damage to Ships' Installations for Handling Aircraft, in Part "D" of this report, this equipment, with the possible exception of elevators exhibited a degree of inherent ruggedness and resistance to blast damage fully equal to that shown by comparable elements of the supporting ship. It should be noted, however, that the large unit size, and moderate structural weight of this equipment, together with the distribution of some items over large portions of the ship's structure (H-2 catapults, for example extend fore-and-aft approximately 121 feet; INDEPENDENCE's arresting gear engines spanned practically the full beam of the ship while her elevators occupied a 42 foot by 44 foot by 26 foot cube) rendered the subject installations extremely sensitive to distortions in the supporting ship's frame. As a result, damage to ships' installations for handling aircraft was frequently a more significant reflection of damage to adjacent elements of the ship than of direct damage to the unit itself.

(b) Effects of Shielding

Significant conclusions as to the effects of shielding upon ships' installations for handling aircraft may be drawn from consideration of the damage sustained in different parts of INDEPENDENCE.

Forward of the forward elevator, this vessel is of conventional frame and shell plating construction. Damage in

this area, both to the flight deck and hull was light to moderate except for a buckle on the starboard side and except in those compartments to which the blast was admitted by the blowing in of doors on the exposed port side.

From the forward to the after elevator a different method of construction is used, the flight deck being carried on massive bents of welded construction rising from the outer edge of the hangar deck and spanning the overhead of the hangar compartment. The outboard or side wall closure, of the elevator wells and hangar, was provided by steel roller curtains in guides between the vertical columns mentioned above. Blowing of port side curtains admitted the bomb blast to the hangar and extreme damage to this large and highly important compartment followed, including blowing out of the elevator platforms, extensive upward distortion and rupture of the flight deck, destruction or dislodging of internal ship's fittings and installations and complete demolition of all airplanes parked on the hangar deck.

From consideration of the moderate damage sustained by the shell-plated forward portion of the vessel, as compared with the extreme damage sustained by the open construction of the hangar section, it is apparent that the shell plating forward was a highly important factor in minimizing blast effect in that area. Restated - the conclusion is inescapable that conventional framing and shell plating, with an absence of openings to omit blast effects, would have provided significant protection to the elevators, the fittings and the aircraft of the hanger area.

(c) Necessity for Uniformity of Resistance to Blast Damage

Downward dishing of SARATOGA's elevator platform under blast conditions of such low intensity as to cause no damage to other elements of the ship's structure and only very light damage to airplanes parked on the flight deck is evidence that this platform lacked the resistance to blast damage existing elsewhere throughout the ship. In other ships, top-hamper fell and fittings were dislodged, damaging aircraft stowed below.

The necessity is indicated for a comprehensive review of the structural elements of vessels carrying aircraft with the objective of insuring that all critical components make good, a uniform minimum standard of resistance to blast damage in order that embarked aircraft may not be damaged or immobilized by falling top-hamper or by inadequate strength of essential components of the ship--measured in terms of the blast phenomena which the airplanes can successfully resist.

4. RADIOLOGICAL EFFECTS

Radiological effects were not predominant in Test ABLE since most of the fission products were carried upward by the hot column of gasses into the mushroom which ascended to the stratosphere. Here winds carried this highly radioactive material clear of the lagoon where it was dissipated without contaminating the target vessels. Those aircraft which are inaccessible as a result of radioactivity may be expected to suffer extreme structural damage. Aircraft sustaining light or no damage should be readily accessible for repairs or operational use insofar as radioactivity is concerned. Aircraft stowed below decks will receive complete protection, radiologically, from the air burst.

Indications are that the highly radioactive materials, even within the hot column of gases and the mushroom cloud, have no permanent effects on operating aircraft, power plants or electronic equipment, although it is questionable as to whether a pilot would survive.

Physiological effects of radioactivity are discussed under the Bureau of Medicine and Surgery and Radiological Safety Section reports.

5. SUMMARY OF CONCLUSIONS

(a) Aircraft

Aircraft exposed topside, to an atomic bomb air burst will be blown overboard or completely destroyed if within 1300 yards of ground zero with damage diminishing to light damage outside of 2200 yards. The most practicable means for reducing damage to aircraft is by stowage below decks. If protected by stowage in intact hangar spaces or in compartments free from openings which will admit blast effects, aircraft will be substantially undamaged at any range at which the supporting vessel will survive. Modifications to aircraft for the purpose of increasing resistance to blast damage appears to entail unacceptable penalties on performance except in minor instances such as canopies and drop tanks. Radiological effects are not significant.

(b) Vessels

In regard to vessels carrying aircraft, the use of continuous shell plating in way of hangars and elevators, i.e. closed hangar construction, appears to offer opportunity for improved protection of these compartments against blast damage. Critical ship's structure exposed to blast damage should make good, a uniform minimum standard of resistance to blast damage in order that embarked aircraft may not be damaged or immobilized by the fall of debris or failure of essential ship's components under blast effects less than those which aircraft successfully can sustain.

PART "C" - TEST BAKER

I - OBJECTIVES

The mission of Joint Task Force One in the conduct of Operation Crossroads, as previously stated, was "To determine the effects of the atomic bomb upon Naval vessels in order to gain information of value to the national defense."

In support of this mission, closely paralleling the plans for exposure of target ships and ships' materials, and in line with the stated objective of the air burst, the Bureau of Aeronautics Group target aircraft exposure plans for Test BAKER had as their broad objective the determination of the effects of an underwater atomic bomb upon aircraft as a function of the distance from the center of the burst.

II - GENERAL PLAN AND METHOD OF TEST FOR TEST BAKER

1. AIRCRAFT

The objectives of Test ABLE were adhered to, the results being reported above in Parts "A" and "B" of this report. Of the seventy-three aircraft originally provided for Test ABLE, forty remained usable for Test BAKER. These forty aircraft comprised nineteen undamaged (twelve of which were the spare aircraft on the SARATOGA hangar deck), ten lightly damaged and eleven moderately to heavily damaged aircraft which were considered, however, to be satisfactory test items.

The general plan for exposure of target aircraft for Test BAKER involved the display of the forty remaining surplus aircraft on target vessels located at graduated distances from the center of the target array in such a manner as to simulate, as closely as practicable, the normal disposition of shipborne aircraft on combat vessels.

With the objectives indicated above observation type airplanes were embarked on the NEW YORK, and carrier types on the SARATOGA and INDEPENDENCE. Exposure of the remaining number of carrier type aircraft necessary to insure adequate coverage, from the center to the periphery of the target array, was effected by embarking twenty-three aircraft on sixteen selected APA's of the GILLIAM class, with one aircraft each on the weather deck and one aircraft each in the second platform deck after cargo hold of seven of these vessels thus simulating carrier flight and hangar deck conditions as nearly as practicable. The pontoon hatch covers on the seven APA's with aircraft in the hold were secured by welding heavy steel clips across the pontoons, in order to prevent damage from failing pontoons and debris, as occurred in Test ABLE, and in order to simulate more closely conditions in a well protected and completely enclosed carrier hangar deck. In view of the limited number of scout observation type aircraft remaining for exposure on combat vessels, one carrier type airplane was secured on the main deck of the PENNSYLVANIA. All embarked airplanes were secured for heavy weather in accordance with Aircraft Carrier Bulletin No. 13.

Included in the target array were the two VPB Coronado Seaplanes in the same stations as those previously ordered for Test ABLE. It is noted

here that these patrol seaplanes were out of their assigned positions for Test ABLE and were moved in 400 and 600 yards closer respectively to the correctly assigned positions for Test BAKER. In view of the high waves anticipated special additional precautions were taken with the heavy weather moorings to preclude capsizing or casting adrift by failure of mooring lines. The mooring pendants were backed up with a three and one half inch manila bridle rigged to the snubbing posts, and preventer wires rigged slack to the inboard propeller hubs. The anchor cable was increased in length by one hundred fathoms and a spring weight added, to take the shock, midway between the anchors and the buoys.

Aircraft were equipped to simulate normal combat ready conditions in a manner similar to that prescribed for Test ABLE, with certain highly inflammable or explosive material, ignition of which might cause secondary damage, omitted and separately tested. Principle items in this category were:

(a) Gasoline

Omitted from all aircraft except two airplanes fueled to capacity on the stern of the SARATOGA flight deck. The two Coronado seaplanes carried about 1000 gallons each.

(b) Ammunition

Reduced in all airplanes to a test quantity of ten rounds per gun secured in the receiver. This quantity was sufficient to disclose any tendence towards ignition or detonation but was insufficient to damage the airplane seriously. Bolts were omitted from all guns to insure safety of personnel, with particular reference to tampering with machine guns.

(c) Bombs, Mines, Rockets and Torpedoes

Omitted except where installation of this material in airplanes was necessary for completeness of exposure program of the Bureau of Ordnance in which case items were blind loaded and fuzed with arming wires in place on the fuzes. Where the Bureau of Ordnance exposed live ammunition, bombs, mines and torpedoes, such exposure was generally effected at a safe distance from the aircraft to prevent destruction of airplanes from secondary causes.

(d) Pyrotechnics

Omitted from all aircraft.

Information as to the location of all target aircraft together with details as to their pre-blast condition, configuration and loading are included in Part "D" of this report.

The table below shows the type aircraft, location on target vessels and special equipment or configurations for Test BAKER.

AIRCRAFT EXPOSURE PROGRAM

OPERATION CROSSROADS

TEST BAKER

NAME OF TARGET VESSEL	MODEL AIRCRAFT BUREAU NUMBER	LOCATION ON TARGET VESSEL HD HANGAR DECK FD FLIGHT DECK	REMARKS SPECIAL EQUIPMENT
USS SARATOGA CV-3	TBM-3E 69099	Port F.D. Frame 95	Bombsight, MK 15 Mod. 7 Temperature paint panel. 5 gal can. Wings spread.
do	TBM-3E 69094	Center, F.D. Frame 100	Wings Spread.
do	TBM-3E 69080	Port F.D.	Fuel and oil tanks full. In steel drip pan. Mk 23 bombsight. Wings spread.
do	TBM-3E 69095	Stbd. H.D. Frame 120	2 VG Recorders Wings folded.
do	SBF-4E 31853	Center F.D. Frame 90	Bomb Director MK 1 Mod 2. 2-500 lb GP bomb, Blind, loaded and fuzed. 5 gal can. Wings spread.
do	SBF-4E 31839	Port F.D. Frame 90	2-500 lb GP bombs Blind loaded and fuzed. Wings spread.
do	SBF-4E 31850	Stbd. F.D.	Temperature paint panel. Fuel and oil tanks full. In steel drip pan. Wings spread.
do	SBF-4E 31850	Stbd. H.D. Frame 100	5 gal. can Wings folded.

NAME OF TARGET VESSEL	MODEL AIRCRAFT BUREAU NUMBER	LOCATION ON TARGET VESSEL HD HANGAR DECK FD FLIGHT DECK	REMARKS SPECIAL EQUIPMENT
USS SARATOGA CV-3	SBF-4E 31894	Stbd. H.D. Frame 90	Wings folded
do	SBF-4E 31840	Stbd. H.D. Frame 110	Wings folded
USS INDEPENDENCE CVL-22	TBM-3E 69169	F.D. Forward Frame 25 Port	5 Gal can. Temperature paint panel. Wings folded
do	SBF-4E 31889	F.D. Forward Frame 40 Stbd	Wings spread
USS NEW YORK BB-34	XSC-1 35300	Catapult, Aft Fwd End	1-100 lb. G.P. Bomb. Blind loaded & fuzed. Temperature paint panel
do	SC-1 35561	Port, Main Deck near turret No. 3	
USS BANNER APA-60	FG-1D 87847	Upper Deck Port side aft	Fuel tank full of salt water. Wings folded
USS BARROW APA-61	F6F-5N 77749	Upper Deck Stbd Aft	Wings folded
USS BLADEN APA-63	FG-1D 87896	Upper Deck Stbd Aft	Wings spread
do	FM-2 47265	Cargo Hold 2nd I tfm deck	Wings folded
USS BRACKEN APA-64	TBM-3E 69188	Upper Deck Stbd Forward	Wings folded
USS BRISCOE APA-65	F6F-5N 78068	Upper Deck Stbd Forward	Mk 23 gunsight. 5 gal. can. six 5" rockets blind loaded and fuzed. Wings folded. Temperature paint panel

NAME OF TARGET VESSEL	MODEL AIRCRAFT BUREAU NUMBER	LOCATION ON TARGET VESSEL HD HANGAR DECK FD FLIGHT DECK	REMARKS SPECIAL EQUIPMENT
USS BRULE APA-66	F6F-5N	Upper Deck Stbd Forward	One 11.75" rocket blind loaded & fuzed. Wings folded. Temperature paint panel
USS BUTTE APA-68	FG-1D 82433	Upper Deck Stbd Aft	Wings folded
USS CARTERET APA-70	FG-1D 88040	Upper Deck Stbd Aft	VG Recorder Wings folded
do	FM-2 56954	Cargo Hold 2nd pltfm deck	Wings folded
USS CORTLAND APA-75	F6F-5 71753	Upper Deck Stbd Aft	Wings folded
do	FM-2 56756	Cargo Hold 2nd pltfm deck	Wings folded
USS CRITTENDEN APA-77	F6F-5N 77637	Upper Deck Stbd Aft	Wings folded
USS DAWSON APA-79	F6F-5N 78086	Upper deck Stbd Aft	VG Recorder Wings folded
do	FM-2 73874	Cargo hold 2nd pltfm deck	Wings folded
USS FALLON APA-81	FG-1D 88033	Upper deck Stbd Aft	Fuel tanks filled with salt water. Wings spread
do	FM-3 74203	Cargo hold 2nd pltfm deck	Wings folded
USS FILLMORE APA-83	F6F-5 71606	Upper Deck Stbd Aft	VG Recorder Wings folded
USS GASCONADE APA-85	FG-1D 87882	Upper deck Stbd Aft	Wings spread
do	FM-2	Cargo hold 2nd pltfm deck	Wings folded
USS GENEVA APA-86	TBM-3E 69197	Upper deck Stbd forward	Wings folded
USS NIAGARA APA-87	F6F-5 58662	Upper deck Stbd Aft	Wings folded
do	FM-2P 74675	Cargo hold 2nd pltfm deck	Wings spread

NAME OF TARGET VESSEL	MODEL AIRCRAFT BUREAU NUMBER	LOCATION ON TARGET VESSEL HD HANGAR DECK FD FLIGHT DECK	REMARKS SPECIAL EQUIPMENT
VPB CORONADO SEAPLANE	PB2Y-5H-7052	Moored in target area	Special heavy Weather moorings with extra preventer
do	PB2Y-5H-7085	do	do

2. NON-BUAER AVIATION EQUIPMENT

In addition to the program outlined above for the exposure of aircraft and related equipment under the cognizance of the Bureau of Aeronautics, the program also made comprehensive provisions for the inclusion, on a cooperative basis, of airborne equipment under the cognizance of other bureaus, but of interest to the Bureau of Aeronautics. This program included material from the following sources:

(a) Bureau of Ordnance Airborne Equipment

In addition to the exposure program indicated above which armed and equipped certain aircraft with test samples of ammunition, bombs, and rockets, Bureau of Ordnance representatives in cooperation with those of the Bureau of Aeronautics provided installations of certain special bombsights and bomb directors not normally carried on all missions of the airplane concerned.

In addition, temperature paint panels, a part of the instrumentation program of the Bureau of Ordnance, were exposed on a number of target aircraft.

(b) Bureau of Ships Airborne Equipment

All aircraft carried standard electronic equipment for the type, the testing and reporting on this equipment being coordinated with the Electronics Coordinating Officer of the Bureau of Ships.

A number of VG Recorders were transferred to the Bureau of Ships Instrumentation Group. Some of these recorders were installed by that group in target aircraft; these in addition to VG Recorders installed in other selected aircraft by the Bureau of Aeronautics Group.

(c) Army Aeronautical Material

The Army Air Forces Group did not participate in Test BAKER and all the aircraft components and equipment displayed

by that unit were removed from target vessels. The five lots of aviation and motor fuels, lubricating oils and greases were again exposed by the Quartermaster Unit of the Army Ground Group and these items as well as some vehicles and ground equipment exposed are of interest to the Bureau of Aeronautics.

(d) Instrumentation by British Representatives

The British participants in Operation Crossroads exposed throughout the target array a number of standard sealed five gallon cans. These, according to British doctors, were representative of a man's chest and analysis of blast effects could be applied to estimation of a man's ability to withstand the blast. A number of these cans were attached to aircraft and the Bureau of Aeronautics Group augmented this program by placing a few additional cans in the cockpits of aircraft.

3. SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

In addition to complete aircraft, other target material under the cognizance of or of primary interest to the Bureau of Aeronautics included those items of ships' installations designed for launching, arresting and handling of aircraft; principally, catapults, arresting gear, barriers, airplane cranes and elevators. The program was arranged to include analysis of the effects of the bomb blast upon this equipment.

III - PROCEDURE FOR TEST BAKER

1. PRE-BLAST INSPECTIONS

The initial condition and configuration of target aircraft and other aeronautical material was in general as specified for Test ABLE with some redistribution of special equipment of the Bureau of Ordnance and instrumentation of the Bureaus of Ordnance, Ships and Aeronautics. As previously noted a number of the aircraft had sustained damage ranging from very light to moderate or major damage during the previous test. Some internal and external fuel tanks, filled with salt water to inspect for leakage, were left in this condition for Test BAKER. After ten of the spare aircraft from the SARATOGA had been redisposed to other target vessels in the BAKER array, secured and photographed, the pre-blast condition of all aircraft in the array was confirmed by detailed inspections by the Bureau of Aeronautics Group utilizing functional tests to supplement visual inspection insofar as practicable. Engines of the fueled aircraft were tested under their own power before Baker day. Similar visual and operational tests were conducted on electronic and armament equipment using standard test equipment and methods. Parallel procedure, employing both inspection and functional tests where possible, was used to determine the pre-blast condition of ships' installations for handling aircraft. Catapults on SARATOGA and NEW YORK were tested by no-load shots. SARATOGA'S elevator was employed lifting aircraft from the hangar to the flight deck, using manual control after

removal of certain elements of the automatic control system. Airplane cranes on the SARATOGA, INDEPENDENCE, NEW YORK, ARKANSAS, PENSACOLA, and SALT LAKE CITY were tested by routine operational uses, largely in handling aircraft, although the latter two cruisers required minor and the INDEPENDENCE major repairs before being placed in limited service.

2. POST-BLAST INSPECTIONS

The post-blast condition of target aircraft and aeronautical material was established by another series of inspections and very limited functional tests as soon as radiological conditions permitted access to target vessels. The functional tests on most aircraft and ships' installations were rather sharply curtailed after Test BAKER as compared to those conducted during post-ABLE inspections because of the high radioactivity persisting in the target array long after the underwater blast. These radiological effects will be discussed in detail in later sections of this report. It will suffice here to say that engines on the two fueled Coronados were tested under their own power and the seaplanes taxied around the lagoon. Tests similar to those of the pre-blast inspection program were conducted on airborne electronic equipment of a few aircraft, while other representative items of equipment were selected for return to continental laboratories where functional tests and more detailed laboratory analysis may be carried out as the items become radiologically safe to handle.

In regard to ships' installations, radiological conditions permitted only visual examinations. It is anticipated that catapults on the NEW YORK and INDEPENDENCE will be tested at a later date by no-load shots, the latter after limited repairs, to the starboard catapult only, of damage sustained during Test ABLE. Airplane cranes on the INDEPENDENCE, NEW YORK, PENSACOLA and SALT LAKE CITY will also be tested at a later date. At the time of writing this report the above target vessels were at Kwajalein where they had been towed from Bikini Lagoon. Plans are being made for return of these vessels to continental and other ports where the contemplated functional tests may be completed at a later date and made the subject of supplementary reports.

3. REPORTS

The results of all pre-blast and post-blast inspections and tests were recorded in a series of comprehensive reports, supported by adequate photographic coverage, describing in detail the exact condition of all target aeronautical material. These are being placed in JTF-1 and BuAer files for reference. A condensed standardized form of presentation was utilized which facilitated ready comparison of the before-and-after condition of the items under consideration and ready differentiation between the damage sustained in Tests ABLE and BAKER. Data and record material in detail was combined in two categories.

(a) Airplanes

One volume per airplane, reporting the material condi-

tions of each airplane, sub-divided by principal groups of components and equipment.

(b) Ships' Installations for Handling Aircraft

One volume per vessel reporting the material condition of each of the following installations: arresting gear and barriers, catapults, airplane cranes and elevators. Information on each unit was sub-divided into principal components.

IV - SUMMARY OF DAMAGE, TEST BAKER

1. AIRCRAFT

(a) General

Of the forty aircraft exposed to the underwater blast in Test BAKER a number had sustained previous damage, ranging from light to major damage, during Test ABLE, but were considered to be satisfactory test items. Inspections conducted after Test BAKER were made with a view to careful distinction between damage incurred in the first test and additional damage sustained in the second. Detailed information relative to the post-blast condition of each aircraft is supplied in Part "D" of this report. The results set forth therein may be summarized in general terms as follows:

(1) MISSING

Sunk with target vessel or blown or washed overboard from target vessel..... 11 Airplanes

**(2) MAJOR DAMAGE*

Due to bomb blast or water thrown by bomb ..... 16 Airplanes

#(3) LIGHT DAMAGE

Airplane could be put in operating condition with field repair facilities and usual spare parts ..... 2 Airplanes

#(4) NO DAMAGE ..... 11 Airplanes

Total ..... 40 Airplanes

*NOTE: Where airplanes had previously sustained damage in Test ABLE, it is estimated that an undamaged airplane in this group would have sustained major damage from Test BAKER.

#NOTE: Airplanes damaged in Test ABLE, which received little or no further damage are included in these categories.

The above damage was incurred from the following sources:

(1) The primary effects of blast pressure; water blown against, falling upon or washing over aircraft; and underwater shock imparted to aircraft through the ship's structure.

(2) The secondary effects of falling or flying debris, collision with ship's structure and immersion in water in flooded compartments.

(b) Structures

Damage to aircraft exposed on the weather decks of target vessels was observed to be graduated as a fairly consistent function of distance from the center of the target array. From the standpoint of analysis of severity of damage sustained by aircraft, the target array may be divided into three concentric areas centered in the point of detonation of the bomb. The *inner zone* includes target material within 700 yards of the point of detonation; the *intermediate zone* includes target material between 700 and 1500 yards; and the *outer zone* includes target components more than 1500 yards from the center. It is pointed out here that the point of detonation of the bomb and the center of the target array are identical locations and are used interchangeably throughout the discussions to follow:

(1) INNER ZONE

Airplanes on weather decks of target vessels in this area were demolished or were blown or washed overboard. Aircraft topside on the SARATOGA and FALLON in this zone were blown or washed overboard, with only a tail wheel and arresting gear assembly remaining of the airplane on the FALLON. The only other aircraft on a weather deck in the inner zone was an FG-1D on the GASCONADE. This airplane received extreme damage, probably from the combined effects of falling, blown or sweeping water, air blast, and underwater shock transmitted through the ship's structure. The fuselage was heavily buckled and completely severed aft of the cockpit, the starboard wing (wings spread during the test) was buckled and twisted and the starboard landing gear strut was broken at its lower extremity from a combination of underwater shock transmitted through the ship's structure and side load from heavy rolling and pitching of the GASCONADE. The airplane was thrown forward by this force, colliding with the ship's structure. Light structural components, such as control surfaces and cockpit canopies, suffered heavy damage.

(2) INTERMEDIATE ZONE

In this area aircraft exposed on weather decks sustained major, diminishing to moderate, damage to structural components. Effects attributable to underwater shock and falling

water were less evident than in the inner zone. There was no discernible damage to landing gear or landing gear struts. Damage to monocoque and semi-monocoque fuselage sections occurred from falling water and possibly airblast, resulting in crushed and buckled sections. Crushing was more pronounced on the side exposed to the blast, with the fuselage crushed to the point where heavy internal cross members used in support of aircraft equipment came through the fuselage skin in the worst cases. Heavy structural components, backed by truss type framing such as metal skinned wings, sustained less crushing and buckling than fuselage sections, but dishing and buckling occurred, and, in the worst cases, spars were bent as well from the combined effect of falling water and blast pressure. Damage to folded wings of F6F type aircraft occurred from underwater shock transmitted through the ship's structure. This damage was distinctly a function of distance from the center and resulted in a slight twisting and buckling of the main spar of the outer wing panel, buckling of the wing skin and pulling of skin away from rivets at the juncture of the main spar and the first transverse member between stations 75 and 95. This was sometimes accompanied by a bending of the fuselage aft of the cockpit as evidenced by wrinkling of the turtleback skin, and in some cases by light wrinkling of the fuselage skin just above the stub wing, (some of the latter wrinkling occurred during handling of the F6F airplanes between Tests ABLE and BAKER) further substantiating the fact that this was underwater shock damage transmitted through the ship's structure and the airplane landing gear, a type of damage not found in Test ABLE. In the airplanes affected by this type of damage, oleo struts were deflated or nearly deflated and hence relatively ineffective as a cushion against shock damage. It is not certain what damage would have occurred had the oleo struts been inflated. On the PENNSYLVANIA, the F6F-5N had oleo struts inflated and apparently suffered no shock damage, but other factors may have contributed to this result. Folded wings suffered less damage to jury locks and wing hinge fittings in this area than in Test ABLE but this type of damage was still prevalent. Cockpit canopies and light structural components were generally heavily damaged but the control surfaces left intact after Test ABLE, sustained only light damage in Test BAKER. Engine cowling was generally intact except that falling water and/or blast pressure on the engine cowl caused failure of the attachment lugs on three engines. Since broken lugs were confined to cylinders 10, 12 and 14, the direction of this pressure seems to indicate the source of damage to be water falling out of the column blown into the air by the bomb.

(3) OUTER ZONE

In the outer zone airplanes sustained little or no damage to structural components. Damage to light structural members such as cockpit canopies and control surfaces was evident only in occasional instances and there was no damage to components of intermediate or major strength.

(4) BLAST PROTECTION

Damage to airplanes shielded from the direct force of the bomb, such as those located in the enclosed cargo holds of the APA's, occurred only within about 800 yards of the target center and was limited entirely to water shock damage transmitted to the airplane via the ship's structure, to side loads imparted to landing gear by heavy rolling and pitching of target vessels and to secondary results of the burst, such as flying debris, collision of the airplane with the ship's structure, and, in the case of the FALLON, salt water filling the cargo hold and inundating the airplane. In all APA's, in Test BAKER, there was no case of collapse of the overhead hatch pontoons above the second platform deck; they were firmly fixed in place before the test by welded steel clips. On GASCONADE, in the inner zone, the FM-2 in the number two cargo hold had its port wheel strut damaged when a securing cable pulled through the upper drag link, the wheel retracted, and the airplane was thrown forward, lightly striking the bulkhead. Though detailed inspection of the FM-2 in the number two cargo hold of FALLON was impossible, due to the fact that it was submerged in approximately nine feet of water, it was noted that the airplane, which had been damaged in Test ABLE, had been thrown forward striking the bulkhead but was otherwise not directly damaged by the primary effects of the bomb.

The effect of partial shielding against falling or sweeping water was noticeable in a number of cases. Airplanes, on the APA's which were oriented in such a way as to have their superstructures interposed between the airplane and the point of detonation, showed less damage, in general, than was the case where there was no protection.

(c) Equipment and Components

(1) GENERAL

In general those aircraft suffering light overall damage sustained no damage or damage of a very minor nature to airborne equipment, all of which could be readily repaired in the field. Aircraft which sustained major overall structural damage, in general, had only light damage to equipment, and only three airplanes suffered significant damage to airborne equipment.

(2) CANOPIES

Numerous airplanes had flat portions of canopies shattered. Curved portions of canopies showed little or no damage in all cases.

(3) INSTRUMENTS

A total of three instruments, all in one airplane on the GASCONADE, had cracked glass. No other instruments showed evidence of damage but several instrument panels were removed for further examination and test. At this time these instruments are radiologically unsafe for shipment and laboratory tests and analyses must necessarily be the subject of supplementary reports at a later date.

(4) PILOT SEAT AND HARNESS

There was no damage to airplane pilot seats and harnesses.

(5) EXTERNAL FUEL TANKS

Two airplanes had damaged external fuel tanks, but in both instances the tanks had become detached from the airplane and may have been damaged by falling to the deck. There was insufficient damage to determine whether full or empty tanks are most susceptible to blast effects.

(6) FUEL AND OIL TANKS

There was no damage to oil tanks or self sealing fuel tanks, either full or empty.

(7) HYDRAULIC SYSTEMS

All hydraulic systems were operable from the hand pump except on one airplane where a completely severed fuselage resulted in broken hydraulic lines. Reservoirs remained full and accumulators retained air charge.

(8) OXYGEN SYSTEMS

All oxygen systems were charged and operable except in one instance where flying debris severed a copper line leading from the oxygen bottle. The diaphragm in a demand regulator was inoperative in one airplane which had obviously been subjected to a heavy water stream during washing down of the airplane in decontamination procedures used on target vessels. This demand regulator operated satisfactorily on "emergency."

(9) FUEL AND OIL SYSTEMS

No damage was sustained by fuel and oil systems.

(10) SURFACE CONTROLS

Surface control cables, pulleys and internal support brackets failed only where supporting structures failed and in such instances the airplane received general major damage.

(11) BULLET RESISTING GLASS

There was no damage sustained by bullet resisting glass.

(12) AIR SEA RESCUE EQUIPMENT

No damage was sustained by air sea rescue equipment (life rafts).

(13) TIRES

No main wheel tires were damaged. One channel tread tail wheel tire was flat on an airplane in the group which received extreme shock loads.

(14) LANDING GEAR

One main oleo failed, and one landing gear collapsed. Both of these were on airplanes on the GASCONADE which evidenced high side shock loads.

(15) FABRICS

There was no evidence of fabric scorching or burning.

(16) SPECIAL EQUIPMENT

There was no damage to special sealed five gallon containers placed in the cockpits of selected aircraft.

(d) Power Plants

(1) CONDITION PRIOR TO BLAST

All aircraft power plants were in operating condition, with light internal and external preservation on most engines. Power plants showed evidence of light corrosion and deterioration from long exposure to the elements without maintenance. The power plants in the two Coronado seaplanes, as well as the fueled aircraft on the flight deck of the SARATOGA, were not preserved and were operated under their own power prior to Test BAKER.

(2) GENERAL SUMMARY OF DAMAGE

Aircraft power plants continued to show a high degree of overall resistance to damage, even within the inner and intermediate zones where aircraft received generally major structural damage. All damage to power plants can be classified as light and attributable to failure of supporting structure or secondary effects of the blast, such as collision with ship's structure.

(3) AIRCRAFT ENGINES

The only damage to engines occurred in the intermediate zone on three APA's where falling water and/or blast pressure on the engine cowl caused failure of cowl support lugs on number 10, 12 and 14 cylinders of three F6F airplanes with 2800-10W engines. The engine on the airplane in the cargo hold of the FALLON was inundated with the airplane when the hold was flooded.

All eight engines on the two Coronado seaplanes started with no difficulty and functioned satisfactorily in all respects in a ground check and while taxiing these seaplanes around Bikini Lagoon.

(4) PROPELLERS

There was no damage to propellers except from secondary causes, namely, collisions with the ship's structure. The propeller hub on the airplane topside on the GASCONADE received no visible damage from collision with the bulkhead, but is possibly damaged internally. There was no indication of propellers having been rotated by blast pressure.

(5) POWER PLANT ACCESSORIES

There was no apparent damage to any power plant accessories. Accessories containing diaphragms, bellows, or aneroids revealed no external damage. One carburetor, type PT-13D4 and a water regulator unit, from an R-2800-8W engine in the FG-1D airplane on the BANNER, were disassembled locally for determination of mechanical derangement of internal mechanisms from shock or rupture of delicate mechanisms, such as diaphragms or bellows, from blast pressure. A careful visual examination of all such parts showed no damage. This airplane was in the inner zone in Test ABLE and the outer zone in Test BAKER. Other samples selected for detailed laboratory analyses are still at this time radiologically too "hot" for return to the continental test facilities.

(6) POWER PLANT INSTALLATIONS

Components of power plant installations such as fuel systems, lubricating systems, water injection systems, induction systems, etc., received no damage because of shielding and protection afforded by the accessory panels and other structural members of the airplane.

(7) FUELS AND LUBRICANTS

Fuels and lubricants in tanks of exposed aircraft showed no effects discernible in the field. There were no fires in

the target array after Test BAKER. The target display of bulk fuels and lubricants by the Quartermaster unit of the Army Ground Group will be discussed in detail in Army Ground Group's Report for Test BAKER.

(8) MISCELLANEOUS EFFECTS

There was no apparent damage from heat or radiological effects to power plants. In view of the highly radioactive conditions prevailing after Test BAKER a number of selected carburetors, controls, generators, accessories and instruments have been removed for return to laboratory facilities of the Army, and Navy, as listed in Part "D" of this report. At this time, however, these items are radiologically unsafe for shipment. Plans are being made for the possible return of a complete airplane or two for test and analysis.

(e) Armament

(1) GENERAL

As in Test ABLE, armament installations in target aircraft were intended to be representative of those in aircraft in a "combat ready" condition. Therefore, in addition to those items under the cognizance of the Bureau of Aeronautics certain items and stores under the cognizance of the Bureau of Ordnance were included. Those items, not normally carried as equipment in the models used as target aircraft, are listed below. While they will be included in the general summation of damage to ordnance equipment and the conclusions drawn therefrom, the listed items are being made the subject of a separate report of damage to the Bureau of Ordnance by the Aviation Ordnance Representative of the Bureau of Ordnance Inspection Group.

ITEM	NAME	LOCATION	DISPOSITION
(1)	*FIRE CONTROL EQUIPMENT*		
	Bomb Director, MK 1 Mod 2	SBF-4E BuNo 31853 USS SARATOGA	blown overside with plane ship sunk
	Bombsight MK 15 Mod 7	TBM-3E BuNo 69099 USS SARATOGA	do
	Bombsight MK 23 Mod 1	TBM-3E BuNo 69080 USS SARATOGA	do
	Gunsight MK 23 Mod 0	F6F-5N BuNo 78068 USS BRISCOE APA65	Naval Ordnance Plant, Indianapolis, Ind.

ITEM	NAME	LOCATION	DISPOSITION
(2)	*BOMBS AND FUZES*		
	(2) bombs, 500 lb. FG AN-M64, Inert	SBF-4E BuNo 31830 USS SARATOGA	Blown overside with plant. Ship sunk.
	(2) bombs, 500 lb. FG AN-M64, Blind loaded & fuzed Nose Fuze - AN-M103A1 Tail Fuze - AN-M101A2	SBF-4E BuNo 31853 USS SARATOGA	do
(3)	*ROCKETS AND FUZES*		
	(6) 5.0" HVARs, Blind loaded and fuzed Nose fuze - MK 149	F6F-5N BuNo 78068 USS BRISCOE	Jettisoned 1 to NAD, Fallbrook five jettisoned.
	Base fuze - MK 164		Jettisoned
	11.75" AR, Blind loaded and fuzed Base Fuze MK 164 Mod 1	F6F-5N BuNo 77960 USS BRULE	Retained for Test CHARLIE Do
(4)	*UNDERWATER ORDNANCE*		
	Mine, MK 24	TBM-3E BuNo 69099 USS SARATOCA	Blown overside with plane. Ship sunk.
	Aircraft Torpedo MK 13	TBM-3E BuNo 69094 USS SARATOGA	Do

An analysis of damage to aviation armament equipment, mounted in aircraft exposed at varying distances from the atomic bomb sub-surface blast, served primarily to point out again the extreme ruggedness inherent in such equipment and its ability to survive blast damage, much in excess of the capacity of the supporting structure to survive such damage. Aircraft in ships located in the inner and intermediate zones suffered varying degrees of major damage, but in no case was there direct blast damage to armament installations. In one of the most severely damaged airplanes, (fuselage broken in two, wings broken, starboard landing gear collapsed) the most outstanding characteristic of the armament installation was the ability of the armament electrical system to withstand the shock of the blast. Armament equipment suffered in general from the corrosive effects of the salt water baths and foamite or other corrosive compound sprays used in decontaminating the vessels in which the aircraft were exposed after Test BAKER.

Radioactivity retained by the ordnance equipment was considerably greater in this test than in Test ABLE, and varied according to the distance from the blast and position in respect to wind direction. In all cases the radioactivity retained by armament equipment was less than that of the aircraft or surrounding ship's structure. No case was encountered where residual radioactivity itself was a factor in the operability of the equipment, except where safety of personnel was involved.

(2) MACHINE GUNS AND CANNON

There was less overall damage to machine guns and cannon in this test than in Test ABLE but this was in direct proportion to aircraft damage. The guns exposed in this test showed on inspection, considerable cumulative corrosion from the long period exposed without routine upkeep on target vessels to ordinary condition f salt spray, rain, heat and humidity, the blast effects o. h tests, and the salt water column resulting from the se.d test. In addition many aircraft were hosed down with salt water under pressure and/or covered with foamite or other corrosive material in the decontamination processes employed for the target ships. One gun was found off its rear mount; this is a case where the wing was badly bent in the vicinity of the port wing gun and folding mechanism. Buckling and warping of the internal structure of the wing failed to injure the .50 cal. gun, however. One breakage occurred. This was in the latch mechanism in the backplate of a .50 cal. gun mounted in a wing which came in violent contact with a steel deck.

(3) AMMUNITION SUPPLY SYSTEMS

Feed chutes, link chutes, and ammunition boxes were undamaged except where warping or buckling of wing structures bent them or forced them out of line. Hydraulic charging lines remained intact in all cases.

(4) BOMBING EQUIPMENT

The bombing equipment withstood the effect of the blast better than in Test ABLE. No instance of bomb stores being torn off was encountered in planes recovered, except for one auxiliary tank mounted on a starboard pylon-shackle of an FG-1D. All bomb racks recovered functioned satisfactorily manually, and electrically where the bomb racks were electrically connected.

(5) ROCKET EQUIPMENT

The rocket equipment mounted in the aircraft was found intact except where the wing structures on which the launchers were mounted came in contact with other objects or decks. In

one case in which six 5" HVAR's were mounted on an F6F-5N in a target vessel just outside the 1000 yard circle all but one were jarred loose from the launchers, in each case bending the rear lug of the after mounting post down. In this case the wings were folded, leaving all the weight of the rockets on the after lug, and the shock of the blast transmitted through the ship's structure as well as through the air probably caused the rockets to jar loose. Station distributors, in each case of aircraft recovered, operated satisfactorily.

(6) FIRE CONTROL EQUIPMENT

In all cases gunsights recovered operated satisfactorily. Of the special equipment installed by Bureau of Ordnance only the MK 23 gunsight was recovered. It was apparently undamaged, and was returned for further study to Naval Ordnance Plant, Indianapolis, Indiana.

(7) TURRETS

Turrets, in planes recovered, were undamaged except that panels of plexiglass were blown out of turret domes. The turrets of the TBM's in BRACKEN and GENEVA were capable of training and elevating, using battery power, and, despite the long period without upkeep, were in operable condition. The turret in the TBM airplane on the INDEPENDENCE could get power to the relays, but the amplidyne motors would not operate. The long period of exposure without routing upkeep is considered to be the direct cause of the failure to operate, rather than the blast.

(8) FUZES AND AMMUNITION

Fuzes and ammunition exposed remained stable. Fuzes in ordnance stores were returned by the Bureau of Ordnance Aviation Representative to cognizant activities for further examination. No pyrotechnics were exposed in Test BAKER.

(9) ELECTRICAL CIRCUTS

Armament electrical circuits were generally intact in all aircraft recovered, even in those sustaining major damage. The circuits are generally protected by the heavy center section construction in most cases, and this was not greatly damaged. A normal 24 volt power supply was used for test purposes and revealed that bomb station distributors, intervalometers and rocket station distributors are capable of withstanding extensive shock damage. Gun solenoids were operative except in occasional instances where there was excessive internal corrosion because of exposure to the salt water under pressure in the decontamination process. Representative items of electrical equipment were returned by the Bureau of Ordnance Representative, as well as by the Bureau of Aeronautics Group to cognizant activities for further examination and report.

(f) Electronic Equipment

As indicated above, pre-blast and post-blast inspections and functional tests of aircraft electronics equipment were conducted under the direction of the Electronics Coordinating Officer and results of these inspections and tests will be included in the electronics section of the Director of Ship Material Report for Test BAKER. A brief summary of damage to aircraft electronics material is extracted for completeness of the aircraft report.

Most electronics equipment in the inner zone, within 700 yards of the point of detonation, was missing with aircraft sunk or washed or blown overboard and was not available for examination. All units recovered appeared to be substantially unaffected by the explosion, both mechanically and electrically, with the exception of AN/APS-6 radomes in the wings of some F6F aircraft in the intermediate zone which were damaged where aircraft wings struck the life lines of the target vessels.

The high radioactivity persisting in the target array prevented completion of functional tests on installed units except on six APA target vessels beyond 2500 yards from the target center. These units were mechanically and electrically intact and showed no appreciable change in their performance of condition. A number of additional units of radar, IFF and communication equipment were removed for laboratory test and examination. Many of these, tested on the USS AVERY ISLAND while still radioactive, also showed no appreciable change in performance or condition. Other units are being returned to continental facilities and the more detailed analysis will be made the subject of later supplementary reports.

Although all equipment available for examination appeared to be intact and operable, due to radioactivity in the area, the airplanes and the electronics equipment itself presented a problem as to the salvage or use of the equipment so affected.

2. SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

Detailed information is furnished in Part "D" of this report relative to damage sustained by all arresting gear, barriers, catapults, airplane cranes and elevators exposed to the bomb blast. A summary of such damage is tabulated below. To facilitate consideration of the subject under discussion, there is also included a brief summary of damage sustained by the vessel concerned, insofar as ship damage is of significance in connection with damage to airplane handling installations. A more extended report on all aspects of damage to ships will be found in the Bureau of Ships section of Director Ship Material Report for Test BAKER. Where applicable a brief statement of damage incurred during the air blast of Test ABLE is included.

(a) Saratoga (CV-3)

(1) GENERAL

There were no observations made from on board [illegible] prior to her sinking on Baker Day. However, aerial photographs taken at an altitude between 600 to 1700 feet were available for study and the ship was inspected through field glasses from salvage tugs, within a few hundred yards, prior to her sinking. In the latter part of August diving operations were undertaken to determine the magnitude of the damage. The most serious damage found anywhere on the ship was on the flight deck. Commencing some fifteen feet forward of the after end of the flight deck and inboard about the same distance from each side, a deep indentation was found running as far forward as the original location of the after elevator. At no point was there an abrupt break or bend; the curvature was gradual and smooth from all approaches. The wooden deck, however, in this area was badly splintered and broken with no indication of the steel deck being ruptured at any point. The indentation was deepest just abaft the after elevator location where it reached a depth of about 12 feet. Although the diver did not go forward of the elevator the deck appeared to be in good condition from that point forward. The forward end of the flight deck was in good condition except the elevator was seriously damaged. This was bent in below the deck with the exception of the after port corner, which was bent upward about six feet.

The superstructure, with exception of the stack, seemed in good condition as did the gun platforms below the flight deck. The flight deck forward appeared to be intact and unobstructed except for three sections of the stack, which had been blown over onto the flight deck in the area aft of the island structure.

(2) ARRESTING GEAR AND BARRIERS

From the damage to the flight deck, observed from photographs and by the divers, it is assumed that in the area of greatest indentation some of the arresting gear engines suspended from the overhead were damaged or thrown out of alignment. As there has been no further report on conditions inside of the ship as a result of diving operations it is impossible to state the exact condition of the arresting gear and barrier equipment housed below the flight deck.

(3) CATAPULTS - *Starboard (H2, Mod 1)*

The flight deck in the area of the catapults was undamaged by the blast. There have been no reports on diving operations in regards to the condition of the catapult machin-

ery, housed below the flight deck, in the forward area of the ship.

(4) CATAPULT -- *Port (H2, Mod 1)*

There was no visible evidence of any damage to this catapult.

(5) AIRPLANE CRANE

As observed from the aerial photographs the crane did not appear to be damaged by the blast.

(6) ELEVATOR *(Forward)*

This elevator, secured in the "locked up" position for Test ABLE, had the platform slightly dished downward in the center of the elevator platform, with broken welds, in a number of places below the platform, on the structural members. This distortion resulted in the displacement and misalignment of the fore and aft equalizing pinions, for a distance of approximately 1/4 inch during Test ABLE. The same method of securing the elevator was utilized for Test BAKER. The elevator platform as observed from the aerial photographs and from diving operations showed that the platform was dished in considerably in the center and slightly to port, to a depth of approximately four to six feet probably from the effect of falling water and blast pressure during Test BAKER. The port side of the elevator had been depressed downward about three feet and the whole platform tilted to starboard, so that the starboard side of the platform extended above the flight deck level about one foot. This elevator would not be able to operate until the platform had been replaced. It is important to note, however, that it had already been dished slightly and members sprung and weakened from the blast effects of Test ABLE.

(7) ELEVATOR *(After)*

The deck in the vicinity of the after elevator, that had previously been removed and decked over prior to Operation Crossroads, showed no signs of dishing or buckling, exceptions described above.

(b) Independence (CVL-22)

(1) GENERAL

INDEPENDENCE had sustained very severe structural damage abaft the forward elevator and above the hangar deck as a result of the Test ABLE bomb blast. Aft of the forward elevator, the overall damage to ship's structure included severe upward distortion and pronounced centerline fracture of the flight deck and of the port side bents supporting same together with extremely severe distortion of all structure from the

water line to the flight deck. No additional distortion was apparent from careful inspection of the flight deck as a result of the ship being exposed to the underwater blast in Test BAKER. Because of the high underwater shock expected on vessels close to the center of the target array and because of some machinery derangement noted on vessels in this category very careful examination of the base, or foundations, of heavy equipment of ships' installations was conducted to detect evidence of shock. None was found on the INDEPENDENCE. Diving Operations conducted around the outside of the hull revealed that there was some change in the condition of the skin of the ship, but no significant damage. Plans have been made to tow the INDEPENDENCE back to some continental port in the near future so that more intensive studies may be conducted on her structures.

(2) ARRESTING GEAR AND BARRIERS

The arresting gear engines of the five units that were detached from the overhead as a result of Test ABLE were removed from the ship prior to Test BAKER. All of the material connected to the engines, which included purchase cables, deck pendants, and some high pressure piping, was also removed. Of the material that remained on board the ship, namely, the accumulators, central control valves, the deck sheaves, and the barrier actuating cylinders, there was no increase in damage as a result of the exposure to Test BAKER.

(3) CATAPULT - *Starboard (H2, Mod 1)*

There was no visible damage to the trackway, shuttle, towing or retrieving cable. The damage the catapult engine had received in Test ABLE was not increased. This catapult is still in good condition after being exposed to two atomic bomb blasts. It could be placed in commission in approximately four days. Radioactivity on the ship prevents initiation of repair work at this time but it is anticipated that this catapult will be repaired and no-load shots fired at a later date.

(4) CATAPULT - *Port (H2, Mod 1)*

The track and shuttle system, towing and retrieving cables were substantially undamaged. There was no increase in the damage to the compartment. The catapult engine did not receive any additional damage as a result of being exposed to the sub-surface blast.

(5) AIRPLANE HANDLING CRANE

The airplane crane had been replaced in its original position prior to Test BAKER and was used to hoist two air-

planes aboard for the Test BAKER blast. There was no evidence of the crane having received any additional damage attributable to the sub-surface blast.

(6) ELEVATORS - *(One forward and one aft)*

The elevator platforms of both elevators had been blown out of the ship during Test ABLE and had not been replaced for Test BAKER. The remaining equipment of the elevator systems remained substantially intact after the sub-surface blast.

(c) Arkansas (BB-33)

The ARKANSAS sank immediately after the sub-surface atomic bomb exploded.

(d) New York (BB-34)

(1) GENERAL

The NEW YORK received a considerable amount of shock damage in her machinery spaces and to some of her structure topside. The bolts securing the catapult to the No. 3 turret were elongated and loosened and the bracing supporting the stern of the catapult was fractured at the attachment to the facing of the turret.

(2) CATAPULT - *(Turret No. 3 (P-4)*

The shock that was received by the ship was transmitted to the catapult secured on the top of the No. 3 turret. The bolts used in securing the main track to the turret were elongated sufficiently to cause the track to become loose. This loosening of the track was also increased by having the bracing for the stern of the catapult fractured at its point of attachment to the facing of the turret, thus making the catapult unsafe for operations until such time as the track is resecured.

(3) AIRPLANE CRANE *(Starboard)*

Undamaged. There was no electrical power available aboard the ship at the time of the inspection. The cranes will be tested at a later date.

(4) AIRPLANE CRANE *(Port)*

Undamaged. There was no electrical power available aboard the ship at the time of the inspection with which to test the crane. The crane will be tested at a later date.

(e) Nevada (BB-36)

(1) GENERAL

The general condition of the weather deck after Test ABLE rendered the airplane handling equipment inoperative. The distortion of the deck upon which the catapult was mounted made it impossible to train the catapult. The airplane crane had been folded over the stern of the catapult by the force of the air blast in Test ABLE. The condition of the airplane handling equipment after Test BAKER was unchanged.

(2) CATAPULT - *Centerline (P-6)*

The training gear track for the catapult had been distorted at the forward end causing the two forward carriage cars to be separated from the track by about eight inches during Test ABLE. This distortion was not increased during Test BAKER. The crane at the stern of the ship was still folded over the stern of the catapult.

(3) AIRPLANE CRANE

The condition of the airplane crane was not changed during Test BAKER. There was no evidence of the base of the crane having been broken or displaced by the blast or from underwater shock.

(f) Pennsylvania (BB-38)

(1) GENERAL

The airplane handling equipment did not suffer any increase in damage during Test BAKER from shock or blast effects.

(2) CATAPULT - *Centerline (P-6)*

The catapult foundations and the deck showed no evidence of any displacement or distortion as a result of the blast. The catapult structure was undamaged from shock or blast effects in Test BAKER.

(3) AIRPLANE CRANE

There was no visible evidence of any damage to the foundation or structure of the airplane crane. The electrical power to the motors, as reported in the interim report for Test ABLE, was not available due to prior battle damage.

(g) Pensacola (CA-24)

(1) GENERAL

The stack on the ship had been blown against the backstays of the airplane crane during Test ABLE. The deck of the boat deck had been distorted at the same time. This condition had not been increased as a result of being exposed to Test BAKER.

(2) CATAPULT PEDESTAL

The base of the pedestal showed no signs of any distortion or displacement, and remained intact and substantially undamaged.

(3) AIRPLANE CRANE

There was no evidence at the base of the crane of any distortion or misalignment due to the sub-surface atomic bomb blast. The electrical conduits to the hoisting and training motors were intact. There was no electrical power aboard ship at the time of the inspection. The operational tests of the crane will be completed at a later date.

(h) Salt Lake City (CA-25)

(1) CATAPULT PEDESTALS

The bases of the catapult pedestals located on the port and starboard sides of the ship showed no signs of any additional distortion or displacement, and remained intact and substantially undamaged by the sub-surface bomb blast.

(2) AIRPLANE CRANE

There was no evidence of any distortion or displacement at the base of the crane. The motors and electrical conduits were all intact. Tests under operational conditions could not be accomplished at the time of the inspections at Bikini Atoll but will be completed at a later date.

3. RADIOLOGICAL EFFECTS

The preceding paragraphs have described in some detail the damage to aircraft, aircraft components and aviation material resulting from Test BAKER. Tabulation of this damage is of importance for further analysis in connection with improvements in the future design of Naval aircraft to withstand the effects of the atomic bomb underwater blast. This bomb expended a high percentage of its released energy in throwing a huge column of water, over 2000 feet in diameter, several thousand feet into the air, following

which tons of water, saturated with highly radioactive fission products, drenched most of the target vessels in the BAKER array and the aircraft on weather decks leaving them contaminated with residual radioactivity. The water in Bikini Lagoon was so contaminated as to prevent access to most target vessels for many days. After the water became safe the condition of target vessels was such that personnel could board vessels for only a few minutes in some cases before exceeding the daily tolerance of radioactivity, while further from the center, a few hours aboard was permissible and some outer vessels, not drenched with water during the explosion were cleared for occupancy by crews and for normal inspections of the embarked aircraft after a few days.

This point is brought out to show that in the case of Test BAKER the radiological effects far overshadowed the structural and other damage to aircraft and aviation equipment. In general, aircraft showed about the same radiological effects as the surrounding ship's structure but in isolated cases the aircraft were more radioactive and aircraft in general were not so readily susceptible to the decontamination processes employed on target vessels without serious corrosive effects on vital aircraft components. For many days after the underwater explosion, aircraft which were structurally undamaged, intact, and otherwise fully operable were not accessible or usable due to radiological hazards both on the target vessels and the aircraft themselves. Damaged aircraft were inaccessible for repairs for an indefinite period in the extreme cases. There is no evidence that this high and persistent radioactivity has caused any temporary or permanent damage whatsoever to the aircraft, components or equipment. This assumption must necessarily await long term radiological studies of the exposed ships and aircraft as well as laboratory analysis of selected components and equipment returned to Army and Navy laboratories for confirmation. Parts returned from Test ABLE showed no effects from radioactivity.

The necessary samples have been removed from target aircraft and some have been shipped to continental facilities. Others, not radiologically safe for shipment, have been placed aboard a small vessel (LST 661) which was towed to Kwajalein to be safeguarded until the material is suitable for shipment.

In addition, because of the many possible lessons to be learned from a long range study of complete aircraft, a number of airplanes, subjected to high radioactivity during Test BAKER, are being retained on target vessels at Kwajalein. These will be available for an indefinite period to the Radiological Safety Advisor and his staff for plotting decay curves and for any further radiological studies desired of the various materials, components and items of equipment in the airplanes. Plans are being made for the return of one complete airplane to the Naval Air Material Center at Philadelphia for decontamination studies, structural tests and analysis. Aircraft are being held for similar tests by the Army Air Forces if they so desire. Those aircraft not held for these studies have been jettisoned or sunk.

V - COMPARISON OF DAMAGE RESULTS FROM TESTS ABLE AND BAKER

1. GENERAL

In order to compare the damage results of the air and underwater atomic bomb bursts it is first necessary to consider some of the physical phenomena associated with the two types of bursts.

The most significant manifestations of the air burst showed themselves in the blast effects resulting in damage to every airplane topside in the Test ABLE array and in considerable damage to ships' installations for handling aircraft from distortion and failure of the ship's supporting structure. There was little evidence of shock damage. The atomic bomb air blast produced an explosion similar to that which would be expected from the detonation of 20,000 tons of TNT. Such similarity applies to the total energy released in terms of heat, light and other types of kinetic energy, but does not necessarily apply to pressures, shock waves and general destructive effects inasmuch as explosion rates and mass of explosive are greatly dissimilar. The residual radiological effects of the air blast were much less evident than the effects of the underwater explosion. Except for the initial radiation which accompanied the explosion, fission products and other radioactive materials were carried aloft by the air currents and were dissipated over a large area. Those target vessels which were directly under the path of the atomic cloud, where radioactive particles could drop on the target, were the only vessels which showed appreciable radiation. Radioactivity persisted on target vessels and aircraft only a few hours to a few days, after which it was dissipated to the extent that target crews returned to the vessel, some on the same day as the burst, all within a few days thereafter.

Peak pressures encountered in the air blast were in the range of 2000 psi near the center of the burst and fell off rapidly in the first few hundred yards to below 100 psi. At the outer edge of the target array, peak pressures were 1 to 3 psi. The peak pressures had a duration of from 1/2 second near the center of the burst to 1 second at the outer edge of the array. Peak pressures fell off rapidly and dropped off to below atmospheric pressure in a little more than a second.

Wind velocities up to 100 miles per hour were encountered near the center of the blast but dropped off to about 10 miles per hour near the outer edge of the target array.

In Test BAKER the significant absence of severe air blast damage indicates that the bomb expended a good proportion of its released energy in hurling a large quantity of water into the air, which subsequently fell upon many targets, and generating an intense underwater shock wave. The underwater atomic bomb explosion produced effects which might be similar to the simultaneous explosion of 15,000 tons of TNT below the water and 5,000 tons of TNT at the surface of the water. A column of water roughly 2,000 feet in diameter was thrown over 5,000 feet high. The explosion was accompanied by the development of a cloud containing radioactive particles, which

enveloped the entire target array. Radioactive effects from the underwater explosion were extremely marked. The high residual radioactivity of targets may be attributed to the fact that fission products were held in the column of water thrown up by the explosion, which subsequently fell back on many of the target vessels, and to the absorption of radioactive material in the water in the lagoon.

Where the air blast tended to collapse aircraft structures the falling water simply applied heavy loads to components in a more or less uniform direction, resulting in distortion of the aircraft structure rather than collapse. This obscured blast effects in the areas where heavy fall of water occurred, and was in general not sufficient to cause distortion of ship's structure and damage to ships' installations for handling aircraft on those vessels remaining afloat. It is quite probable, however, that falling water and sweeping water in the high wave developed by the bomb may have contributed more than air blast effect in sweeping all aircraft off the flight deck of the SARATOGA as well as dishing the forward elevator and the flight deck aft before that vessel sank. Shock damage, not readily discernible in Test ABLE, was very pronounced in Test BAKER and resulted in damage, *transmitted through the ship's structure* and the aircraft landing gear, to heavy structural components of aircraft. Shock damage was detected in ships' installations for handling aircraft and was evident in machinery spaces of some target vessels as described in the Bureau of Ships final reports. The radiological effects of the sub-surface explosion were more severe than in the case of the air burst or at least were considerably more persistent, the net result being that radioactive contamination of target vessels and aircraft was perhaps the most significant damage sustained in either test.

Air peak pressures in Test BAKER were considerably less than those encountered in Test ABLE, amounting to 15 psi at a few hundred yards from the center of the burst and dropping to 1 psi near the outer edge of the array. Such peak pressures had a duration in the range similar to pressures encountered in Test ABLE; namely 1/2 second. Water peak pressures encountered in Test BAKER approached 7000 psi at mid-depth and 5000 psi at the surface less than 1000 yards from the point of detonation. Surface and mid-depth pressures fell off to less than 400 pounds at the outer edge of the array and were approximately equal. Water peak pressures were of a duration of less than a millisecond and dropped off to near zero in a few milliseconds.

Wind velocities in Test BAKER were less than those encountered in Test ABLE, however exact ratios are not available at this time. Temperature data are not available at this time.

2. AIRCRAFT

In general, damage to aircraft on weather decks in the inner zone of 700 yards from the point of detonation, as defined for Test BAKER, was perhaps more severe in Test BAKER than to aircraft exposed at similar distances in Test ABLE, although an accurate comparison is difficult since most aircraft within that zone in both tests were missing and others were generally demolished. Beyond the range of heavy underwater shock damage and

large volumes of falling water, blast effects were lighter and airplanes starting at some point in the intermediate zone and in the outer zone, suffered significantly less damage in Test BAKER. In these zones there was correspondingly less damage to airborne equipment, power plants, armaments and aircraft electronics.

No aircraft in well protected hangar decks or cargo holds were damaged during Test ABLE, while aircraft in the cargo holds of APA target vessels in the inner zone sustained damage to landing gear from a combination of underwater shock and side loads from heavy rolling and pitching of ships, probably due to the high waves developed during Test BAKER.

Many aircraft, undamaged or lightly damaged during Test ABLE would have been usable almost immediately or within a few hours after the air burst. While a higher percentage of aircraft topside in Test BAKER would have been usable within a short time, insofar as structural damage is concerned, radiological effects prevented access to or possible operation of these airplanes for several days. In addition, aircraft receiving moderate or major damage in Test BAKER, and requiring overhaul before again being employed, would generally not be radiologically safe to overhaul for an indefinite period, so that in time of emergency they would be destroyed and even in peace time operations normal deterioration, while awaiting decay of the radioactive elements, would make these airplanes of no further use unless rapid decontamination methods were employed.

The overall effects of Test BAKER on aircraft must therefore be considered as more severe than those of Test ABLE.

3. SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

Most ships within 500 yards of the point of detonation in both the ABLE and BAKER tests were sunk and comparison of results on ships' installations for handling aircraft is not practicable within this area. Beyond this point, which is also beyond the point of the heaviest fall of water from the column resulting from Test BAKER, the comparison is readily made since devastation to the upper decks and structures supporting ships' installations was more severe from the blast effects of Test ABLE, resulting iii in much greater damage to catapults, airplane cranes, arresting gear, barriers and elevators. Some shock damage to heavy ships' installations was evident after Test BAKER. This damage was more pronounced in the lower machinery spaces than in ships' installations for handling aircraft which are generally located above or supported on weather decks. Functional tests to be conducted at a later date upon return of some target vessels to continental ports may bring out damage as yet undetected.

Here again the radiological effects, present after Test BAKER, must be considered since they prevented access to or use of the otherwise undamaged ships' installations for indefinite periods.

VI - CONCLUSIONS, TEST BAKER

1. GENERAL

Selection, disposition, and exposure of target aircraft and aviation material was accomplished in accordance with the approved plans. The bomb was fixed at the target center and exploded on schedule. The expected loss of a small number of ships and embarked target aircraft near the point of detonation was compensated for by the planned scope of the exposure program and resulted in no serious curtailment of the technical data obtained. An adequate number of different types of aircraft received damage in varying degrees ranging from total destruction to none; and the objective of the test, namely the determination of the effect of a sub-surface atomic bomb detonation upon aircraft as a function of distance from the center of the burst, was successfully achieved.

Complete and accurate information on the blast conditions and instrumentation results designed to give data relative to the physiological effects and the physical phenomena of the burst are not available at this time, except for that information included in paragraph V above. These data when compiled will be in the TOP SECRET category and will be included in the Technical Director, Radiological Safety and the Bureau of Medicine and Surgery Sections of the final reports. The conclusions and comments to follow are based largely upon the physical effects observed on the spot and substantiated as necessary by functional tests and analyses of selected items returned to continental laboratory facilities. For example, it was determined in this manner that blast pressure and shock had no unusual effect on the diaphragms or delicate internal mechanisms of accessories such as carburetors and controls; magnetic instruments, magnetos, generators and electronic equipment functioned normally and showed no permanent effects from the high radioactivity to which they were subjected; metals and materials such as fabric, rubber, etc., subjected to high radioactivity and themselves contaminated with high residual radioactivity, showed no temporary or permanent change in physical properties and no effects other than physiological, resulting from handling the equipment; guns tested by firing showed only normal wear and deterioration from long exposure without maintenance and no apparent radiological effects; and operating drone aircraft functioned normally while flying through the highly radioactive clouds after each burst. Further laboratory tests and studies are planned on a complete airplane to be returned to the Naval Air Material Center at Philadelphia in the near future.

2. AIRCRAFT, COMPONENTS AND EQUIPMENT

(a) Sources of Damage

Secondary or induced damage occurred from falling or flying debris, collision with ship's structure and immersion in water in flooded compartments. More significant, insofar as structural damage is concerned, were the primary sources of damage, namely blast effect; water blown against, falling

upon, or sweeping over aircraft; and underwater shock imparted to aircraft through the ship's structure. Overshadowing these primary and secondary effects, and perhaps the most significant of all, were the radiological effects persisting in the target array, in the water of the lagoon, on the target vessels and on the aircraft, making the area and ships untenable and rendering the aircraft useless for periods ranging from several days to an indefinite length of time. There is no evidence to indicate that this radioactivity causes any temporary or permanent structural damage or deterioration of aircraft, components, equipment or materials except for normal deterioration resulting from an enforced lack of attendance and maintenance by personnel. This has been substantiated to some extent by laboratory analysis and functional tests of items returned to continental facilities. In other respects the damage to aircraft and equipment was comparable to that which would have been produced by a conventional explosive, of equivalent blast effect and detonated in the same manner.

(b) Relation of Damage to Distance

The damage sustained by aircraft as a direct result of the sub-surface bomb blast was a reasonably consistent function of distance from the point of detonation. An analysis of the relation of damage sustained to the distance from the bomb burst leads to the conclusion that aircraft of current types, if exposed topside to the direct effects of the blast within 700 yards of the center, will be sunk with target vessels, washed or blown overboard, or completely demolished. Within an intermediate zone of 700 to 1500 yards radius, aircraft exposed topside will receive major to moderate damage sufficiently severe as to require major overhaul, at the least; and jettisoning in the case of the majority of the aircraft thus exposed. Outside of the 1500 yard circle the damage diminishes rapidly from light to none, with effects limited to light structural members such as cockpit canopies and control surfaces. Radiological effects are discussed separately.

(c) Effect of Shielding

The conclusions stated above relate to aircraft topside exposed to the direct effects of the blast. In contrast thereto, those aircraft parked on well protected hangar decks or cargo holds receive considerable shielding from blast. Damage in this case was confined to within 800 yards of the target center and was limited to underwater shock transmitted to aircraft through the ship's structure and side loads imposed upon aircraft landing gear from heavy rolling and pitching of target vessels plus miscellaneous secondary effects such as collision with ship's structure and loose debris, or flooded compartments. Important considerations here are that protection must be complete, equivalent to that provided by

unbroken shell plating on the side of the ship; and that ship's fittings and the structure of the compartment remain intact and in place, since falling or flying debris constitute a serious menace to the safety of aircraft stowed below decks.

(d) Effect of Partial Shielding and Orientation

Midway between the heavy damage which will be sustained by aircraft exposed topside to the direct effects of the blast and the excellent protection to aircraft stowed in unbroached hangars or holds, there will be significant protection afforded to those aircraft secured topside which are partially shielded (by the ship's structure) from direct blast effects or from falling or sweeping water. Aircraft and ships so oriented that the ship's superstructure is interposed between the aircraft and the point of detonation will suffer less damage. This protection is inconsiderable at short ranges, and significant at intermediate ranges and beyond. An important corollary is that resistance of ship's components topside to dislodgement should be sufficient to insure that they at least remain intact under blast conditions and at those ranges where aircraft can survive, in order that debris from this source will not destroy aircraft otherwise undamaged.

Orientation of aircraft with respect to the blast is an important factor in the intermediate and outer zones, in determination of damage to be expected with the least damage resulting where aircraft are headed into the blast.

(e) Relative Vulnerability of Aircraft Components

Because of the wide variety of primary effects of the sub-surface explosion such as radiological effects, blast pressure, shock transmitted through ship's structure and falling or sweeping water, it is difficult to list the critical weaknesses in order of relative vulnerability, since the relative order would be different for each of these effects. Disregarding radioactivity, however, and considering the overall effects, a study of the nature, severity and frequency of damage sustained indicates the following order of vulnerability, weakest elements listed first:

Cockpit canopies, particularly flat plexiglass plates.
Control surfaces.
Fuselage monocoque sections.
Folded wings (with peculiar shock damage to F6F wings).
Stressed skin (subject to dishing).
Heavy structural components (subject to shock and falling or sweeping water).
Landing gear struts (from shock and side loads only).

(f) Equipment

Airborne equipment, shielded from the blast effects by aircraft structures, may be expected to suffer insignificant damage as compared to structural components and will generally follow failure of the supporting structure itself. No hazard may be expected from explosions of oxygen, CO_2 bottles or charged accumulators, nor from inflammable materials such as hydraulic fluid and gasoline as a result of the bomb blast. Damage to instruments and other shock mounted equipment will be negligible except where aircraft are demolished. Landing gear, particularly if oleo struts are deflated, is susceptible to damage from shock and side loads. No special design criteria need be established to improve resistance of airborne equipment to the underwater atomic bomb blast with the possible exception of improvements in cockpit plexiglass canopies to withstand blasts of any nature.

(g) Power Plants

Damage to aircraft power plants and components is negligible as compared to structural damage and it may be expected that aircraft will not be put out of commission solely because of damage to power plants. Outside of the inner zone of 700 yards from the center power plant may be expected to receive no damage. Within the inner zone they will sustain extensive damage only under conditions sufficiently severe to demolish the aircraft. Failure of the supporting structure rather than failure of the individual units will be the factor limiting successful operation of power plant installations such as fuel, lubricating, induction and similar systems. Delicate internal mechanisms such as diaphragms, aneroids and bellows in accessories such as carburetors and controls may be expected to withstand blast pressures and derangement from shock which causes even major damage to aircraft heavy structural components.

Fuels, lubricating oils and greases will not be ignited as a result of the underwater bomb blast, unless from secondary causes following rupture of containers, tanks or lines in connection with major damage to aircraft.

(h) Armament

The inherent ruggedness of this equipment is such as to warrant the conclusion that serious failure or damage will be sustained only in those cases where the blast effects are sufficient to cause major damage to the aircraft. Ignition of current types of aircraft ammunition, bombs, rockets, and ordnance equipment appears to be unlikely even under conditions which cause complete demolition of the aircraft. Armament electrical circuits may be expected to remain intact and operable except from ruptured circuits caused by failure of aircraft supporting structures.

(i) Electronic Equipment

Items of electronic equipment, generally shock mounted and protected by aircraft structure, may be expected to withstand all effects of the sub-surface blast except under conditions of such severity as to cause complete destruction of the aircraft. Radomes in folded wings of F6F aircraft are susceptible to damage from shock and secondary causes. All units of radar and communication equipment, intact and operable except where aircraft are completely demolished, will be rendered useless for indefinite periods by the radioactivity persisting in the aircraft as well as in the units of equipment.

(j) Comparison of Seaplanes and Carrier Types

An analysis of damage to *patrol seaplanes* as compared to carrier types indicates that seaplanes may be expected to receive somewhat heavier damage when exposed at the same distance under conditions of equal severity. The seaplanes in this case were beyond the range of severe damage from underwater shock, heavy fall of water or high waves generated by the sub-surface explosion and the comparison is based largely on blast effects alone.

The resistance of the structure of *float type seaplanes* was comparable to that of carrier types. However, the unstable foundation provided by the floats of observation planes resting in catapult launching cars or cradles as compared with the wider tread and far more stable wheel type landing gear of carrier types, increased the vulnerability of the former type to capsize on deck and secondary damage therefrom.

(k) Securing of Aircraft

The standard "Heavy Weather" method of securing aircraft, in accordance with Aircraft Carrier Bulletin No. 13 utilized during Test BAKER, provided tie down strength adequate to secure the airplanes under conditions sufficiently severe as to cause loss or destruction of minor components and up to the point of failure of most major cable attachment points in the airplanes. The method of anchoring patrol seaplanes, with additional bridle, preventers and scope of wire rope as previously described in this report was adequate.

3. SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

(a) General

As indicated in the Summary of Damage above and the individual damage reports in Part "D" of this report, this equipment, with the possible exception of elevators, exhibited a

degree of inherent ruggedness and resistance to blast damage and effects of falling or sweeping water fully equal to that shown by comparable elements of the ship's structure. Damage to ships' installations from the underwater shock wave generated by the burst was detected, although it was more significant in machinery spaces and at locations very low in the ship's structure. Pending further analysis after functional tests are completed, it may be concluded that ships' installations for handling aircraft, generally supported by the upper decks, are not as susceptible to shock damage as those comparable elements whose foundations are supported at lower points in the ship's structure. The conclusion drawn in Test ABLE also holds for this test, namely that damage to ships' installations for handling aircraft is a more significant reflection of damage to adjacent elements of the ship than of direct failure of the unit itself.

(b) Effect of Shielding

Shielding of ships' installations for handling aircraft from air blast effects was not so pronounced in the underwater explosion as for Test ABLE, particularly in view of the loss of the closest ships to the center, namely SARATOGA and ARKANSAS. However, protection of these installations from shock damage was quite apparent as evidenced by considerable machinery dislocation and derangement below decks on such vessels as SALT LAKE CITY and PENSACOLA, while those installations topside were generally undamaged or lightly damaged, having been cushioned by the intervening ship's structure from the underwater shock. Heavy fall of water from the column thrown up in Test BAKER apparently caused little damage from which to draw any conclusions under this heading except for the dishing and distortion of the already weakened SARATOGA elevator which was directly exposed to considerable water fall plus possible sweeping water in addition to blast effects. The flight deck of the SARATOGA, with the exception of this elevator and the flight deck aft, appeared to be essentially undamaged leading to the conclusion that it was shielded by continuous shell plating along the side from the type of blast effects which blew in the side wall curtains on the INDEPENDENCE in Test ABLE and seriously damaged that flight deck as described in Part "B" of this report.

(c) Necessity of Uniformity in Resistance to Blast Damage

Further serious distortion of the SARATOGA's forward elevator and the blowing of three sections of the stack onto the flight deck without other serious damage to the ship's tophamper and parts of the flight deck, indicates lack of uniform resistance existing elsewhere throughout the ship. On other vessels, cargo hatches, debris and ship's components became dislodged and were a source of danger to aircraft stowed below.

The necessity is still indicated in Test BAKER, as it was for Test ABLE, for a comprehensive review of the structural elements of vessels carrying aircraft, with a view to insuring that all critical components make good, a uniform minimum standard of resistance to effects of the atomic bomb, measured in terms of the blast phenomena which the airplanes can successfully resist, in order that embarked aircraft may not be damaged or immobilized by falling top-hamper or by inadequate strength of essential components of the ship. On an aircraft carrier, for example, perhaps the flight deck should be the criterion by which to judge strength of other components; with elevators, catapults, cranes, arresting gear and ship's top-hamper in general able to withstand any conditions which will still leave the flight deck intact and usable for aircraft operations.

4. RADIOLOGICAL EFFECTS

Since the radiological effects persisting in the target area, on target vessels and on aircraft were more significant in immobilizing the ships and rendering the aircraft inoperable for longer periods of time than structural or other damage the conclusion is inescapable that serious attention must be directed toward the protection of target vessels and aircraft from this residual radioactivity and extensive research must be initiated to establish suitable and effective decontamination procedures. Perhaps the former is of the greatest urgency on the basis that the prevention is more important than the cure.

5. SUMMARY OF CONCLUSIONS

(a) Aircraft

Aircraft exposed topside to an atomic bomb sub-surface blast, detonated under the same conditions and assuming attainment of the same efficiency as for the Baker burst, will be blown or washed overboard, or completely demolished of within 700 yards of the point of detonation with damage diminishing from major to moderate from 700 to 1500 yards and decreasing from light to none beyond 1500 yards. A practicable means for protecting aircraft is by stowage below decks in well protected and intact spaces, free from openings. Aircraft beyond 800 yards in such compartments will be essentially undamaged. Modifications to aircraft for the purpose of increasing resistance to blast damage appears to entail unacceptable penalties on performance except in minor instances, such as improvements in canopies and control surfaces. Most significant effects of the bomb were radiological, indicating the necessity for extensive further studies in connection with protection from radioactivity and development of decontamination procedures for aircraft.

(b) Vessels

In regard to vessels carrying aircraft, the use of closed hangar construction on aircraft carriers appears to offer opportunity for improved protection of aircraft as well as ship's components in these compartments. Ship's structure exposed to atomic bomb bursts should achieve uniform standards of resistance to the physical effects of the bomb in order that embarked aircraft may not be damaged or immobilized by the fall of debris or failure of essential ship's components under blast or other effects less than those which aircraft can successfully survive. Radiological effects were highly significant insofar as vessels are concerned and overshadow the structural damage in immobilizing target vessels. Need for development of protective and decontamination measures is strongly indicated.

PART "D" REPORT ITEMS

I - INDEX TO REPORT ITEMS

II - PLOTS OF APPROXIMATE LOCATION OF TARGET VESSELS AND TABLES OF BEARINGS AND DISTANCES

III - PHOTOGRAPHS

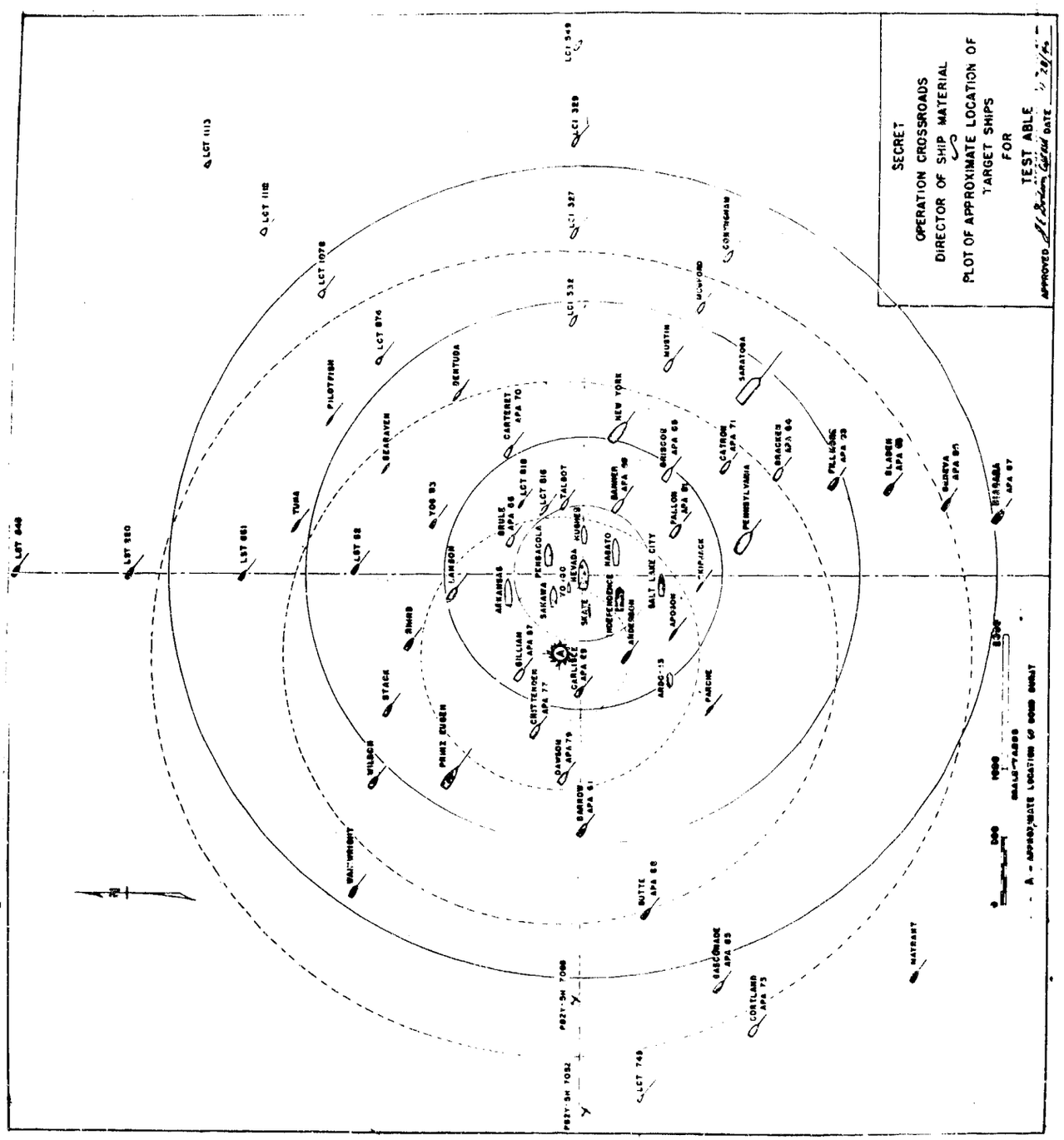
IV - DAMAGE REPORTS

V - LIST OF AERONAUTICAL MATERIALS RETURNED FOR LABORATORY ANALYSIS

VI - ORGANIZATION MANUAL FOR BUREAU OF AERONAUTICS GROUP

I - INDEX TO REPORT ITEMS IN PART "D"

II - PLOTS OF APPROXIMATE LOCATION OF TARGET VESSELS AND TABLES OF APPROXIMATE BEARINGS AND DISTANCES



Enclosure (C) to Director Ship Material Serial 001500

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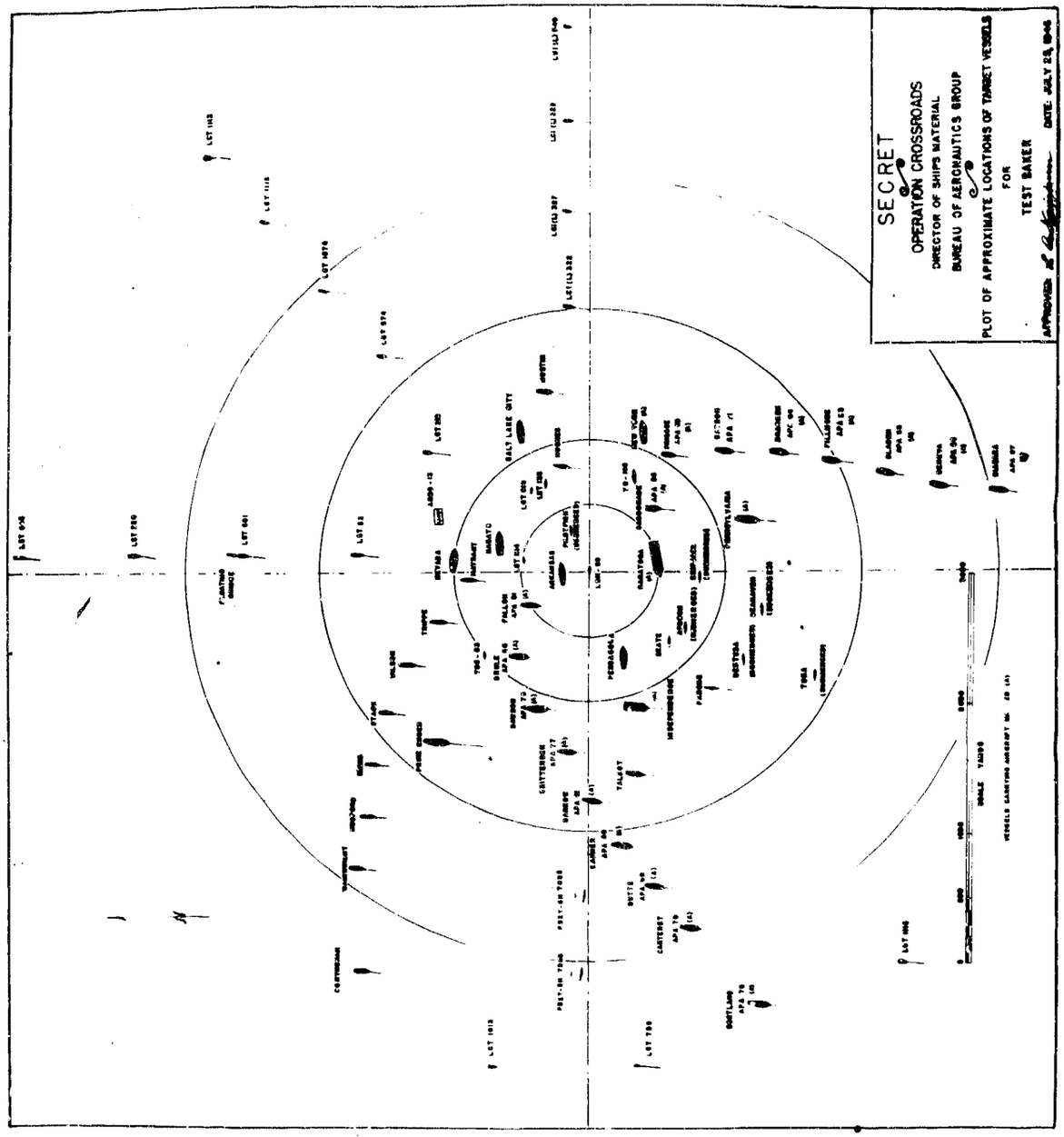

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3. Table of Approximate Bearings and Distances of Target Vessels Containing Aircraft or of interest to Bureau of Aeronautics:

TEST ABLE

Ship	Distance in Yards from Center of Burst	True Bearing from center of Burst
USS ARKANSAS (BB-33)	400	033° T
USS NEW YORK (BB-34)	1900	104° T
USS NEVADA (BB-36)	600	105° T
USS PENNSYLVANIA (BB-38)	1800	148° T
USS PENSACOLA (CA-24)	600	077° T
USS SALT LAKE CITY (CA-25)	1000	133° T
USS SARATOGA (CV-3)	2700	126° T
USS INDEPENDENCE (CVL-22)	700	130° T
USS GILLIAM (APA-57)	150	321° T
USS BANNER (APA-60)	1400	112° T
USS BARROW (APA-61)	1300	257° T
USS BLADEN (APA-63)	2800	152° T
USS BRACKEN (APA-64)	2200	138° T
USS BUTTE (APA-68)	2000	248° T
USS CARLISLE (APA-69)	300	221° T
USS CARTERET (APA-70)	2000	078° T
USS CORTLAND (APA-75)	3200	241° T
USS CRITTENDEN (APA-77)	500	098° T
USS DAWSON (APA-79)	900	265° T
USS FALLON (APA-81)	1400	134° T
USS FILLMORE (APA-83)	2500	145° T
USS GASCONADE (APA-85)	2800	242° T
USS NIAGARA (APA-87)	4000	151° T
PB2Y-5H 7052	3500	267° T
PB2Y-5H 7085	2600	269° T

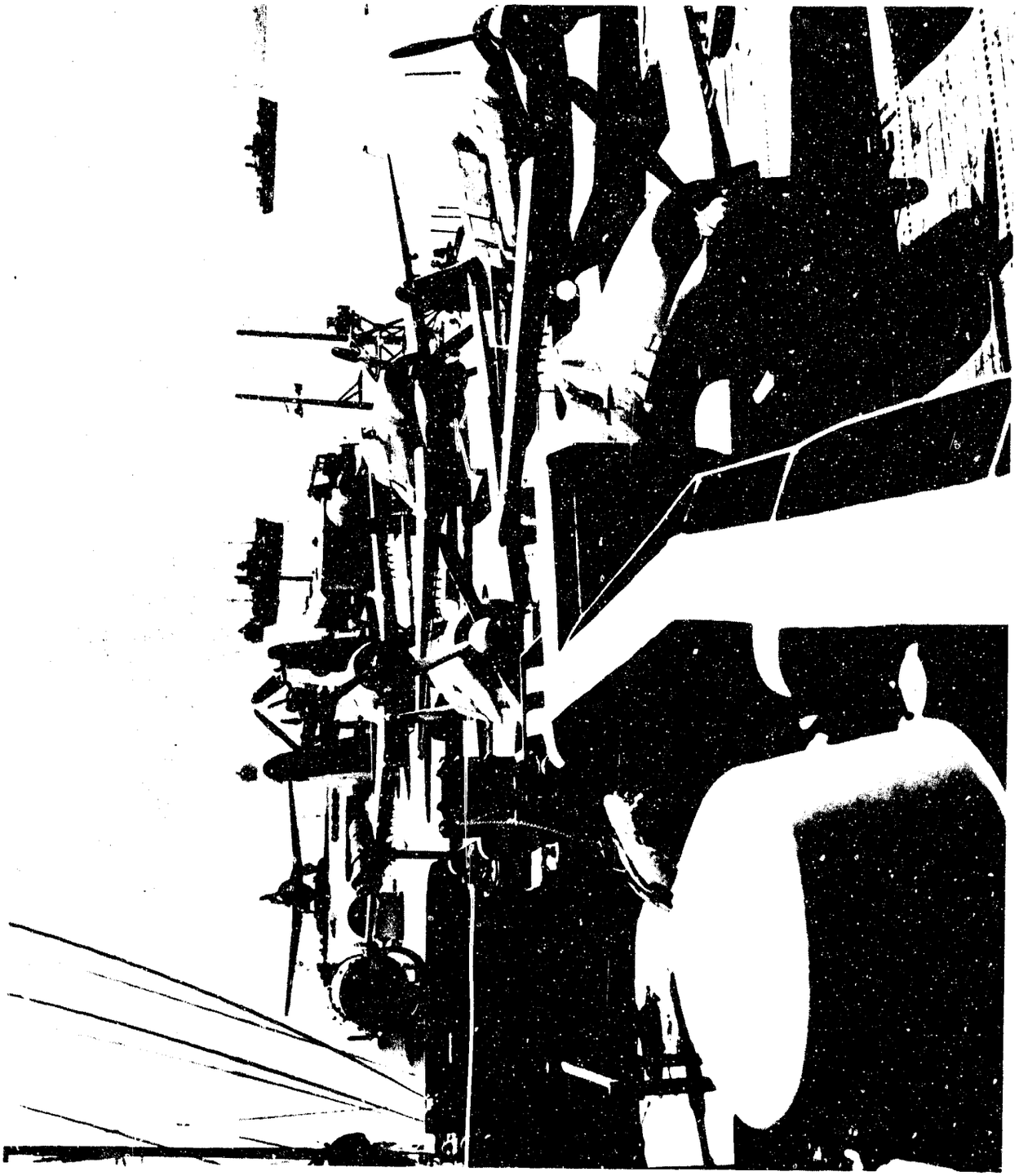
4. Table of Approximate Bearings and Distances of Target Vessels Containing Aircraft or of Interest to Bureau of Aeronautics:

TEST BAKER

Ship	Distance in Yards from Center of Burst	True Bearing from center of Burst
USS ARKANSAS (BB-33)	240	345° T
USS NEW YORK (BB-34)	940	105° T
USS NEVADA (BB-36)	1060	000° T
USS PENNSYLVANIA (BB-38)	1210	170° T
USS PENSACOLA (CA-24)	710	265° T
USS SALT LAKE CITY (CA-25)	1210	055° T
USS SARATOGA (CV-3)	380	185° T
USS INDEPENDENCE (CVL-22)	1400	245° T
USS BANNER (APA-60)	2460	260° T
USS BARROW (APA-61)	2050	265° T
USS BLADEN (APA-63)	2560	165° T
USS BRACKEN (APA-64)	1520	155° T
USS BRISCOE (APA-65)	930	135° T
USS BRULE (APA-66)	900	295° T
USS BUTTE (APA-68)	2740	255° T
USS CARTERET (APA-70)	2800	255° T
USS CORTLAND (APA-75)	3600	250° T
USS CRITTENDEN (APA-77)	1680	271° T
USS DAWSON (APA-79)	1210	283° T
USS FALLON (APA-81)	520	305° T
USS FILLMORE (APA-83)	2100	168° T
USS GASCONADE (APA-85)	660	150° T
USS GENEVA (APA-86)	2870	170° T
USS NIAGARA (APA-87)	3150	175° T
PB2Y-5H 7052	2700	271° T
PB2Y-5H 7085	3100	271° T

III PHOTOGRAPHS

1. TEST ABLE



Target airplanes exposed on flight deck of USS INDEPENDENCE prior to Test ABLE. Engine and cockpit covers were removed and the two airplanes on fantail were filled to capacity with gasoline and oil just prior to blast.

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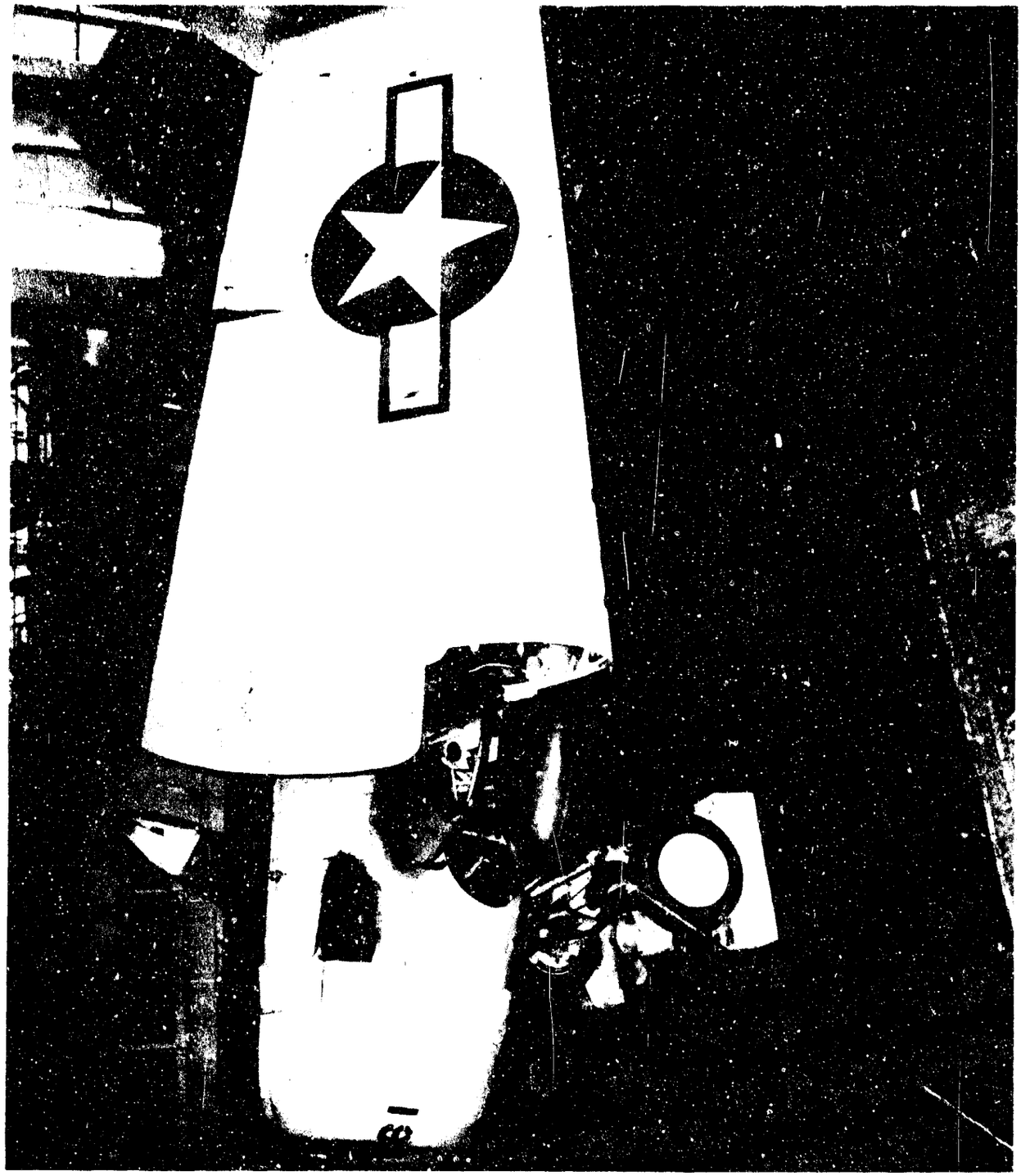
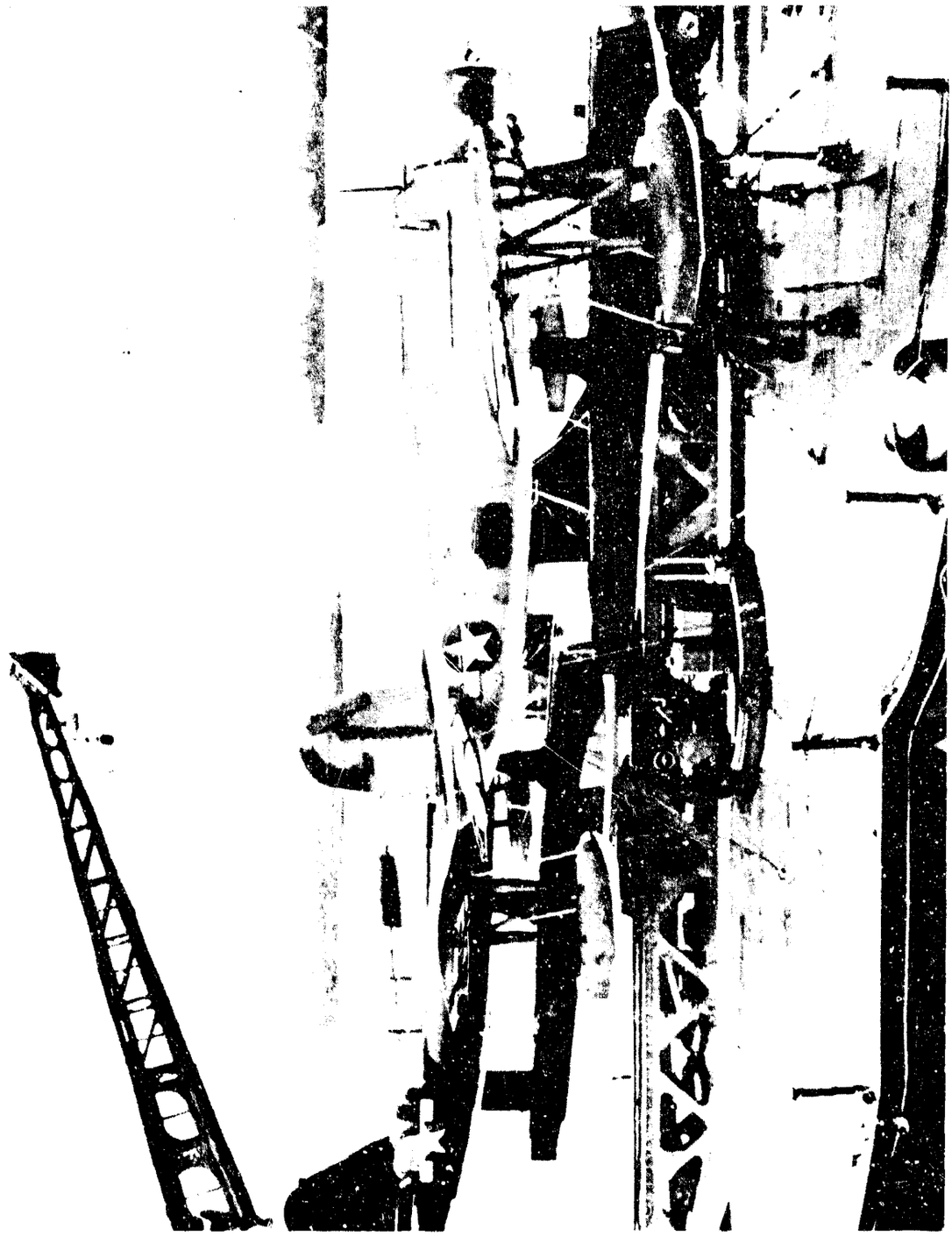
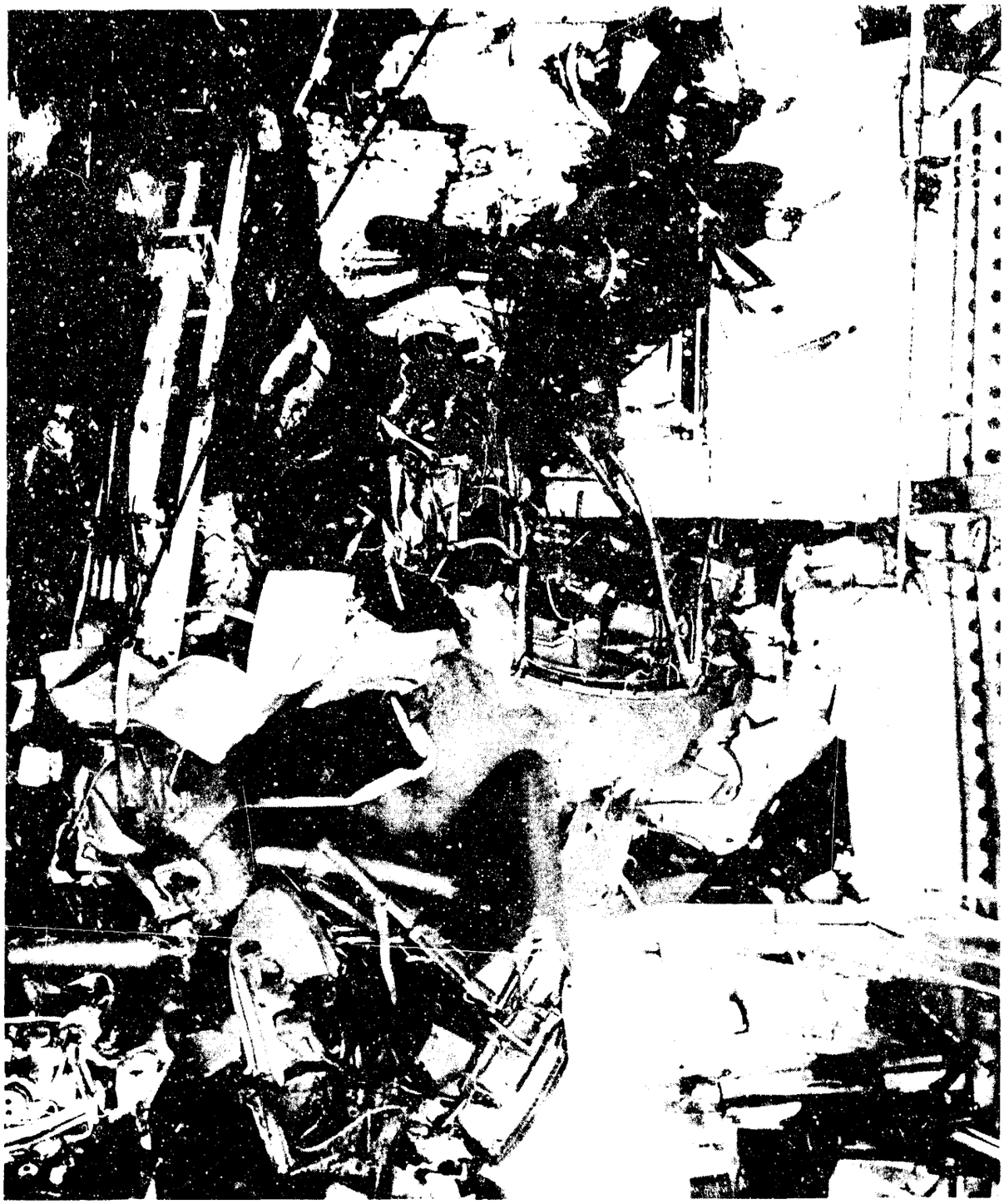


Model FM-2 airplane in cargo hold of USS BARROW APA-61 prior to Test ABLE. Typical securing methods used for aircraft on hangar deck and in holds.



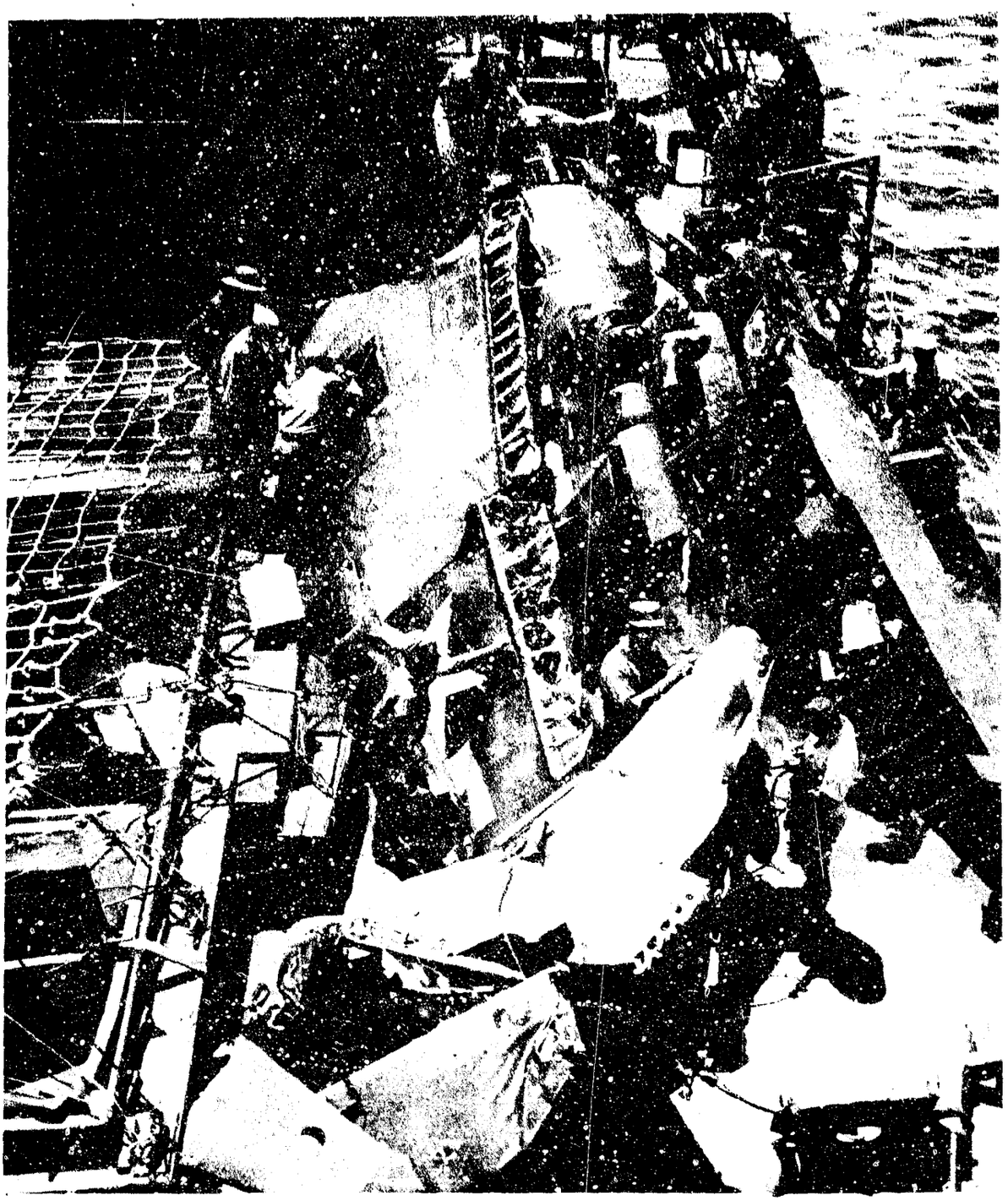
Model OS2U Airplanes aboard USS PENNSYLVANIA prior to Test ABLE with heavy weather securing gear in place. Similar tie down arrangements used on all float type aircraft in exposure plan.

General view of USS ARKANSAS after Test ABLE. OS2U-3 secured to cradle welded atop the turret, visible to the left of center in photograph, was blown over the side with no trace of the airplane remaining.



Aircraft on hangar deck of USS INDEPENDENCE. Thin side wall curtains surrounding hangar deck provided insufficient protection to aircraft and much damage to aircraft was caused by falling and flying debris.

OS2U-3 airplanes on USS NEVADA after Test ABLE. Damage to airplane is typical of that sustained in the inner zone.



Model F6F-5 Airplane on main deck of USS DAWSON APA-79. This airplane in inner zone illustrates typical severe structural damage from blast effect.

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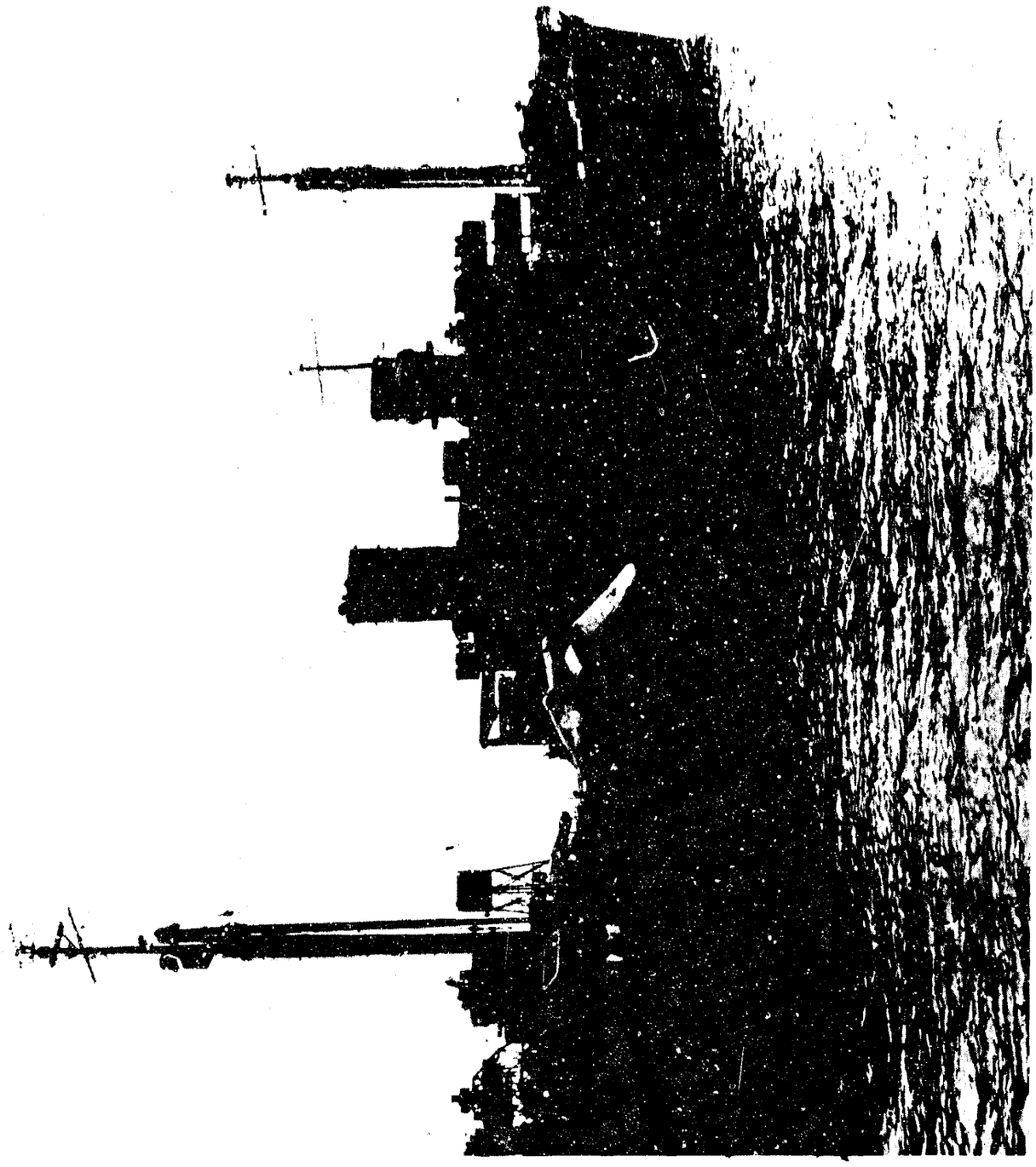
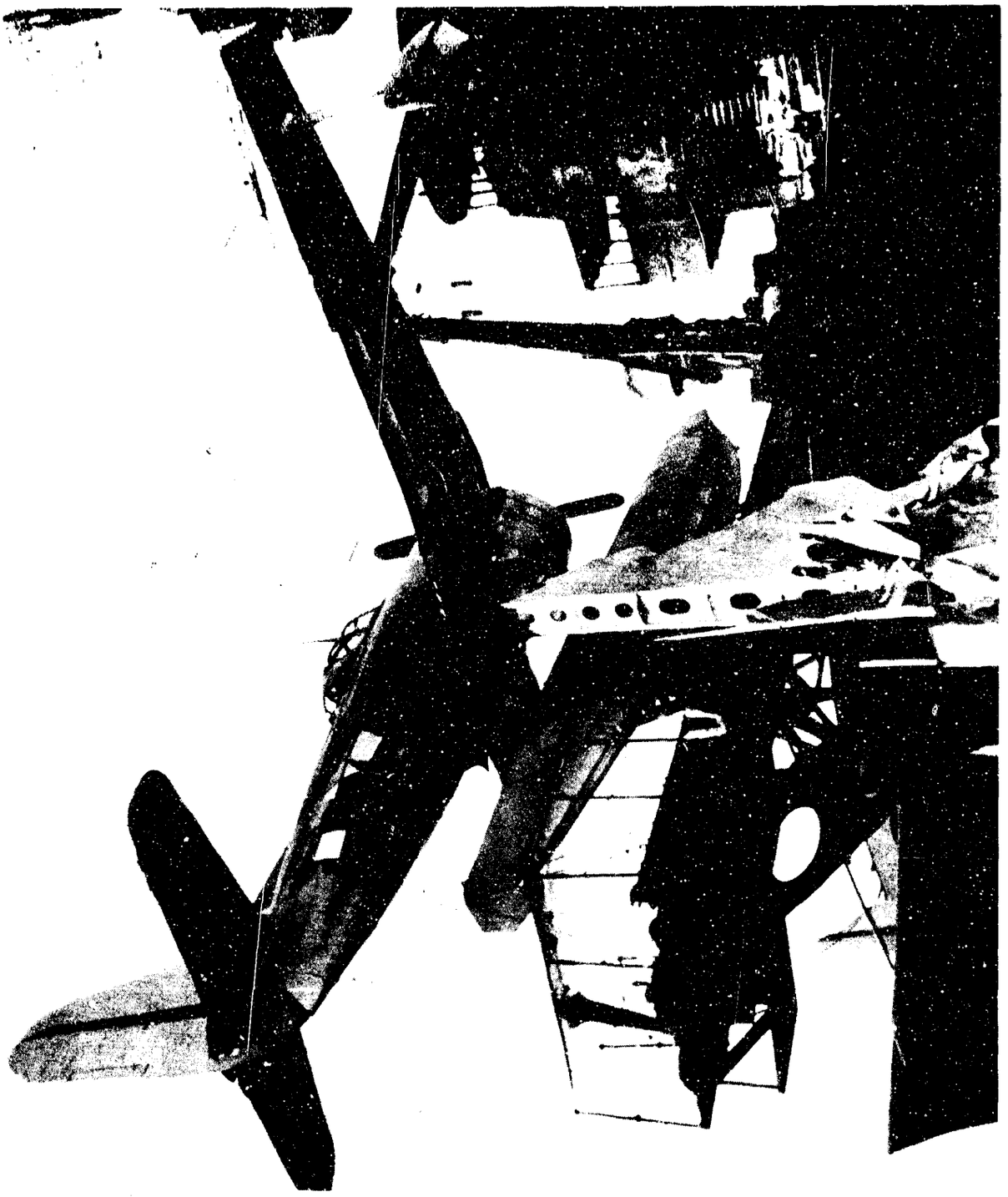


Model FG-1D airplane on main deck of USS CARTERET APA-70, after Test ABLE. The CARTERET was approximately 1600 yards from the blast center in the intermediate zone of damage. Right wing was blown from folded position by the blast.



Model XSC-1 Airplane in place on catapult on USS NEW YORK after Test ABLE. This airplane in the intermediate zone shows extreme buckling of fuselage and loss of control surfaces.

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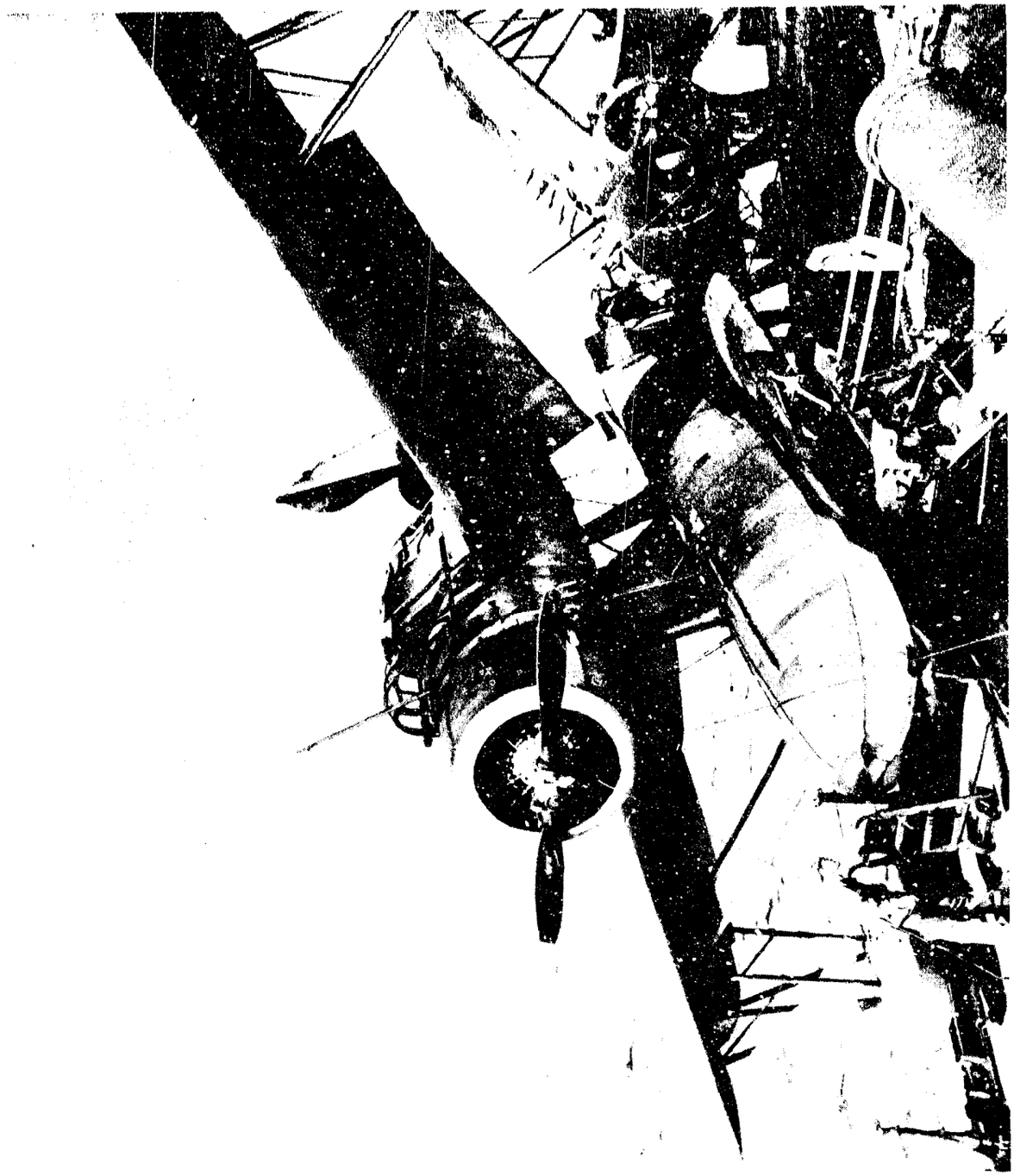
Model FG-1D on main deck of USS FALLON APA-81 after exposure to Able blast. The FALLON was approximately 1300 yards from actual blast center. This airplane sustained damage typical throughout the intermediate zone of 1300 to 2200 yards from the blast center.



Model OS2U-3 airplane on board USS PENNSYLVANIA after Test ABLE. Float type aircraft exhibited less resistance to overturn as compared to wheel type aircraft, and consequently may be more affected by secondary damage due to falling to deck. Note blast damage to control surfaces and cockpit panels.

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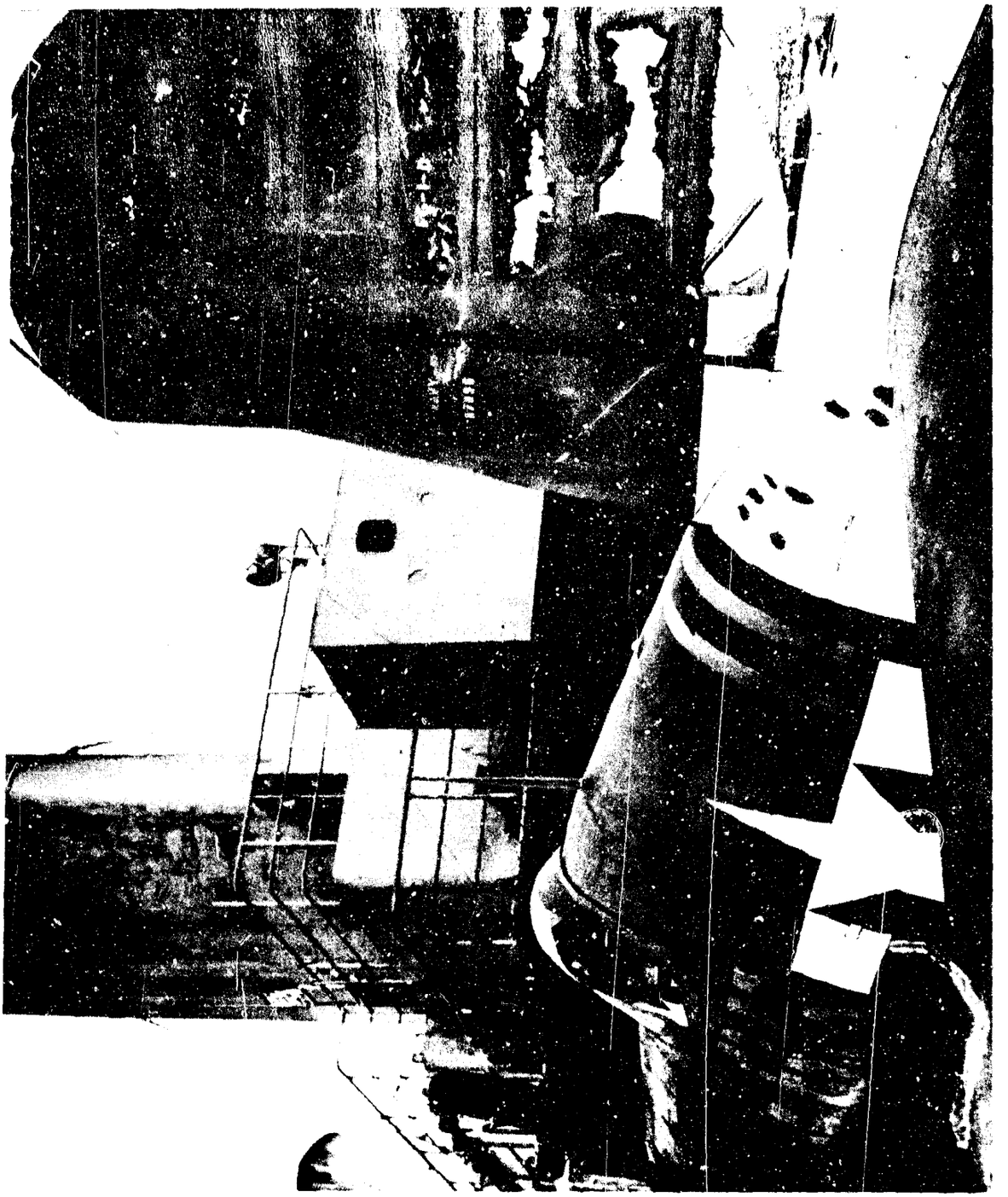
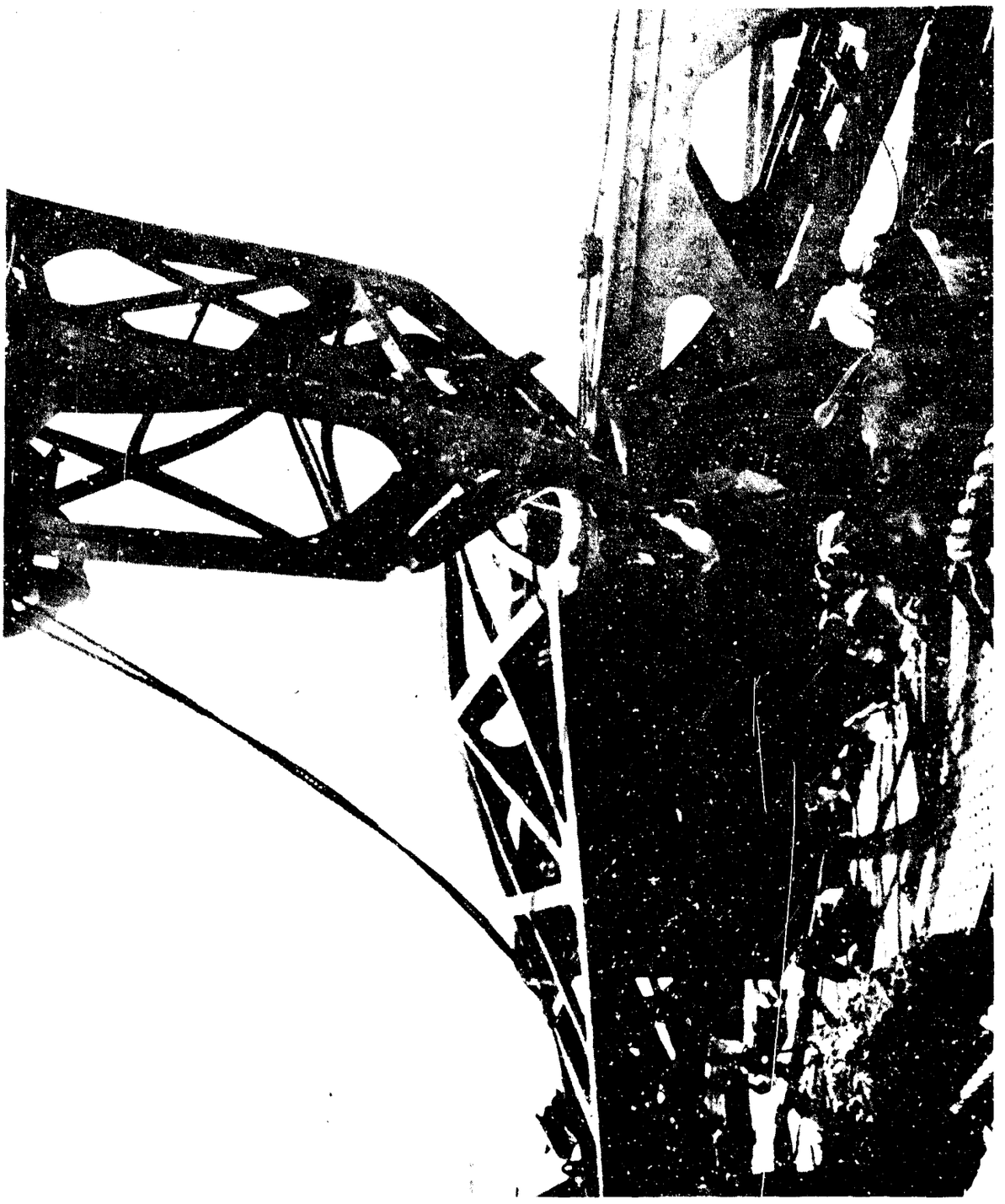
Model PB2Y-5H airplane after Test ABLE moored at 2500 yards from the blast. View shows buckling of the fuselage caused by air blast.



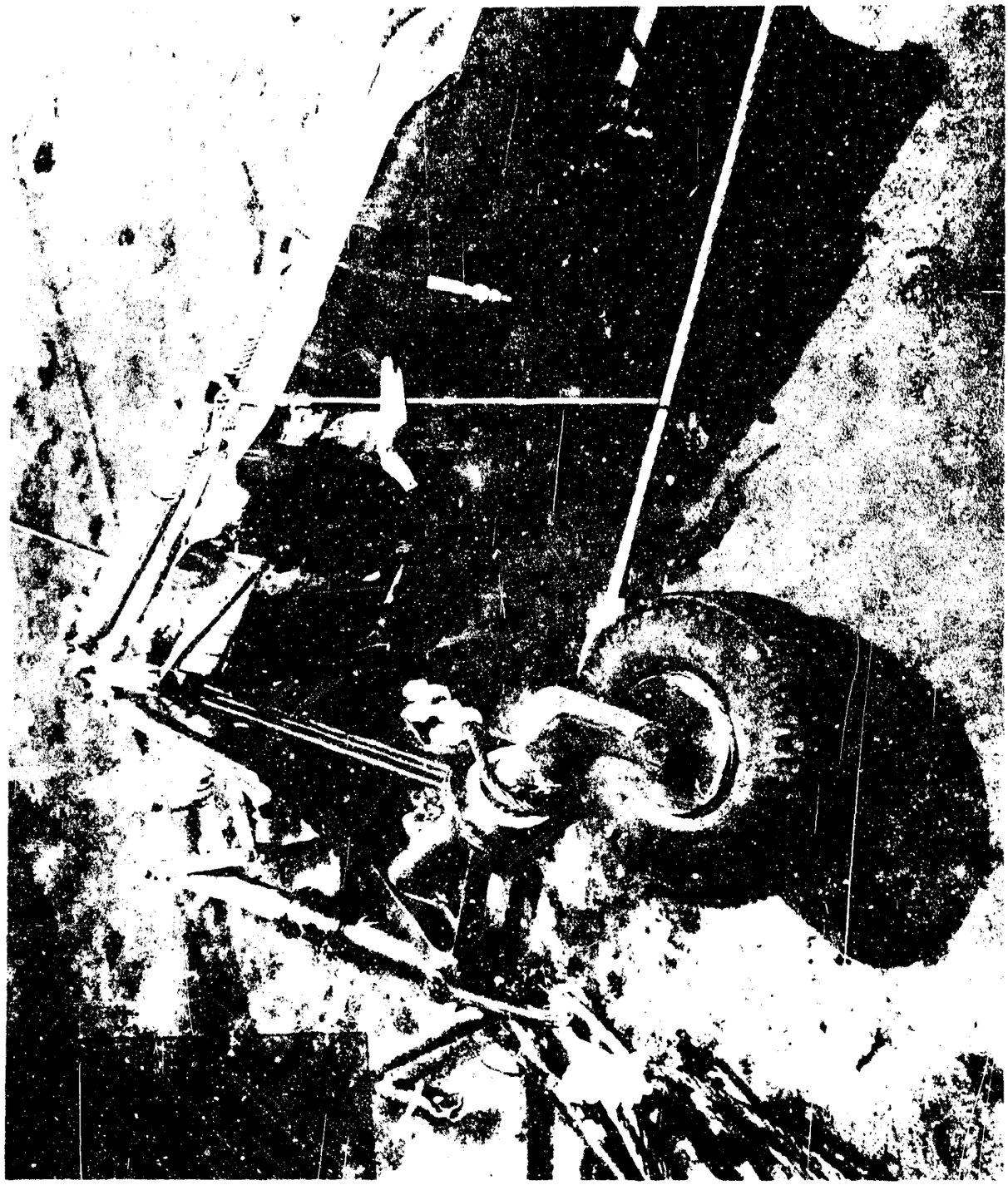
Model FG-1D airplane on main deck of USS BLADEN after Test ABLE. Scorching of fabric and damage to plexiglass is typical of the minor damage sustained by airplanes in the outer zone.

Model FM-2 airplane in cargo hold of USS BARROW after Test ABLE. This airplane, located at approximately 1200 yards from the center of the burst was undamaged as a direct result of the blast, but was crushed by falling hatch covers.



Airplane crane, USS NEVADA after Test ABLE. Lower leg of the crane bent over the stern of the catapult starboard side.

F6F on DAWSON damaged during Test ABLE being jettisoned under supervision of BuAer Group in preparation for Test BAKER.



Model FG-1D airplane on main deck of FALLON at aproximately 500 yards from burst was blown or washed overboard. The only remaining trace of the airplane was that portion of the tail wheel assembly shown on photograph.

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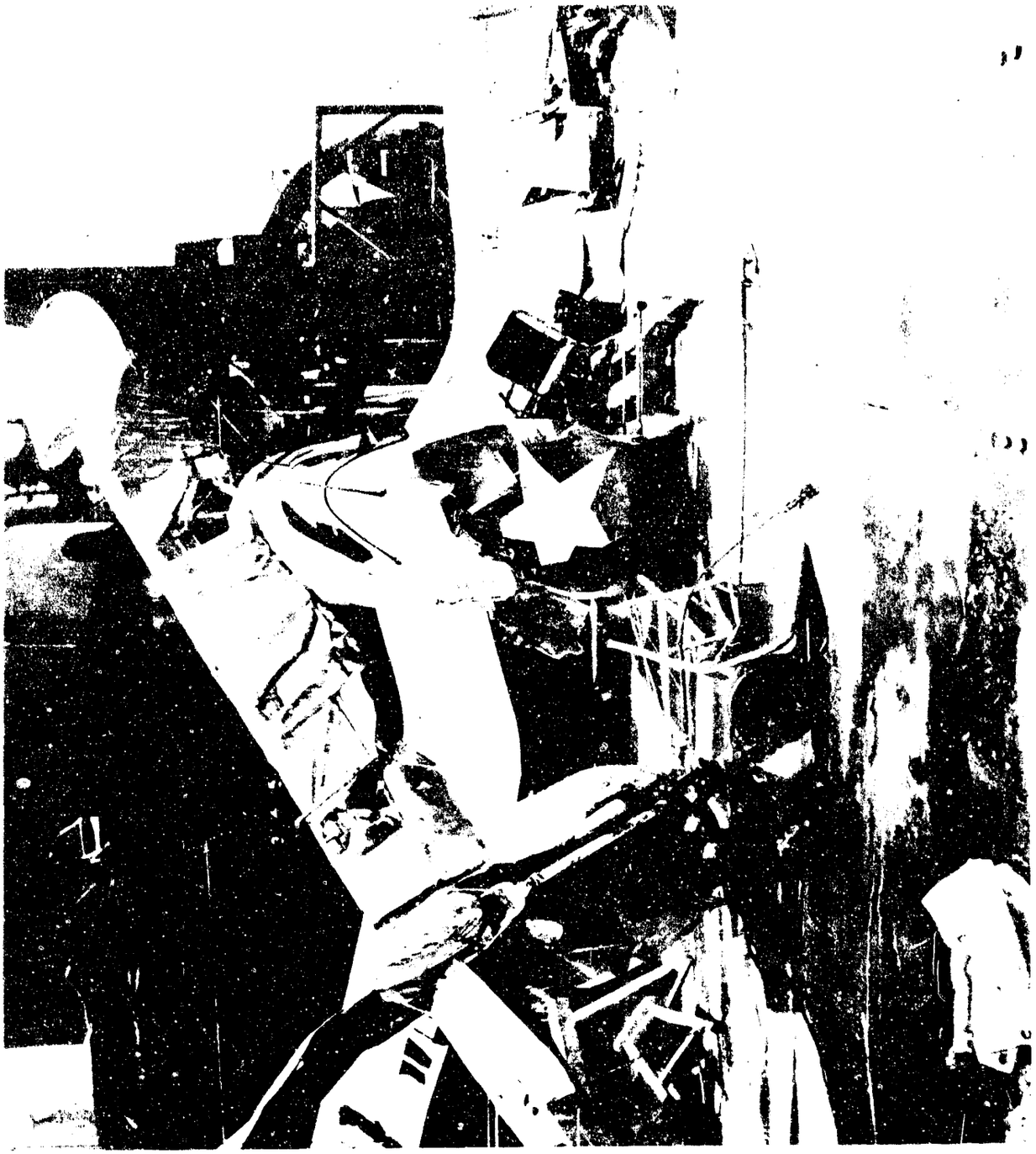

Model F6-1D airplane on main deck of USS NAVE at approximately 700 yards from burst. Extreme damage; broken fuselage, battered wing and tail surfaces, and collapsed landing gear was the result of a combination of water shock and falling or sweeping water. Any air blast effect was overshadowed by the two effects mentioned above.

Right landing gear strut on FG-1D on Main Deck of GASCONADE at approximately 700 yards from burst. Landing gear failed when airplane was thrown forward and to the left by a combination of sweeping water and heavy side loads caused by rolling and pitching of target ship.

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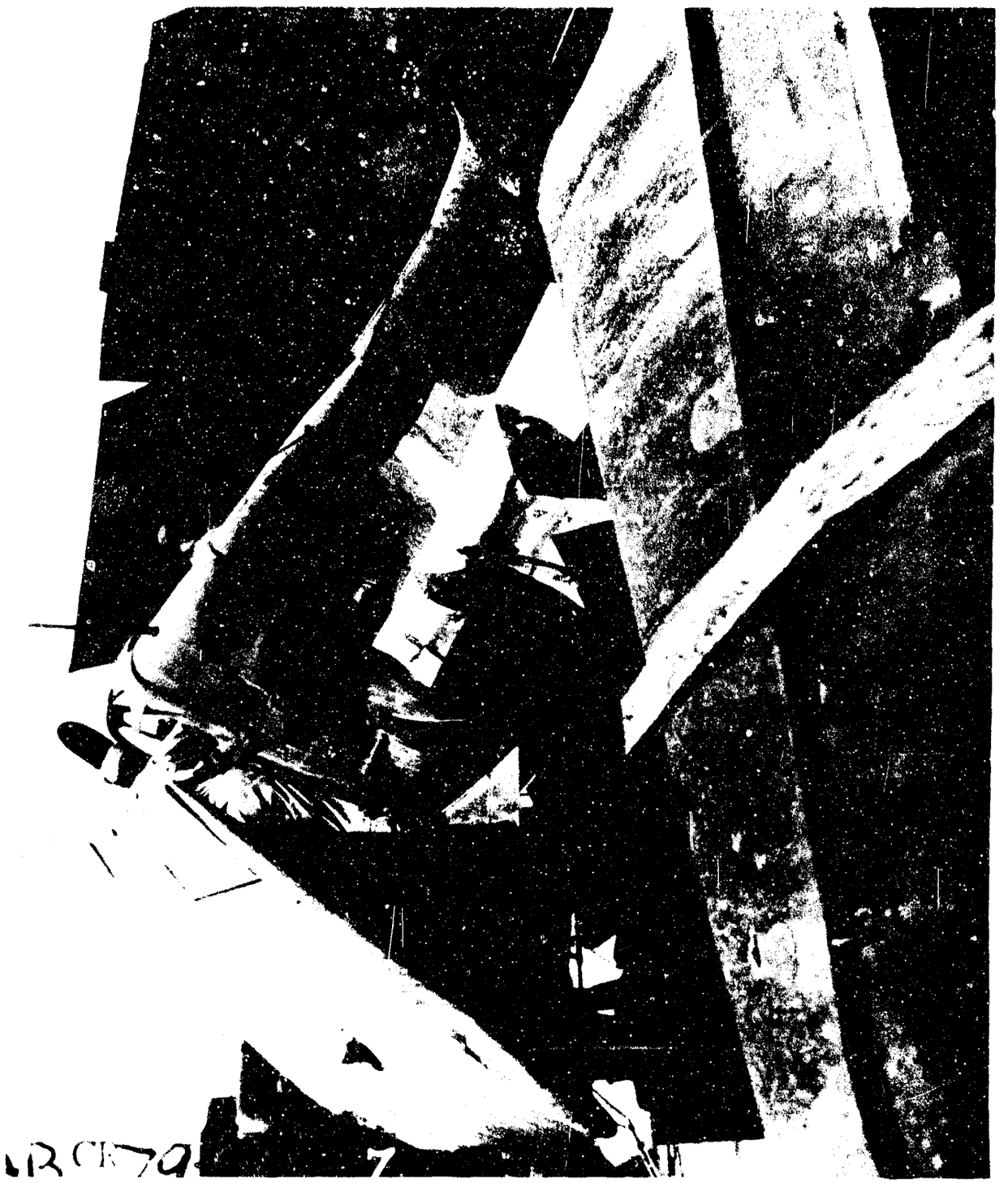
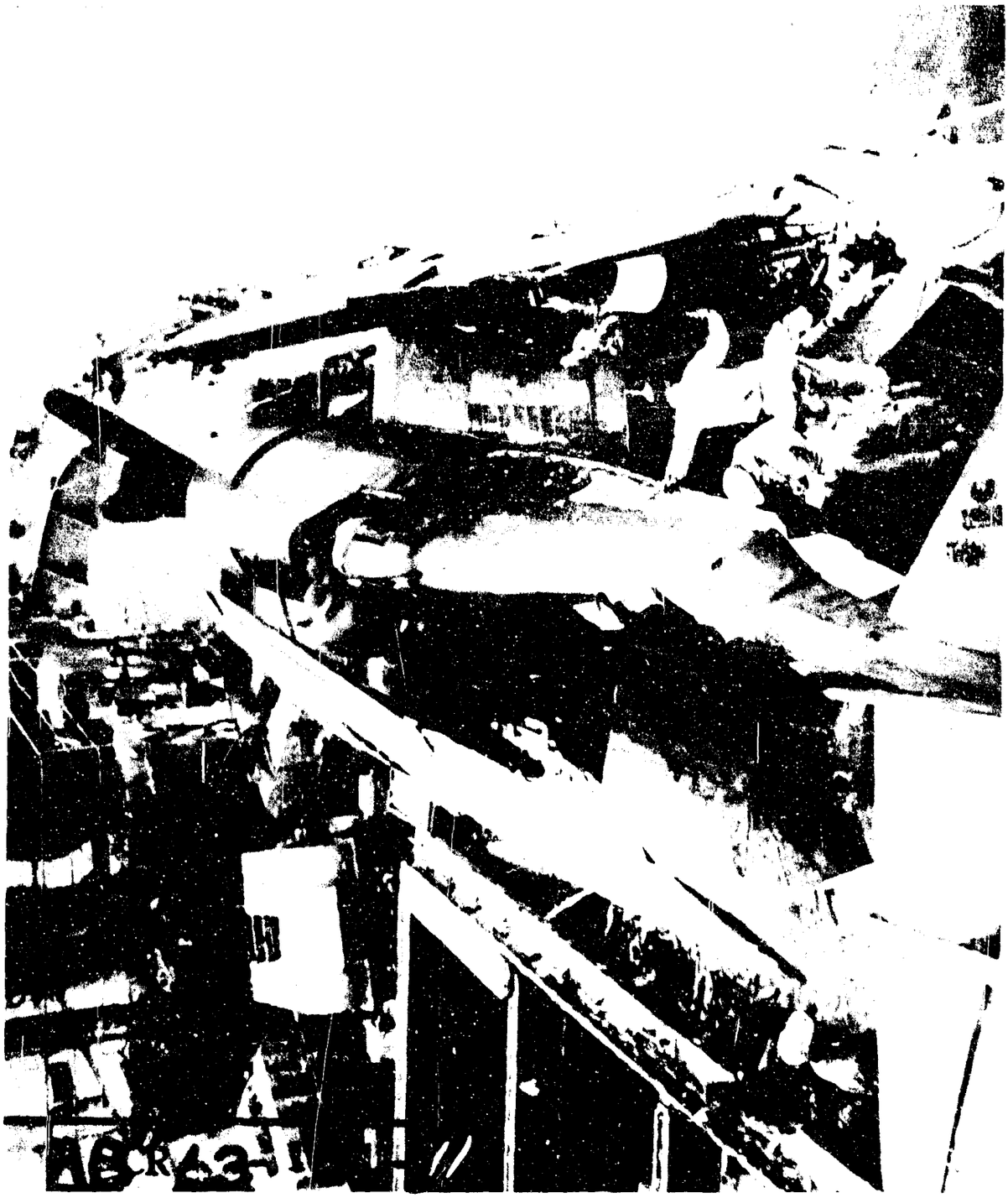
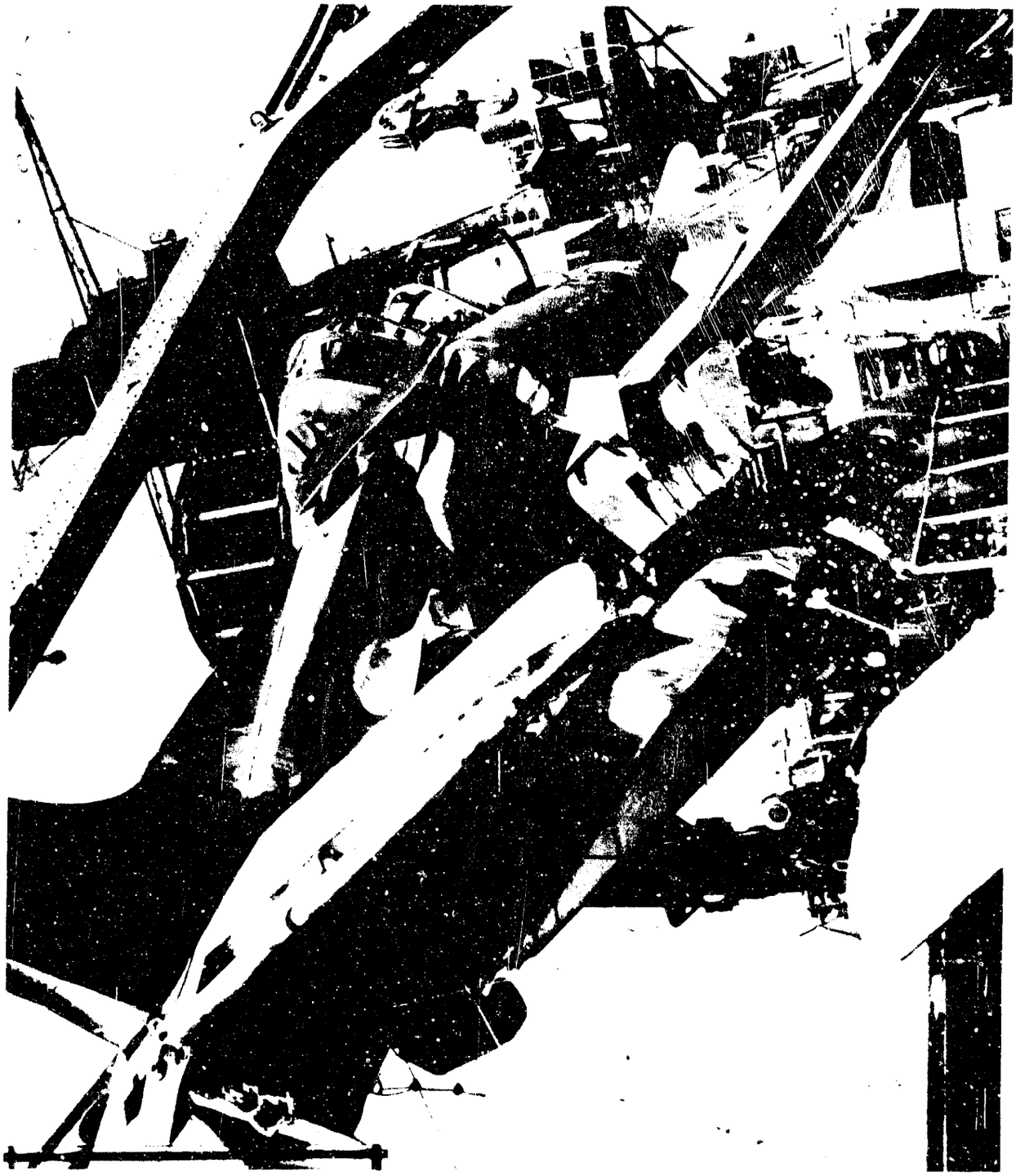


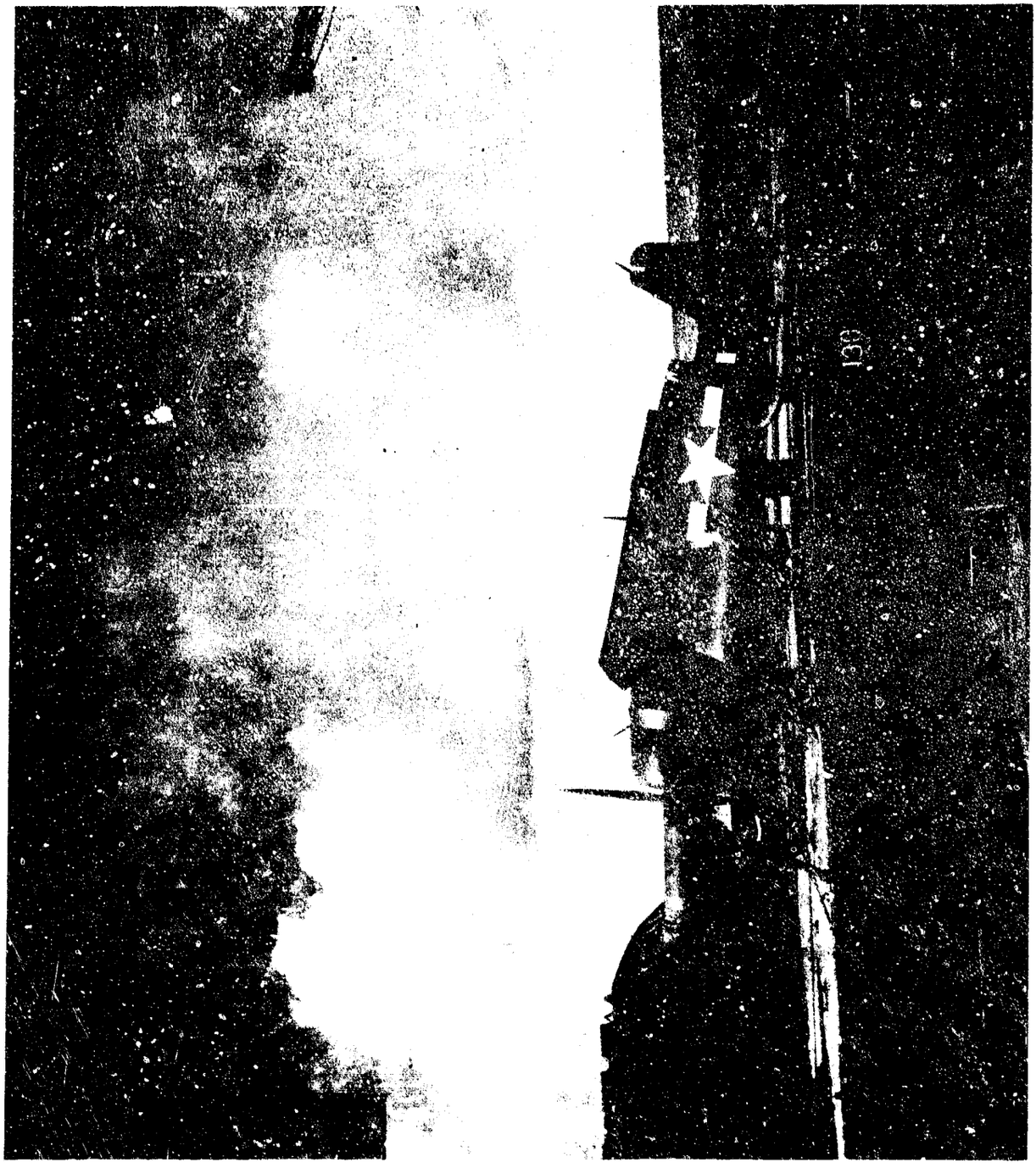
Model F6F-5 airplane aboard BRULE at approximately 900 yards from blast. Extreme buckling of fuselage and distortion of wing hinges was the result of both falling or sweeping water and shock.



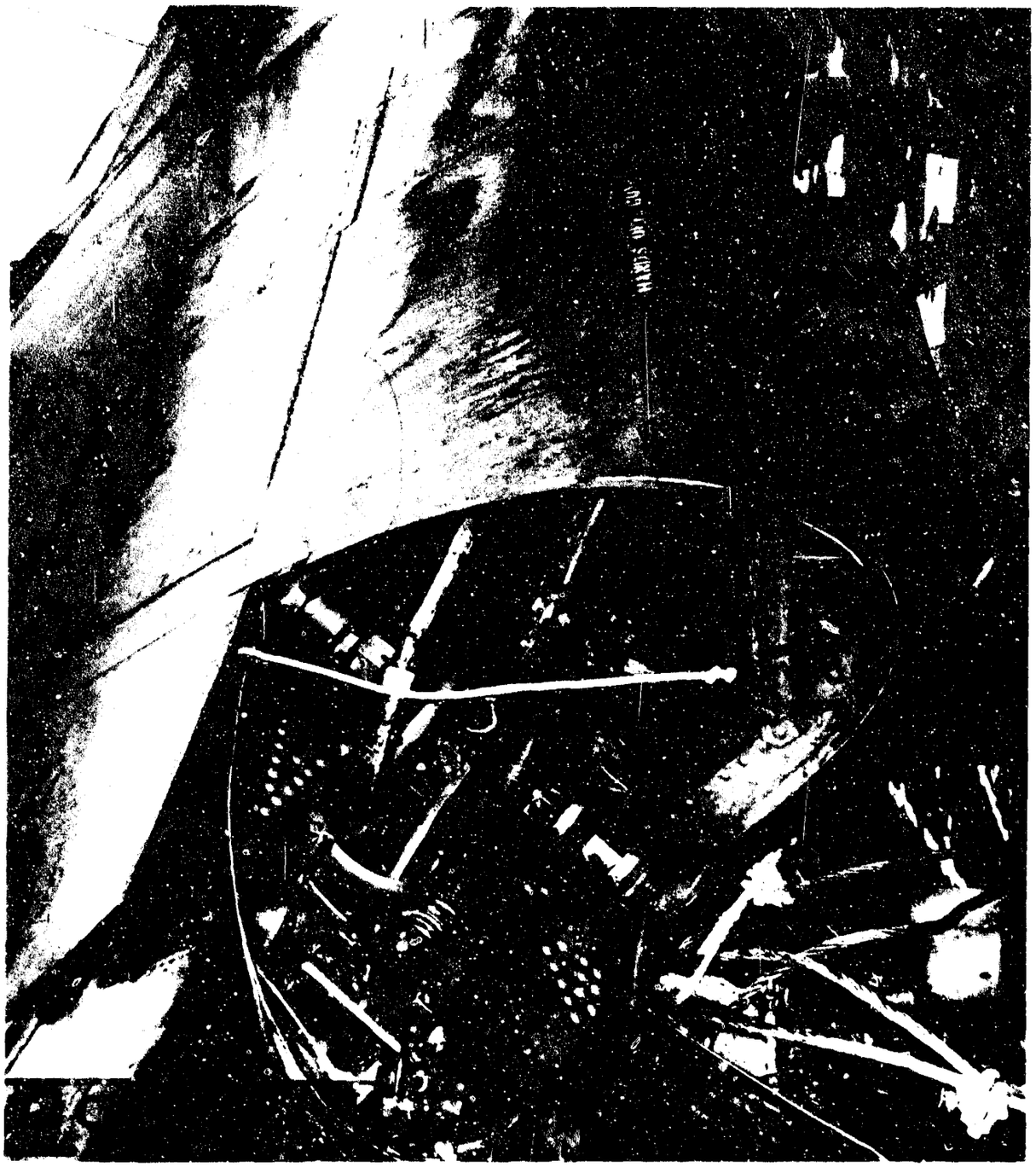
Model F6F-5N airplane on main deck of BRISCOE at approximately 1000 yards from burst.. Damage to fuselage is typical of damage caused by water shock transmitted through hull of target ship and by falling water.



Model XSC-1 Airplane aboard NEW YORK at approximately 1100 yards from burst. Airplane sustained extreme structural damage as a direct result of air blast and falling water.

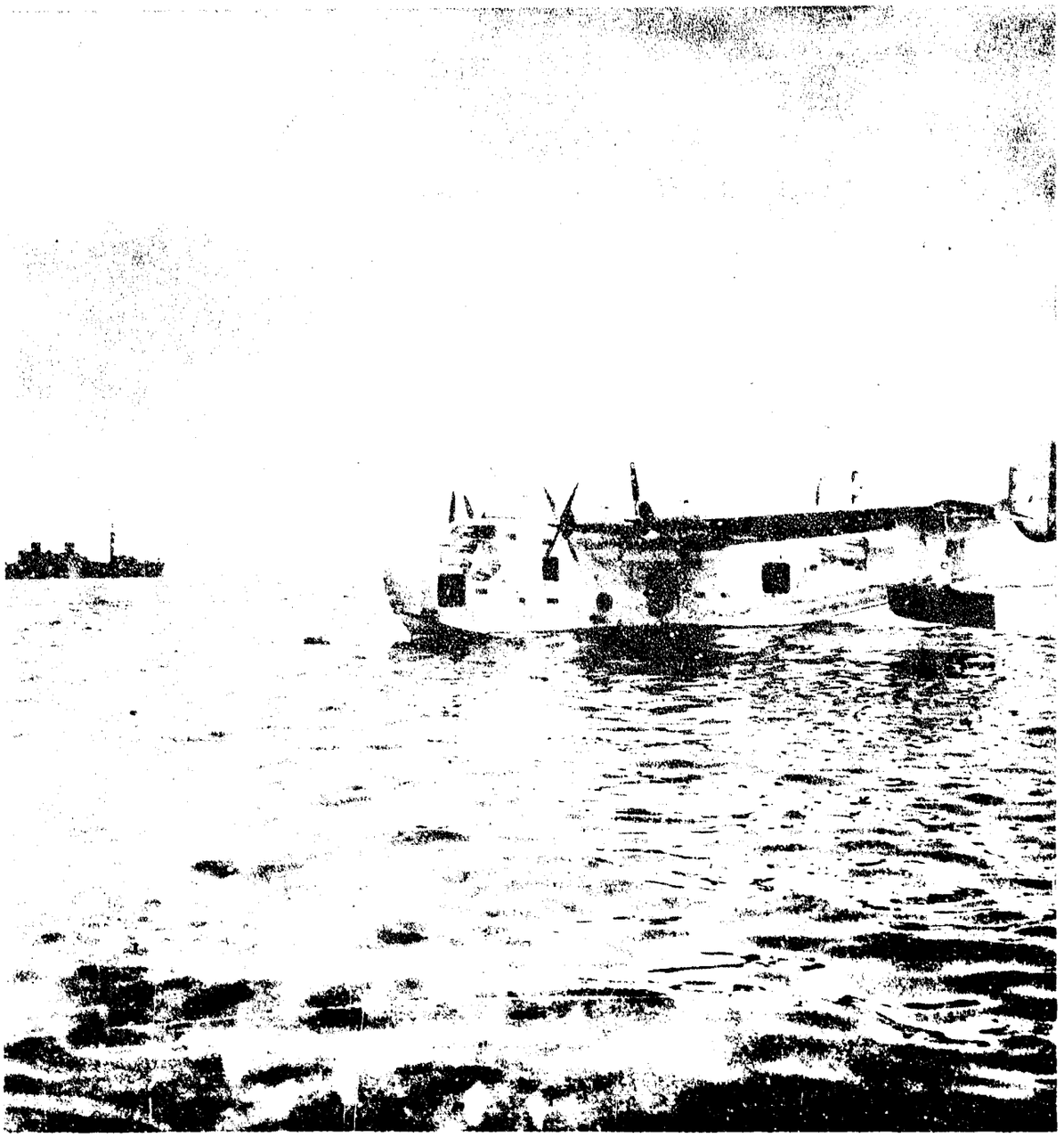


Model F6F-5N airplane aboard PENNSYLVANIA at approximately 1200 yards from burst. This airplane was essentially undamaged by Test BAKER, however extreme radiological contamination would prevent routine maintenance or operation.



Model F6F-5N BuNo 77749 on main deck of BARROW at approximately 1700 yards, illustrating indications of moderate distortion and twisting of port wing outer panel main spar from underwater shock transmitted through ship's structure.

Enclosure (C) to Director Ship Material Serial 001500



PHOTOGRAPH NUMBER:- AF-615*97

Model PB2Y-5H Airplane BuNo 7085 moored at approximately 3000 yards from burst. Additional damage sustained in Test BAKER; namely increase in buckling in nose above insignia, and further damage to after portion of fuselage, was caused by air blast effect. Note that temporary hatch covers installed after Test ABLE have been blown in.

IV - DAMAGE REPORTS

1. TEST ABLE

(a) AIRCRAFT

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31839 *ENGINE:* R-2600-20 *SERIAL:* 109724

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight Deck port side frame 90.

ARMAMENT AND BOMB LOAD: Two 20mm fixed M-2 Cannon; Twin .30 cal. mount rear. Ten rounds per gun, bolts removed. Two 500 pound GP inert bombs Fuzed nose and tail in bomb bay.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotecnnics.

REPORT ON DAMAGE TEST ABLE: This aircraft sustained light damage as a result of exposure to the bomb detonation. The fixed cabin assembly was dished on the port side. The cockpit canopy rear section had panels blown in on both sides. The actuation linkage of the aileron system was badly distorted rendering the ailerons inoperative. The flaps show indication of very slight distortion. The empennage was only damaged in that the trailing edges of the elevators were slightly dented.

Power plant components, armament, airborne equipment and electronics equipment suffered no damage.

Direction of the blast was 210° relative. Less damage would have resulted to control surfaces if this airplane had been oriented facing the blast.

Airplane was retained for use in Test Baker.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31859 *ENGINE:* R-2600-20 *SERIAL:* 121020

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight deck, stbd side fantail frame 219

ARMAMENT AND BOMB LOAD: Two 20mm fixed M-2 cannon forward; twin .30 cal. mount in rear. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Complete equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Full. Engine: Operated satisfactorily before and after Able.

Combat ready less: Bombs, ammunition, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained light damage as a result of exposure to the bomb detonation. The port side of the fixed cabin assembly was dished by the blast. The port side of the cockpit enclosure had two panels blown in. The starboard aileron control linkage was broken and the aileron cannot be moved above the neutral position. The starboard aileron tab is inoperable. The elevator security and actuating mechanism were damaged when the elevators were blown violently downward.

Electronic, armament and airborne equipment suffered no damage.

The engine was started and operated on Able plus 4 days. Power plant was given a standard pre-flight "run-up" and it functioned satisfactorily.

The direction of the blast was 200° relative. Less damage to control surfaces would have occurred had this airplane been oriented facing the blast.

This aircraft was retained for use in Test Baker in its present position on the SARATOGA, secured in a steel drip pan.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31853 *ENGINE:* R-2600-20 *SERIAL:* 121030

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight deck, amidships, frame 90.

ARMAMENT AND BOMB LOAD: Two 20mm fixed cannon (M-2); Twin .30 cal. mount rear. Ten rounds per gun. Bolts removed. Two inert 500 lb. G.P. bombs, live fuse - nose and tail - in bomb bay.

EQUIPMENT: Standard for type, less parachute. AN/ASG 10 MK1 Bomb Director, Two VG recorders and five gallon sealed can in cockpit.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Comba ready less: Bomb (except special 500 lb inert G.P. bomb), ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained light damage as a result of exposure to the bomb detonation. The fixed cabin assembly dished in on the port side. The rear section of the cockpit canopy had panels blown in on the port side. The elevator security and actuation mechanism were damaged when the elevators were blown violently downward.

This aircraft sustained no other damage. A sealed 5 gallon tin can placed in the cockpit was undamaged and not collapsed.

The direction of the blast was 200° relative.

This airplane would have sustained less damage to control surfaces had it been oriented facing the blast.

This aircraft was retained for use in Test Baker.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 59080 *ENGINE:* R-2600-20 *SERIAL:* 122284

TARGET VESSEL: SARATOGA *LOCATED IN VESSEL:* Flight Deck aft, port side frame 210.

ARMAMENT AND BOMB LOAD: Two .50 cal. BAM guns fixed; single .50 cal. in turret; ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft. Bomb sight MK 23 installed in bombardier's compartment.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Complete equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Full. Engine: Operated satisfactorily before and after Test ABLE.

Combat ready less: Bombs, ammunition, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained moderate damage as a result of exposure to the bomb detonation. The port side of the fuselage was very slightly dished in aft of the turret. The cockpit canopy was heavily damaged excepting for the first (wind screen) section and the turret which had only one panel blown in. The tail gunner's window below was blown in. The flaps sustained some buckling when they were blown downward by the blast. The security and actuating linkage of the elevators were severely damaged when the elevator was blown violently downward. The paint on the elevator fabric was slightly blistered and charred.

No damage was sustained by armament, electronics or airborne equipment except as noted above.

The engine of this aircraft was started and operated on Able plus 4 day. Power plant was given a standard pre-flight "run-up" check and it functioned satisfactorily.

The direction of the blast was 200° relative. The control surfaces would probably have been undamaged had this aircraft been oriented facing the blast.

This aircraft was retained in its present position, secured in a steel drop pan, for Test Baker.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69099 *ENGINE:* R-2600-20 *SERIAL:* 122143

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight deck port side frame 90.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns; single .50 cal turret aft; ten rounds per gun. Bolts removed. One aircraft mine in bomb bay.

EQUIPMENT: Standard for type less parachute and raft. One 5 gallon sealed can in cockpit. Bomb sight MK 15 in bombardier's compartment.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained light structural damage as a result of exposure to the bomb detonation. The cockpit canopy structure was damaged except for the first (wind screen) section and the turret. The gunner's window below was blown in. The flaps were buckled and damaged when they were blown downward by the blast. The elevator security and actuating mechanism were damaged when the elevators were blown violently downward by the blast.

Armament, electronic gear and power plant components were undamaged.

Airborne equipment except as mentioned above was undamaged. The air tight five gallon tin can in the cockpit was not collapsed.

Direction of the blast was 200° relative. The damage to control surfaces would have been less if this aircraft had been oriented into the blast.

This airplane was retained for use in Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77960 *ENGINE:* R-2800-10W *SERIAL:* Not readable.

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight deck, port side, frame 60.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed; 10 rounds per gun. Bolts removed. 11.75" MKII Mod 10 Rocket Body inert with MK16 Mod 1 Base Fuse on port bomb rack.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.
Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: The only damage sustained by this aircraft was so slight that it can not even be called light. The port side between stations 82 and 97 the skin shows slight oil canning. The accessory cowling is very slightly dished.
Direction of the blast was 200° relative.
This aircraft was retained for use in Test Baker.

AIRPLANE: F6F-5N *SERIAL:* 77637 *ENGINE:* R-2800-10W *SERIAL:* HP-211516

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, amidships, frame 95.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM fixed guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.
Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77749 *ENGINE:* R-2800-10W *SERIAL:* HP-210913

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, amidships, frame 85.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun.

EQUIPMENT: As specified for type. No parachute or raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: F6F-5N *SERIAL:* 78086 *ENGINE:* R-2800-10W *SERIAL:* HP-211125

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, stbd side, frame 85.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun.

EQUIPMENT: As specified for type. No parachute or life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 78068 *ENGINE:* R-2800-10W *SERIAL:* HP-211412

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight deck, stbd side, frame 50.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun. Six HVAR inert rockets MK 6 Mod 1 with live fuses nose and base.

EQUIPMENT: As specified for type. No parachutes or raft. Five gallon sealed can in cockpit. MK 23 Mod 1 gunsight in pilot's cockpit.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: TBM-3E *SERIAL:* 69188 *ENGINE:* R-2600-20 *SERIAL:* 109490

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, port side, frame 130.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fwd; single .50 cal turret aft. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69095 *ENGINE:* R-2600-20 *SERIAL:* 109607

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, stbd side, frame 120.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fwd, single .50 cal in turret. Ten rounds per gun, bolts removed.

EQUIPMENT: As specified for type, less parachutes.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: TBM-3E *SERIAL:* 69169 *ENGINE:* R-2600-20 *SERIAL:* 122086

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, port side, frame 120.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fwd; single .50 cal in turret; ten rounds per gun, bolts removed.

EQUIPMENT: As specified for type. No parachutes or rafts. Five gallon can sealed and installed in cockpit.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and charged.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77648 *ENGINE:* R-2800-10W *SERIAL:* HP-210951

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, port side, frame 85.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun.

EQUIPMENT: As specified for type. No parachute or raft. Five gallon sealed can in cockpit.

ELECTRONICS Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved internally.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: TBM-3E *SERIAL:* 69094 *ENGINE:* R-2600-20 *SERIAL:* 122102

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Flight deck, frame 100 (Amidships).

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fixed, single .50 cal turret gun. Ten rounds per gun. MK 13 aircraft torpedo, inert head charged air flask.

EQUIPMENT: As specified for type. No parachute.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - ten day preservation.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69197 *ENGINE:* R-2600-20 *SERIAL:* 122145

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, stbd side, frame 130.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns; single .50 cal turret. Ten rounds per gun.

EQUIPMENT: As specified for type. No parachutes or rafts.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: SBF-4E *SERIAL:* 31850 *ENGINE:* R-2600-20 *SERIAL:* 121042

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, stbd side, frame 100.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed M-2 cannon; twin .30 cal mounts, rear. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type. No parachutes or rafts. Five gallon sealed can in cockpit. "VG" Recorder BuAer Spec. SQ-142 in bomb bay.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31894 *ENGINE:* 2600-20 *SERIAL:* 123108

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Port side, hangar deck, frame 110.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed cannon. Twin .30 cal free guns aft. Ten rounds per gun. Bolts removed.

EQUIPMENT. Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31889 *ENGINE:* R-2600-20 *SERIAL:* 122790

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Hangar deck, port side, frame 100.

ARMAMENT AND BOMB LOAD: Two 20 mm M-2 fixed cannon; twin .30 cal mount, rear. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type. No parachutes or rafts.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: SBF-4E *SERIAL:* 31840 *ENGINE:* 2600-20 *SERIAL:* 123575

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* Stbd hangar deck, frame 110.

ARMAMENT AND BOMB LOAD: Two 20 mm cannon; twin .30 cal free guns aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31843 *ENGINE:* R-2600-20 *SERIAL:* 121067

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Hangar deck, stbd side, frame 75.

ARMAMENT AND BOMB LOAD: Two 20 mm cannon fixed; twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachutes and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft on the hangar deck was completely demolished as a result of exposure to the bomb detonation. It was pulled clear of its tie down security and major structural components were very heavily damaged. The fuselage was broken off just aft of the wing trailing edge. The outer panels of the wing were crumpled and broken from stub wings. The wing stubs, main landing gear and the engine mounts are intact and undamaged.

Ring mount from the rear cockpit was found in the wreckage but twin .30 cal mount and adapter were not recovered. MK 8 reflector plate was broken. MK 9 was not recovered.

Any electronics units which were salvaged required major overhaul and could only be used for salvage parts.

Auxiliary fuel tank was undamaged.

Power plant components were undamaged.

Relative direction of the blast was 210°.

Since all aircraft on this vessel were missing or completely demolished, little of significance can be learned by a more detailed description of damage to component parts.

Remaining parts of this aircraft were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (0143)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31849 *ENGINE:* R-2600-20 *SER* 121089

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Hangar deck, amidships, frame 72-80.

ARMAMENT AND BOMB LOAD: Two 20 mm cannon (fixed); twin .30 cal. mount rear. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type. No life raft or parachute. Five gallon can in cockpit. "VG" recorder.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft in the hangar deck was demolished completely as a result of exposure to the bomb detonation. It was swiveled about in its security and major structural components were heavily damaged. The fuselage was broken off just aft of the trailing edge of the wing. Both outer panels of the wing were blown about and are not secure. The stub wings, the landing gear, the engine mounts and engine and propeller were relatively intact and undamaged.

The 20 mm cannon were undamaged but rear cockpit armament equipment is missing. MK 8 reflector plate was broken. MK 9 was not recovered.

Units of electronic gear would require major overhaul or be used for salvage parts only.

Auxiliary drop tank was undamaged. Five gallon airtight tin can was demolished in wreckage.

Propeller blades were bent but aircraft engine and accessory components suffered little or no damage.

The direction of the blast was about 210° relative.

Since all aircraft on this vessel were missing or completely demolished little of significance can be learned by more detailed description of damage to component parts.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31856 *ENGINE:* R-2600-20 *SERIAL:* 121083

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Stbd side, flight deck, frame 75.

ARMAMENT AND BOMB LOAD: Two M-2-20 mm cannon fixed; twin .30 cal. mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachutes and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft, though not missing, was thrown on its back over on the starboard catwalk. Both wings were gone, the fuselage was broken off aft of the wing stubs and the main structure was heavily crushed. The wing stubs themselves were still intact though badly wrenched. The main landing gear and engine mounts were still secure though possibly distorted.

Rocket launchers were missing on port side. Those on starboard side were badly bent. Gunsight was missing. Bomb racks and 20 mm cannon were undamaged.

Units of electronic equipment which were salvaged were in need of major overhaul or could be used only for salvage parts.

External drop tank was missing. Other equipment demolished.

Propeller blades badly bent, major damage. Engine and accessory section were still intact and attached to the fuselage, which was upside down on flight deck.

Direction of the blast was 210° relative.

Since all aircraft on this vessel were missing or completely demolished little of significance can be learned by a more detailed description of damage to component parts.

Remaining parts of this aircraft were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77569 *ENGINE:* R-2800-10W *SERIAL:* HP-210873

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Port side, hangar deck, frame 65.

ARMAMENT AND BOMB LOAD: Six .50 cal. BAM guns fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft on the hangar deck of INDEPENDENCE was completely demolished as a result of exposure to the bomb detonation. The fuselage was broken aft of the cockpit. Both wings and wing stubs were badly crushed and wrenched. The engine mounts were partly broken but still hold the engine. The main landing gear is intact, though one tire is flat and appears to have blown out.

Detailed inspection was not made. Bomb racks and guns appeared capable of operation. Rocket launchers were bent, probably from collision with flying debris.

Units of electronic gear would require major overhaul and would be fit only for salvage of parts.

Airborne equipment - no detailed inspection made.

Propeller blades were full of nicks and bent. No detailed inspection was made of power plant components.

Direction of the blast was 210° relative.

Since all aircraft on this vessel were missing or completely demolished little of significance can be learned by a more detailed description of damage to component parts.

Remaining parts of this aircraft were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77349 *ENGINE:* R-2800-10W *SERIAL:* P-14804

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Stbd side, hangar deck, frame 65.

ARMAMENT AND BOMB LOAD: Six .50 cal. BAM fixed guns fwd. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and life raft. Five gallon sealed can in cockpit.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft on the hangar deck was completely demolished as a result of exposure to the bomb detonation. The fuselage was broken aft of the cockpit. Both wing panels sustained heavy damage. The stub wing section appears to be intact but may be distorted. The main landing gear and the engine mounts appear to be intact and undamaged.

Items in cockpit and guns were undamaged.

Items of electronic gear would require major overhaul or could be used only for salvagable parts.

No detailed inspection was made of airborne equipment. Five gallon airtight can was demolished with the plane.

Only damage sustained to power plant components was that to propeller blades and these blades were probably bent by flying debris.

Direction of the blast was 210° relative.

Since all aircraft on this vessel were missing or completely demolished, little of significance can be learned by a more detailed description of damage to component parts.

Remaining parts of this aircraft were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69116 *ENGINE:* R-2600-20 *SERIAL:* 108503

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Stbd side, hangar deck, frame 85.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fwd; one .50 cal in turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft on the hangar deck was demolished completely as a result of exposure to the bomb detonation. It was swiveled about on its security to the deck amd major structural components were heavily damaged by the blast and by collision with other aircraft and parts of the ship's structure. The fuselage was broken aft of the turret. The engine was torn from the mount and blown against the bulkhead. The main landing gear was intact and undamaged.

Turret mount was torn out of the plane and badly damaged. Gun sights were broken by the blast. Rocket launchers were bent.

Salvaged electronic units were fit only for salvage of parts.

External fuel tank was torn from rack. Other equipment was demolished..

Engine and propeller were torn from engine mounts and plastered up against starboard hangar bulkhead. Major damage to engine, propeller and accessories. No detailed inspection was made.

Direction of the blast was 210° relative.

Since all of the aircraft on this vessel were missing or completely demolished little of significance can be learned by a more detailed description of damage to component parts.

Remaining parts of this airplane were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE. TBM-3E *SERIAL:* 69275 *ENGINE:* R-2600-20 *SERIAL:* N-77088

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Hangar deck, port side, frame 89-98.

ARMAMENT AND BOMB LOAD: Two .50 cal fixed BAM guns fwd; one .50 cal gun in turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and life raft.

INSTRUMENTS: Complete less clock and auto pilot. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft on the hangar deck of the INDEPENDENCE was demolished as result of exposure to the bomb detonation. It was still secured to the deck in its approximate position, but flying debris and the blast pressure together damaged all structural components. The landing gear was intact except for the port tire which was cut and flat. The engine was secure on the engine mounts.

Starboard wing gun was missing. Turret was completely torn out and wrecked. Rocket launchers were bent and gunsight was broken.

Electronic units would require major overhaul and are fit only for salvage of parts.

External fuel tank was torn from bomb rack.

Propeller blades were bent, probably from flying debris. No other power plant damage noted.

Direction of the blast was 210° relative.

Since all aircraft on this vessel were missing or completely demolished little of significance can be learned by a more detailed description of damage to component parts.

Remaining parts of this aircraft were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69063 *SERIAL:* R-2600-20 *SERIAL:* 122087

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Port side, flight deck, frame 80.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fixed; one .50 cal in turret aft. Ten rounds per gun. Bolts removed. Inert mine in bomb bay.

EQUIPMENT: Standard for type less parachute and life raft.

INSTRUMENTS: Complete less clock and auto pilot. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Aircraft missing. One small part of mine found on port side of flight deck frame 85. Taken in charge by BuOrd representative.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69239 *ENGINE:* R-2600-20 *SERIAL:* 109565

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Stbd side, flight deck, frame 70.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fixed; one single gun turret aft .50 cal. Ten rounds per gun. Inert MK13 torpedo (live air flask) in bomb bay.

EQUIPMENT: Standard for type less parachute and life raft.

INSTRUMENTS: Complete less clock and auto pilot. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Aircraft missing. Torpedo found on flight deck at frame 90. Inert head missing, air flask and tail section remained. Taken in charge by BuOrd representative.

AIRPLANE: TBM-3E *SERIAL:* 69124 *ENGINE:* R-2600-20 *SERIAL:* 64722

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Stbd side, flight deck, frame 130.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns; one .50 cal in turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Full. Engine: Operated satisfactorily prior Test ABLE.

Combat ready less: Bombs, ammunition, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: MISSING - Blown overboard.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77492 *ENGINE:* R-2800-10W *SERIAL:* HP-211462

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Flight deck, stbd side, frame 65.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns (fixed). Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft. Five gallon sealed can in cockpit.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Fuel - empty. Oil - 13 gal. Engine: Not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Aircraft missing: Blown overboard. Outboard port .50 cal gun found in port wing aft of island on flight deck frame 60. Barrel and barrel gasket bent, but apparently gun otherwise operable.

AIRPLANE: F6F-5N *SERIAL:* 77433 *ENGINE:* R-2800-10 *SERIAL:* 48636

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Flight deck, port side, frame 60.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel tank: Empty. Oil tank - 17 gal. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: MISSING - Blown overboard.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31857 *ENGINE:* R-2000-20 *SERIAL:* 121055

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Port side, flight deck, frame 130.

ARMAMENT AND BOMB LOAD: Two .20 mm M-2 cannon (fixed); twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Full. Engine: Operated satisfactorily prior to Test ABLE.

Combat ready less: Bombs, ammunition, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: MISSING - Blown overboard.

AIRPLANE: SBF-4E *SERIAL:* 31852 *ENGINE:* R-2600-20 *SERIAL:* 121049

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* Flight deck, port side, frame 70-80.

ARMAMENT AND BOMB LOAD: Two 20 mm cannon (fixed); twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

SPECIAL EQUIPMENT: VG recorder.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: MISSING - Blown overboard.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: OS2U-3 *SERIAL:* 09632 *ENGINE:* 985-AN-2 *SERIAL:* 12771

TARGET VESSEL: ARKANSAS *LOCATION IN VESSEL:* Top No. 3 turret.

ARMAMENT AND BOMB LOAD: One .30 cal fixed gun fwd; one .30 cal free gun aft. Ten rounds per gun. Bolts removed. One inert 100 lb. G.P. bomb, fused.

EQUIPMENT: Standard equipment for type less parachutes and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Missing except for catapult fitting and float keel strip found on car on turret No. 3.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: XSC-1 *SERIAL:* 35300 *ENGINE:* 1820-62 *SERIAL:* 114904

TARGET VESSEL: NEW YORK *LOCATION IN VESSEL:* Catapult, amidships.

ARMAMENT AND BOMB LOAD: Two .50 cal fixed BAM guns fwd. Ten rounds per gun. Bolts removed. Inert 100 lb. G.P. bomb with live fuses.

EQUIPMENT: Standard equipment for type less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage to structural components. Fuselage aft of the cockpit was buckled, the skin heavily wrinkled, frames buckled. Wings showed no damage to main structure or wrinkling of skin. All control surfaces were heavily damaged, with some flap, aileron, rudder and elevator hinges broken. Main float suffered minor dents and scratches. Cockpit canopy had plexiglass panels blown out. Fabric on control surfaces was lightly burned and charred. No damage forward of cockpit.

Power plant, armament and airborne equipment suffered no damage. Electronic equipment had only a switch broken from secondary causes. The fuse in the 100 lb. inert bomb was intact.

This aircraft was tailed into the blast (relative bearing about 155°) and would have suffered less damage, particularly to control surfaces had it been facing the blast. Securing cables were intact.

Aircraft was retained for use in Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: SC-1 *SERIAL:* 35561 *ENGINE:* 1820-62 *SERIAL:* 99855

TARGET VESSEL: NEW YORK *LOCATION IN VESSEL:* Port side main deck Fr. 80.

ARMAMENT AND BOMB LOAD: Two .50 cal fixed guns forward. Ten rounds per gun. Bolts removed. No special bombs.

EQUIPMENT: Standard for type less parachutes and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage to structural components. Fuselage turtleback was crushed downward, fuselage heavily wrinkled and buckled with rivets pulled away from frames where skin was badly distorted. The main float strut was slightly bent, the float being undamaged except for minor scratches. Plexiglass was blown out in the cockpit canopy. Main structure of wings was undamaged and ailerons appeared to be intact and operable. Flaps and tail surface controls were badly damaged including broken attachment fittings.

Power plants, armament and airborne equipment suffered no damage. Some damage to electronics was caused by the fuselage access door being blown into the fuselage.

This airplane was tailed into the blast (relative bearing about 155°) with blast pressure being exerted from aft and above. Less damage would have resulted with the airplane oriented to face the blast.

Securing cables were intact.

This aircraft was retained in its present position for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: OS2U-3 *SERIAL:* 5765 *ENGINE:* 985-AN-2 *SERIAL:* 12558

TARGET VESSEL: NEVADA *LOCATION IN VESSEL:* Main deck stbd side aft-fr. 130.

ARMAMENT AND BOMB LOAD: One .30 cal fixed gun fwd. One .30 cal free gun aft. Ten rounds per gun, bolts removed. Inert 100 lb. G.P. bomb - fused.

EQUIPMENT: Standard equipment for type less parachutes and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel tanks: Empty. Engine: Operable and not preserved.

Oil tank: 7 gal.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft was completely demolished. Aircraft was blown off the catapult about 50 feet forward onto the deck. Main float was detached from the fuselage and crushed. Fuselage aft of the rear cockpit was broken off and blown over the side. Other structure was badly distorted. Starboard wing is missing and about eight feet of the port wing still attached to the fuselage was badly distorted. Paint charred from heat but no evidence of airplane burning.

Propeller blades distorted from engine falling on deck with forward part of fuselage. Engine fairly intact.

Armament, equipment and electronics demolished from primary and secondary causes.

Blast occurred aft of this airplane, slightly on the port side, relative bearing about 200°, with no protection from the ship's structure.

The remaining parts of this airplane were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: OS2U-3 *SERIAL:* 5742 *ENGINE:* 985-AN-2 *SERIAL:* 12462

TARGET VESSEL: NEVADA *LOCATION ON VESSEL:* On catapult aft #4 turret, frame 123.

ARMAMENT AND BOMB LOAD: One .30 cal fixed gun fwd. One .30 cal free gun aft. Ten rounds per gun, bolts removed. One 100 lb. G.P. inert bomb fused.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Fuel, empty; oil, 5 gallons. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft was completely demolished, torn from its securings and overturned 20 feet away onto the deck. The main float was detached and crushed. Fuselage aft of the cockpit was broken off and missing. Port wing is missing. A portion of the starboard wing is missing, the remainder badly buckled.

Armaments, airborne equipment and electronics were demolished along with supporting structure. Power plant and components badly damaged from landing on gun structure.

Paint charred from heat of blast and fire on the NEVADA. No evidence of aircraft burning.

Direction of the blast was about 200° relative.

Remaining parts of airplane were jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: OS2U-3 *SERIAL:* 5342 *ENGINE:* 985-AN-2 *SERIAL:* 10070

TARGET VESSEL: PENNSYLVANIA *LOCATION IN VESSEL:* On catapult.

ARMAMENT AND BOMB LOAD: One .30 cal fixed gun fwd, one .30 cal free gun aft. Ten rounds per gun, bolts removed. One inert 100 lb. G.P. bomb, fused.

EQUIPMENT: Standard equipment for type less parachutes. One MK II life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Aircraft intact and operable.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft received moderate damage as a result of the bomb blast and major damage as a result of being blown off the catapult onto the deck. The main float was dented and punctured by the fall and striking protuberances. Port side of engine accessory cowl and fuselage between cockpits heavily dished by blast. After tie down tube pulled through bottom of fuselage by securing cable. Starboard wing badly buckled and fuselage skin wrinkled on starboard side from wing striking deck. Heavy damage to control surfaces and flaps, including distorted frames, burned fabric, broken hinges. Cockpit plexiglass blown out.

Power plant and airborne equipment undamaged.

Port bomb rack received minor damage. The 100 lb. bomb was released and on deck with vanes and fuse caps missing from nose and tail fuses.

Electronic gear inspected visually appeared to be undamaged.

Direction of the blast was about 215° relative, with no protection from the ship's structure.

The aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: OS2U-3 *SERIAL:* 5584 *ENGINE:* 985-AN-2 *SERIAL:* 12774

TARGET VESSEL: PENNSYLVANIA *LOCATION IN VESSEL:* Main Deck Aft, frame 130.

ARMAMENT AND BOMB LOAD: One .30 cal fixed gun fwd, Twin .30 cal guns aft. Ten rounds per gun, bolts removed. One 100 lb. G.P. bomb fused.

EQUIPMENT: Standard equipment for type less parachutes. One MK II life raft. No special equipment.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION:

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft was tilted in its cradle and suffered major damage to control surfaces and light structures. Main float was dented, skin wrinkled, and seams opened at one point. Top of fuselage between cockpits dished in, port side of accessory cowl dished, plexiglass blown out of cockpit canopy, and after tie down tube was pulled through the bottom of the fuselage by the securing cable. All control surfaces heavily damaged with frames buckled, fabric burned and hinges broken.

Power plant and armament were undamaged. Airborne equipment and electronics were damaged only from secondary causes, with electronic equipment in most cases operable after the blast.

Direction of the blast was about 215° relative with no protection from ship's structure. This aircraft would have survived a blast from ahead with considerably less damage.

Aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: OS2U-3 *SERIAL:* 09574 *ENGINE:* 985-AN-2 *SERIAL:* 12925

TARGET VESSEL: SALT LAKE CITY *LOCATION IN VESSEL:* Stbd. Catapult Mount Frame 60.

ARMAMENT AND BOMB LOAD: One fixed .30 cal forward, twin .30 cal free guns aft. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard equipment for type less parachutes, and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and Oil Tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Missing - blown overboard. Right wing tip float and aileron found on forecastle.

AIRPLANE: OS2U-3 *SERIAL:* 5956 *ENGINE:* 985-AN-8 *SERIAL:* 31903

TARGET VESSEL: PENSACOLA *LOCATION IN VESSEL:* Port Catapult Mount, Frame 65.

ARMAMENT AND BOMB LOAD: One fixed .30 cal fwd, one .30 cal. free gun aft. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type less parachutes and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Missing - found hanging over port side by cable around propeller shaft, 90% submerged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: PB2Y-5H *SERIAL:* 7085 *ENGINES:* R-1830-92 *SERIALS:* P-357547, P-357729, P-357700, P-357554.

LOCATION OF AIRPLANE: Moored in target area.

ARMAMENT AND BOMB LOAD: None since this is a hospital airplane.

EQUIPMENT:. As specified for type, less parachutes and life rafts.

INSTRUMENTS: Complete, less clock.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.
Fuel: 1100 gals; Oil: 160 gal; Engines: Operable not preserved. All engines operated before and after Test ABLE.

Combat ready less: Safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained major damage as a result of exposure to the bomb blast. The port side was heavily dished with some of the framing buckled above the anchor hatch from station 58 to station 150. The anchor hatch was blown in and the anchor hatch frame was somewhat bowed in. From station 150 to 264 on a level with the anchor hatch, the side was dished in. The hatch to the navigator's compartment was buckled slightly and blown in, it's frame being slightly bowed. From station 350, the side of the fuselage was dished heavily with its framing bowed in aft to station 470 at the level of the midship hatch. Aft of station 470 at this level there was lighter dishing of skin and framing. The beaching gear hatch was blown in and slightly buckled but its frame is relatively undistorted. The midships hatch was blown in and badly wrinkled and the steps leading down into the midships compartment were bowed downward. From station 380 at the level of the waist hatch and above the skin was dished and wrinkled longitudinally all the way up to station 820 with framing buckled and bowed in. The waist hatch was blown in and heavily buckled, its rollers were off the track. At station 706 the skin was gaping from WL plus 120 to WL plus 192, the riveting on the frame having pulled out. The starboard side was slightly dished in from station 274 to station 469 with frames slightly bowed in but not heavily buckled. Aft of station 469 there was further dishing in and wrinkling of skin. The waist hatch was blown in and slightly buckled. When its rollers were replaced on the track it was possible to close and secure this hatch. The cockpit canopy and wind screen had panels of plexiglass blown in on the port side. The seams in the hull are apparently intact and the aircraft is not taking water in appreciable amounts. All compartmentation doors were wrenched or blown open, but could be closed and secured. The only notable damage to the wings was the blowing open of bomb bay doors, all of which were uniformly blown in by the blast on both wings. The aileron and flap systems were intact and undamaged.

The only notable damage to the empennage consisted of slight dishing and wrinkling of the port side of the port vertical fin. The empennage was otherwise undamaged.

There was no damage to airborne equipment or electronics.

The power plants were operated satisfactorily before and after Test ABLE, by a flight test with the BuAer Group prior to the test and by taxiing to a protected mooring after the test.

Direction of the blast was about 330° relative.

This seaplane was repaired to insure watertight integrity and retained for use in Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: PB2Y-5H *SERIAL:* 7052 *ENGINES:* R-1830-92 *SERIALS:* P-138399, P-138428, P-138440, P-138386.

LOCATION OF AIRPLANE: Moored in target area.

ARMAMENT AND BOMB LOAD: None since this is a hospital airplane.

EQUIPMENT: As specified for type, less parachutes and life rafts.

INSTRUMENTS: Complete, less clocks.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable.

Fuel: 900 gals; Oil: 160 gals; Engines: Operable, not preserved. Engines operated before and after Test ABLE.

Combat ready less: Safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained major damage to the hull, fuselage and isolated light damage as a result of exposure to the bomb detonation. The port side sustained blast damage. The anchor hatch was dished in and slightly buckled, but its security remained intact. From station 70 to the navigation compartment hatch, the skin is lightly dished and wrinkled and the frames slightly bowed. The navigation hatch is buckled slightly but its security is intact. The after panel of the pilot's port side canopy was blown in. The beaching gear hatch was blown in but is intact and could be forced back into a secure position. The midships hatch was blown in and pulled off its hinges. Distortion of the door and its frame was almost negligible and it was easily closed and secured. The side dishing in which occurred from station 264 to station 585 was very light. The waist hatch was blown in and its frame was slightly distorted as evidenced by wrinkles in the skin near its corners. Aft of station 585, the entire side from WL plus 106 to WL plus 182 and aft to station 830 was moderately dished in with the framing bowed in but stringers intact. The seams and riveting are intact. The starboard side of the fuselage was apparently undamaged. The hull underwater was apparently undamaged with no seams spread. The compartments are not taking water in any appreciable quantity. The only damage to the wing group was to the bomb bay doors on the port side which were all buckled, though not completely blown in. The aileron and flap systems were undamaged and are operable.

There was no damage to airborne equipment or electronics.

Power plants were operated before and after the test, prior to Test ABLE by a flight test by the BuAer Group and after the test by taxiing to protected moorings.

Direction of the blast was about 330° relative.

This seaplane was repaired and retained for use in Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 71358 *ENGINE:* 2800-10W *SERIAL:* HP-201986

TARGET VESSEL: GILLIAM APA 57 *LOCATION IN VESSEL:* Port side, upper deck, aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fwd. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type, less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Fuel empty; oil, 7 gals. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: MISSING - Sunk with USS GILLIAM.

AIRPLANE: FM-2 *SERIAL:* 73535 *ENGINE:* 1820-56W *SERIAL:* 116203

TARGET VESSEL: GILLIAM APA 57 *LOCATION IN VESSEL:* 2nd platform, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns fwd. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type, less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: MISSING - Sunk with USS GILLIAM.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 87847 *ENGINE:* R-2800-8W *SERIAL:* 323039-P

TARGET VESSEL: BANNER APA 60 *LOCATION IN VESSEL:* Port side upper deck aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns, ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel tank: empty; Oil tank: 17 gals. Engine: Operable, preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained moderate damage as a direct result of exposure to the blast. The fuselage was buckled slightly and dished in on the starboard side aft of the cockpit. The controls were rather badly blown about and suffered major damage generally. The ailerons made of plywood were completely splintered. The main structure of the wings was intact and undamaged and the landing gear was entirely intact. The cockpit canopy sliding section had plexiglass blown in. The engine accessory cowling heavily dished in.

There was no damage to armament or electronics equipment.

There was no further damage to power plant or airborne equipment other than Universal drop tank collapsed and unusable and the cowl flaps were blown open and three sections blown from their hinges.

Direction of the blast was 160° relative. It is apparent that heavy damage to controls resulted largely from the aircraft being tailed into the blast.

This aircraft was retained in its present position for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 55299 *ENGINE:* R-1820-58W *SERIAL:* 117590

TARGET VESSEL: BANNER APA 60 *LOCATION IN VESSEL:* No. 2 Cargo Hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun, bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel tank: empty; Oil tank: 17 gals. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage when hatch covers overhead fell on it. The fuselage sustained the greater part of the impact. The wings were dented and punctured by falling debris as was the empennage to a lesser degree. None of the damage can be attributed directly to the physical phenomena associated with the detonation of the bomb.

No additional damage other than that mentioned above was sustained by armament, electronics and airborne equipment or to power plant components.

A more detailed description of damage to aircraft and components is of no significance since this airplane would have been completely undamaged except for loose pontoon hatch covers falling into the cargo hold.

The aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 56736 *ENGINE:* R-1800-56W *SERIAL:* 115592

TARGET VESSEL: BARROW APA 61 *LOCATION IN VESSEL:* Stbd side, upper deck, aft.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage as result of exposure to the bomb blast. The fuselage aft of the cockpit was badly buckled and the monocoque section failed and collapsed in several places. The cockpit canopy sliding section was demolished. The main landing gear was intact, but the tail wheel was broken. The main framing of the wings is generally intact and undamaged except where the wing tips struck the deck. The ailerons and flaps suffered blast damage and are generally beyond repair. The empennage is slightly damaged, components having blown about and slightly distorted by blast; the fabric on the rudder port side and on the port elevator tip has been burned.

Broken gunsight bulb was only damage sustained to armament equipment.

Electronic units received no damage.

External fuel tank and oil tank were dished in approximately 1" but useable. Flight controls were inoperative.

No damage to power plant or components.

Direction of the blast was 320° relative.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 47238 *ENGINE:* R-1820-56W *SERIAL:* 117666

TARGET VESSEL: BARROW APA 61 *LOCATION IN VESSEL:* No. 2 Cargo Hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage as a direct result of the collapse and fall of overhead hatch covers which struck its structure. The fuselage was crushed from the forward end of the cockpit canopy to the monocoque. The monocoque section itself collapsed, the back of the fuselage being broken down. The starboard wing sustained heavy structural damage on its trailing edge and dents and punctures at random from the falling covers. The flaps and ailerons were completely collapsed. The main landing gear, the tail wheel and the entire empennage were undamaged. The engine and engine mount were intact.

No other damage was sustained by armament, electronic and airborne equipment or by power plant components.

A detailed description of damage to component parts is of no significance since this aircraft would have been completely undamaged except for loose hatch pontoons falling into the cargo hold.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 87396 *ENGINE:* 2800-8W *SERIAL:* R-23117

TARGET VESSEL: BLADEN APA 63 *LOCATION IN VESSEL:* Port side upper deck aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachutes and rafts.

INSTRUMENTS: Complete less closk. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Fuel empty; oil 12 gals. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained very light damage. The plexiglass in the cockpit canopy was blown in on the port side. Port wing had fabric ruptured on the lower side. Paint on the aileron tab was charred. Rudder was blown to starboard side, slightly distorted and had fabric burned. There was no other damage except cowl flap hinges slightly sprung.

The blast direction was from 210° relative.

This airplane was retained in its present position for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BEREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 47265 *ENGINE:* 1820-56W *SERIAL:* 116097

TARGET VESSEL: BLADEN APA 63 *LOCATION IN VESSEL:* 2nd Platform Cargo Hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready except: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 82433 *ENGINE:* R-2800-10W *SERIAL*

TARGET VESSEL: BUTTE APA 68 *LOCATION IN VESSEL:* Upper deck stbd. side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel tank: empty; Oil tank: 14 gals. Engine: Operable - preserved.

Combat ready less: Bqmbs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained moderate damage as a direct result of exposure to the bomb. The fuselage was completely undamaged. Both wing fold hinges were wrenched from their security to the wing stub main spar shearing attachment bolts. Fabric on the underside of the port wing was partly burned and ruptured. The landing gear was completely intact and undamaged. The rudder and fin only of the empennage group were damaged; the rudder had fabric burned off on the port side, and the vertical fin skin was slightly dished on the same side. The port side of the canopy sliding section was blown in.

There was no damage to power plant, airborne equipment, armament or electronics.

It appears that the folded wings were partially spread by the blast and then blown violently backwards. This airplane would have received very light damage had the wings been spread.

Direction of the blast was about 310° relative.

This aircraft was retained in its present position on the BUTTE for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 65901 *ENGINE:* R-1820-56 *SERIAL:* 116326

TARGET VESSEL: BUTTE APA 68 *LOCATION IN VESSEL:* No 2 Cargo Hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft received major structural damage solely as a result of pontoon hatch covers becoming dislodged and falling into the cargo hold onto the airplane. The turtle back aft of the cockpit was crushed and the monocoque section of the fuselage collapsed and was badly buckled. Both wings and tail sections were heavily damaged by falling debris.

Components were damaged from secondary causes but a detailed description of the damage is of no significance since it was not caused directly by the bomb blast.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 88046 *ENGINE:* 2800-8W *SERIAL:* 212412

TARGET VESSEL: CARTERET APA 70 *LOCATION IN VESSEL:* Upper deck, stbd side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Fuel empty; oil 5 gal. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major structural damage from the blast. Engine accessory cowl dished in, fuselage was buckled and partially collapsed on the starboard side of the cockpit. The starboard wing outer panel was carried away pulling the wing fold hinge out of the stub wing section. Flaps were blown down and hinges damaged. Aileron paint burned highly. Rudder was carried away.

There was no damage to power plants or equipment except for a slight dish in the droppable fuel tank.

Electronics equipment tested and showed no damage.

Armament was damaged from secondary causes, guns in starboard wing panel missing with wing.

Direction of the blast was 195° relative.

This airplane was retained in its present location on the CARTERET for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 56954 *ENGINE:* 1820-56 *SERIAL:* 98327

TARGET VESSEL: CARTERET APA 70 *LOCATION IN VESSEL:* 2nd platform cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, safety equipment, fuel, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

AIRPLANE: F6F-5 *SERIAL:* 71753 *ENGINE:* 2800-10W *SERIAL:* 59276

TARGET VESSEL: CORTLAND APA 75 *LOCATION IN VESSEL:* Upper deck, stbd side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered very light damage to the rudder which had paint scorched on the side facing the blast. Cockpit canopies were intact.

No damage to power plant, equipment, armament or electronics from the blast.

Direction of the blast was 300° relative.

This aircraft was retained in its present location in the CORTLAND for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 56756 *ENGINE:* 1820-56W *SERIAL:* 117621

TARGET VESSEL: CORTLAND APA 75 *LOCATION IN VESSEL:* 2nd platform, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type, less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2' *SERIAL:* 56945 *ENGINE:* R-1820-56W *SERIAL:* 97782

TARGET VESSEL: CRITTENDEN APA77 *LOCATION IN VESSEL:* #2 cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained extreme damage as a result of being struck by the overhead hatch covers. The fuselage was crushed from the engine mounts to the monocoque section. The monocoque itself was flattened and crushed beyond recognition. The wing structure suffered major damage being crushed by the falling hatch covers. The empennage was completely flattened. The engine, engine mounts, and the main landing gear were undamaged.

Armament, electronics and airborne equipment suffered damage when cargo hatch panels fell on aircraft. Power plant components were undamaged.

A more detailed description of damage to components is of no significance since this aircraft would have been completely undamaged except for the loose pontoon hatch falling into the cargo hold.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 55266 *ENGINE:* R-1820-56 *SERIAL:* 76282

TARGET VESSEL: CRITTENDEN APA 77 *LOCATION IN VESSEL:* Upper, deck, stbd side, aft.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolt removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered extreme damage as a result of exposure to the bomb blast. The fuselage is heavily battered and buckled and is demolished aft of the cockpit. The monocoque section was wrenched and twisted approximately 70° as well as collapsed. Both wing stubs were wrenched in their primary structure and both wings sustained major damage. The port main spar attachment of the intermediate skin section was pulled out along the entire length of the spar. The structure of the wings aft of the main spar was collapsed and the skin covering heavily dished. Flaps and ailerons sustained heavy blast damage. The empennage components were severely damaged; the starboard stabilizer and elevator were buckled. The rudder and vertical fins were intact though damaged. Fabric covered surfaces were generally intact excepting for damage from flying debris and for one small area on the port elevator which was slightly charred. The main landing gear is intact although the starboard tire is partly flat and the tail wheel was pulled bodily out of the fuselage. The cockpit canopy was entirely demolished. The IFF destructor impast switch was tripped.

There was no damage to power plant components.

Equipment: Oxygen demand regulator rendered inoperative by bomb blast. Droppable fuel tank was torn from shackle and collapsed rendering it unusable. Oil tank was dished in on one side but usable and still had filler cap tightly secured.

Armament: Starboard wing guns damaged and sunfilter on gun sight was broken.

There was no visual evidence of damage to electronic equipment.

Direction of the blast was 350° relative and very close aboard.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 71553 *ENGINE:* R-2800-10W *SERIAL:* HP-208355

TARGET VESSEL: DAWSON APA 79 *LOCATION IN VESSEL:* Upper deck, stbd side, aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel tanks empty, oil tanks 11 gal. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained major damage as a direct result of exposure to the bomb. Aft of the cockpit, the fuselage is broken as if by a blow from the starboard. The structure failed completely. Skin was stripped from framing and ruptured. The main part of the starboard wing is fractured forward of the gun bay and the wing is partially collapsed. The port wing main spar is broken outboard and sprung at the gun bay. The wing is partially collapsed. Empennage and wing control surfaces were heavily damaged. The plexiglass side panels of the cockpit canopy were blown in though the wind screen section remained intact. The main landing gear and tires are undamaged; the tail wheel is wrenched out of the fuselage.

The port inboard gun was off its mounts and starboard inboard gun was damaged.

The AN/APS-4 bomb unit that had been secured to the starboard bomb rack was completely smashed and only component parts could be removed for test. With the exception of broken tube and minor repairs, the component functioned in a normal manner when tested.

The Universal drop tank was collapsed and unusable.

The nose cowl and cowl flap attachment lugs on engine cylinder were broken. Oil and ADI tanks were "dished" but both tanks were usable. The oil tank was still filled to operating level with oil.

Direction of the blast was 330° relative.

This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 73874 *ENGINE:* R-1820-56W *SERIAL:* 99273

TARGET VESSEL: DAWSON APA 70 *LOCATION IN VESSEL:* #2 cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained major damage when the overhead hatch covers fell on it. The upper half of the fuselage was crushed and the remainder buckled; the wing control surfaces were badly battered and the wings sustained major dents and punctures. The empennage was wrenched and skin on the vertical fin was ruptured. The fuselage forward of the cockpit was relatively undamaged. The landing gear was intact except that the starboard tire was flat. The tail wheel was collapsed into the fuselage.

No damage was sustained by power plants or equipment and electronics. A release cable was broken on MK 5 release.

More detailed description of damage to this aircraft and components is of no significance since it was caused entirely by falling debris and was not a direct result of the bomb blast.

This aircraft was retained in its present position on the DAWSON for use in Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (C14J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 88033 *ENGINE:* R-2800-8W *SERIAL:* HP-212059

TARGET VESSEL: FALLON APA 81 *LOCATION IN VESSEL:* Upper deck, stbd side, aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained major damage as a result of exposure to the bomb blast. The fuselage was slightly buckled and was heavily dished in on the port side aft of the cockpit. The main structure of the starboard wing was wrenched and the riveting of skin to the main spar on the upper surface was pulled out. The fabric is intact but stretched. The port wing main structure is generally undamaged though some distortion is evidenced near the tip. The empennage and wing control surfaces were generally damaged. Metal and fabric covered surfaces are distorted but generally intact. Plywood ailerons are completely splintered and largely carried away. The cockpit canopy sliding section has plexiglass blown in, the wind screen section remaining intact. The landing gear appears to be completely undamaged.

Working parts of the starboard bomb shackle are binding.

Detailed inspection of principal electronics items showed no change in the performance or condition of the units.

Hydraulic system was inoperative due to broken line in wing. External drop tank partially collapsed and released.

No damage to power plant or components except failure of cowl flaps as result of the hydraulic system being inoperative.

Direction of the blast was 195° relative.

This aircraft was retained in its present position on the FALLON for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (614J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 74203 *ENGINE:* R-1820-56W *SERIAL:* 99450

TARGET VESSEL: FALLON APA 81 *LOCATION IN VESSEL:* #2 cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major structural damage when overhead hatch covers fell on it. The cockpit canopy and upper part of the fuselage aft are completely collapsed, the lower part of the fuselage is buckled. The starboard wing main structure is intact but the skin, flaps and aileron have received heavy damage from falling debris. The port wing was badly crushed and distorted throughout. The fuselage forward of the cockpit wind screen is relatively undamaged and the landing gear is intact. The empennage is undamaged and intact.

Major damage to airplane caused by falling hatch covers and was not a direct result of the blast.

Detailed description of damage to component parts is of no significance since the airplane would have been completely undamaged except for the loose hatch pontoon falling into the cargo hold.

This aircraft was retained in its present position on the FALLON for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 71606 *ENGINE:* R-2800-10W *SERIAL:* HP-207278

TARGET VESSEL: FILLMORE APA 83 *LOCATION IN VESSEL:* Upper deck, stbd side aft.

ARMAMENT AND BOMB LOAD: Six BAM .50 Cal fixed guns. Ten rounds per gun. Bolts removed. No special bombs.

EQUIPMENT: As specified for type less parachutes.

INSTRUMENTS: Complete less clock.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered light damage. Fuselage skin on the port side aft of the cockpit was slightly dished with no damage to frames. Cockpit canopy had broken plexiglass with frame intact. Starboard wing, folded before the blast was blown off its jury lock and swung over the side slightly damaging the jury lock fitting.

Power plant, armament, airborne equipment and electronics suffered no damage.

Securing cables and fittings were intact.

Direction of the blast from this airplane was about 210° relative.

This airplane was retained in its present position for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 55449 *ENGINE:* 1820-56W *SERIAL:* 116117

TARGET VESSEL: FILLMORE APA 83 *LOCATION IN VESSEL:* 2nd platform, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed. No special bombs.

EQUIPMENT: As specified for type less parachute.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage, solely as a result of falling debris, consisting of pontoon hatch covers. Damage is of no significance since it was not caused by the blast. This aircraft was jettisoned.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 87882 *ENGINE:* 2800-8W *SERIAL:* P-22562

TARGET VESSEL: GASCONADE APA 85 *LOCATION IN VESSEL:* Stbd side, upper deck aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns forward. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Aircraft received very light damage, with cracks in plexiglass of cockpit canopy and fabric on the port side of the rudder partially burned. There was no other damage.

Blast direction was 310° relative.

Aircraft was retained in same position on the GASCONADE for Test BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 74277 *ENGINE:* 1820-56W *SERIAL:* 112543

TARGET VESSEL: GASCONADA APA 85 *LOCATION IN VESSEL:* 2nd Platform, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics

REPORT OF DAMAGE TEST ABLE: Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 58662 *ENGINE:* R-2800-10W *SERIAL:* Not readable

TARGET VESSEL: NIAGARA APA 87 *LOCATION IN VESSEL:* Stbd side, upper deck, aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft sustained very light damage. The cockpit canopy had plexiglass blown out, the dorsal fin was slightly dented, and the starboard wing was blown off the jury lock, striking a hatch cover causing a dent in the wing tip. This would not have occurred with wings spread. The rudder broke off its securing batten without damaging the rudder. There was no other damage.

Direction of the blast was 220° relative.

This aircraft was retained for Test BAKER in its present position in the NIAGARA.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2P *SERIAL:* 74675 *ENGINE:* R-1820-56W *SERIAL:* 11847

TARGET VESSEL: NIAGARA APA 87 *LOCATION ON VESSEL:* 2nd platform, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachutes and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE. Undamaged.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST ABLE
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 71544 *ENGINE:* 2800-10 *SERIAL:* Cannot read Serial No.

TARGET VESSEL: CARLISLE *LOCATION IN VESSEL:* Topside aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM fixed guns forward. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

INSTRUMENTS: Standard less clock. *OXYGEN:* Installed charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Missing - sunk with CARLISLE.

AIRPLANE: FM-2 *SERIAL:* 47336 *ENGINE:* 1820-56W *SERIAL:* 115788

TARGET VESSEL: CARLISLE APA 69 *LOCATION IN VESSEL:* 2nd platform deck cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns forward. Ten rounds per gun. Bolts removed.

EQUIPMENT: Standard for type less parachute and raft.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable and preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Missing - sunk with CARLISLE.

USS INDEPENDENCE (CVL-22)

(A) ARRESTING GEAR:

(1) Arresting Gear Engine: The arresting gear engines of all seven units were detached from the overhead and deposited on the hangar deck, with the exception of the two units located in compartment C-0201EL. These two arresting engines were lying in the passageway of the compartment.

(2) Cylinder Support Frames: The cylinder support frames on the arresting engines were bent or twisted out of alignment to varying degrees. Unit #6 suffered the greatest distort by having the starboard six feet of the frames bent at an angle of 35°.

(3) Purchase Cable: The purchase cables were broken on three of the units and badly burned by the fire on the two units contained in compartment C-0201EL.

(4) High Pressure Pipe: The high pressure piping on all the units was loose and torn from the engine cylinder. In two cases the piping had broken loose from the control valves.

(5) Accumulators: The accumulators were all intact to external appearances. Only the accumulator on unit #3 retained any of its initial air charge which was placed in it prior to Test ABLE. All others had lost their charge through the various valves and loose flanges on the high pressure pipe line.

(6) The Constant Pressure Valve: The constant pressure valves were all in good condition, with the exception of the two located in compartment C-0201EL which were damaged by the fire located in that area. The dome valves, with the exception of the two set mentioned above, all retained their initial air charges.

(7) Deck Sheave Assemblies: All of the deck sheave assemblies were in good operating condition. They showed no evidence of damage due to the blast or fire.

(8) Deck Pendants: All the deck pendants were intact with the exception of wire number 4 which was missing. There was no visible damage to the deck pendants.

(9) Yielding Elements: All of the yielding elements were intact, but were inoperable due to the upheaval of the flight deck which caused the control cables to part in various places.

(10) Arresting Gear Control Stations: Station number 1 had all of the controls intact, but was inoperative due to the damage to rest of the gear. Station number . received external damage caused by the port catwalk being folded up by the blast and bending the control levers.

(B) BARRIERS:

(1) The Barrier Stanchions: All of the barrier stanchions were intact and could be operated by hand. Air operation of the stanchions was not possible due to the lack of ship's air supply.

(2) The Barrier Stanchion Actuating Cylinders: The actuating cylinder for the stanchions were all in good condition.

(3) The Barrier Cables: The barrier cables on barriers numbers 1 and 2 were hanging over the starboard and port sides of the ship, respectively, due to broken purchase cables. The barrier cables appeared to be in good

condition. Barrier number 3 was intact on deck. However, one of the swaged fittings on the starboard side was split in the coupling to the purchase cable. This damage, however, would not place the barrier out of commission in case of an emergency.

(C) CATAPULT - Starboard (H-2 Mod. 1):

(1) Track and Shuttle System: There was no visible damage to the track on the shuttle on the flight deck. The towing and retrieving cables appeared to be in good condition.

(2) Compartment: There was very little damage to the compartment. The storage lockers that were attached to the bulkheads were torn loose and on deck.

(3) Piping: The following piping connections were broken or loosened by the blast:

(a) Air vent pipes at junction with the hydraulic oil pumps.
(b) Low pressure oil return pipe from manifold to gravity tank.
(c) Low pressure oil return pipe from sump tank to gravity tank at gravity tank.
(d) High pressure air manifold connecting accumulator with the air flask buckled in two places and fitting loose at both ends.
(e) Low pressure oil line from control valve to gravity tank loose at both junctions.
(f) High pressure oil lines from pumps to accumulator fittings loose at both connections.

(4) Crosshead Rails: There was no visible damage to the crosshead rails of this catapult.

(5) Air Flask and Accumulators: The accumulator sustained no visible damage other than the loosening of pipe connections. The air flask connection to the accumulator by the manifold was lifted up sufficiently to shear the bolts on the retainer straps about the flask and to bend the manifold in two places.

(6) Gravity Tank: The gravity tank showed no evidence of damage. However, all of the pipes leading to the tank were snapped off at their junction with the tank.

(7) The Oil Gear Pumps and Motors: There was no evidence of damage to the pumps or the motors. The rotors turned easily when rotated by hand.

(8) The Oil and Air Charge: The accumulator prior to Test ABLE had been charged with 8" of oil and 2700 psi of pressure. This charge was completely gone, having leaked out via various loose joints and connections.

(9) Condition of Catapult: The general condition of this catapult was good, with the exception of the broken piping.

(D) CATAPULT - Port (H-2 Mod. 1):

(1) Flight Deck Track and Shuttle: The flight deck track and shuttle system were in good condition. There was no visible damage to this system.

(2) Compartments: The storage lockers were torn from their mountings on the bulkheads and the port side emergency hatch was blown in. Other than this there was no damage to the compartment.

(3) Crosshead Rails: The port crosshead rail was twisted to port about 3 to 4 inches for a distance of 8 feet. The starboard rail was sprung about a half to three quarters of an inch.

(4) Sump Tank: The sump tank was sprung from its base about six inches to port. In so doing, it sheared off all of the anchoring bolts at the crosshead rail. The 3/8" steel plate used as an outboard mount for the sump tank was buckled. This movement of the sump tank to port caused the piping to break loose from the tank and the electrical leads to the motors situated on top of the tank to be snapped.

(5) Oil Gear Pump and Motors: There was no visible damage to the pumps or motors except for the shearing of the electrical cables to the motors. The rotators rotated easily by hand.

(6) Gravity Tank: There was no visible damage to the tank, except for the sheared connections with the various oil lines at the tank.

(7) Air Flask: The braces about the air flask were loosened, but the bolts were not sheared. The manifold to the accumulator showed no signs of being bent.

(8) Pump Selector Control Panel: The control panel was directly opposite the port emergency hatch, which had been blown in and the force of the blast against the back of the panel had bent it out of line.

(9) Oil and Air Charge: This catapult had an initial charge in its accumulator of 8" of oil and 2700 psi prior to the blast. After the blast all of the charge was gone, having leaked out through the various loose connections.

(10) General Condition of Catapult: This catapult would require a major overhaul in order to make it operable.

(E) AIRPLANE CRANE:

(1) The airplane crane located on the starboard side of the flight deck forward of the island structure was not operative without considerable repairs, which is beyond the capacity of the ship's force.

(2) The rotating hydraulic motor was torn loose from its foundation and all the holding down bolts were sheared. The thruster brake was torn loose from the foundation. All the bolts, except one, of the foundation for the gear box were sheared off and the input shaft was bent downward about 10°.

(3) The entire rotating structure of the crane was lifted clear of the track and was leaning outboard at an angle of about 15°. The kingpost was lifted out of the lower bearing and the lower shaft bronze was bent and gouged.

(4) All of the guard rails were bent, broken, or twisted.

(5) There was no visible evidence that the crane was struck by the elevator platform, but it is possible that this might have occurred as the platform was blown off the ship.

(F) ELEVATORS:

(1) The elevator platforms were both blown out of the flight deck by the blast.

(2) The hoisting gear other than that below the hangar deck was damaged by having the wire rope cables broken and the upper sheaves bent and pulled out of alignment. The main control valves on both elevators were broken.

(3) The elevator machinery, other than the above derangements, appeared to be intact on both elevators.

REPORT OF DAMAGE TO SHIPS' INSTALLATIONS
FOR HANDLING AIRCRAFT

USS SARATOGA (CV-3)

(A) ARRESTING GEAR AND BARRIERS: The arresting gear and barrier equipment sustained no visible damage from the blast.

(B) CATAPULT - Starboard (H-2, Mod. 1): Undamaged. Tested by firing two no-load shots after Able Day.

(C) CATAPULT - Port (H-2, Mod. 1): Undamaged. Tested by firing two no-load shots after Able Day.

(D) AIRPLANE CRANE: Undamaged. The airplane crane was tested by hoisting over the side ten (10) aircraft subsequent to Able Day.

(E) ELEVATOR:

(1) The elevator platform was slightly dished downward at the center.

(2) The fore and aft equalizing shaft pinion hub was separated from the forward bearing by about 1/8 inch. The shaft also pulled out of the universal joint hub, which is located near the center of the elevator platform. The athwartship equalizing shaft pinion was hard against the bearing on the port side, but the starboard pinion was separated from the bearing approximately 1/8 inch. The athwartship equalizing shaft pinions were riding on the racks toward the starboard side. Some of the welded joints on the platform base gave way.

(3) All three equalizing pinions are bearing heavily on the inboard side indicating that the shafts were sprung downward toward the center of the platform.

(4) The forward equalizing shaft which carries the small pinion which operates an auxiliary rack for the automatic control of the elevator was gouged. This action was due to the misalignment and derangement of the forward equalizing pinion, which was gouging into the auxiliary rack and its bronze guides, which was bolted to the main rack.

(5) The elevator was restored to operating condition by the removal of the automatic control rack (or the auxiliary rack) and is now operable by manual control only.

USS NEVADA (BB-36)

(A) CATAPULT - Centerline (P-6):

(1) The deck on which the foundation was mounted was buckled in about four places making it impossible for the mount to have a level foundation.

(2) The training gear track on the foundation was distorted by the buckled deck.

(3) The airplane crane at the stern of the catapult was folded over the stern section of the catapult causing a dishing in the top of the track platform.

(4) The electric power motors were not damaged by the blast.

(5) Other parts of the catapult sustained little or no damage.

(B) AIRPLANE CRANE:

(1) The electrical equipment on the crane sustained no damage.

(2) The lower frame of the crane was bent over the stern of the catapult, while the upper leg showed little distortion.

REPORT OF DAMAGE TO SHIPS' INSTALLATIONS
FOR HANDLING AIRCRAFT

USS NEW YORK (BB-34)

(A) CATAPULT: Undamaged, except for broken retainer plate for after slipper on carriage car. Two no-load shots fired satisfactorily on 7/22/46.

(B) AIRPLANE CRANE (Starboard): Undamaged.

(C) AIRPLANE CRANE (Port): Undamaged.

USS ARKANSAS (BB-33)

(A) CATAPULT: This unit, formerly mounted on Turret III had been removed prior to Operation Crossroads. Turret III trained freely after the blast.

(B) AIRPLANE CRANE (Starboard):

(1) The electrical equipment on the starboard crane was in good operating condition following the blast, however, it could not be tested under a load due to a mechanical failure of the crane.

(2) The crane rotating platform, which carries the crane machinery and the boom, was thrown off of the rollers, and the platform bent and twisted out of alignment.

(C) AIRPLANE CRANE (Port):

(1) The port crane received no visible damage to the mechanical equipment.

(2) All of the electrical motors operating the port crane were undamaged by the blast. They are all in operating condition.

USS PENNSYLVANIA (BB-38)

(A) CATAPULT:

(1) This catapult was inoperable prior to Operation Crossroads.

(2) Sustained no damage by the blast.

(B) AIRPLANE CRANE:

(1) Crane was inoperable prior to Operation Crossroads as a result of previous battle damage to electrical equipment.

(2) Undamaged by the blast.

USS PENSACOLA (CA-24)

(A) CATAPULTS:

(1) The catapults had been removed prior to Operation Crossroads.

(2) The pedestals installed starboard and port as foundations for catapults remained intact and substantially undamaged by the blast.

(B) AIRPLANE CRANE:

(1) The crane sustained only moderate damage, principally due to the distortion of the crane foundation which was the result of the distortion of the deck.

REPORT OF DAMAGE TO SHIPS' INSTALLATIONS
FOR HANDLING AIRCRAFT

USS SALT LAKE CITY (CA-35)

(A) CATAPULTS:

(1) The catapults had been removed prior to Operation Crossroads.

(2) The pedestals installed on either side of the ship as foundations for the catapults remained intact and substantially undamaged by the blast.

(B) AIRPLANE CRANE:

(1) The back-stays were bent by the stack.

(2) Training gear race was slightly twisted and out of alignment.

(3) The boom was in good condition.

(4) The electrical motors operating the hoists were in good condition.

2. TEST BAKER

(a) AIRCRAFT

	TARGET VESSEL	MODEL	SERIAL NUMBER	PAGE
1.	USS SARATOGA	TBM-3E	69099	198
2.	do	TBM-3E	69094	199
3.	do	TBM-3E	69080	200
4.	do	TBM-3E	69095	201
5.	do	SBF-4E	31853	202
6.	do	SBF-4E	31839	203
7.	do	SBF-4E	31859	204
8.	do	SBF-4E	31850	205
9.	do	SBF-4E	31894	206
10.	do	SBF-4E	31840	207
11.	USS INDEPENDENCE	TBM-3E	69169	208-209
12.	do	SBF-4E	31889	210
13.	USS NEW YORK	SC-1	35300	211-212
14.	do	SC-1	35561	213-214
15.	USS PENNSYLVANIA	F6F-5N	77648	215
16.	USS BANNER	FG-1D	87847	216
17.	USS BARROW	F6F-5N	77749	217
18.	USS BLADEN	FG-1D	87896	218
19.	do	FM-2	47265	219
20.	USS BRACKEN	TBM-3E	69188	220
21.	USS BRISCOE	F6F-5N	78068	221-222
22.	USS BRULE	F6F-5N	77960	223-224
23.	USS BUTTE	FG-1D	82433	225
24.	USS CARTERET	FG-1D	88040	226
25.	do	FM-2	56954	227
26.	USS CORTLAND	F6F-5	71753	228
27.	do	FM-2	56756	228
28.	USS CRITTENDEN	F6F-5N	77637	229
29.	USS DAWSON	F6F-5N	78086	230-231
30.	do	FM-2	73874	232
31.	USS FALLON	FG-1D	88033	233
32.	do	FM-2	74203	234
33.	USS FILLMORE	F6F-5	71606	235
34.	USS GASCONADE	FG-1D	87882	236-237
35.	do	FM-2	74277	238
36.	USS GENEVA	TBM-3E	69197	239
37.	USS NIAGARA	F6F-5	58662	240
38.	do	FM-2P	74675	241
39.	VPB Coronado Seaplane	PB2Y-5H	7052	242
40.	VPB Coronado Seaplane	PB2Y-5H	7085	243-244

(b) SHIPS' INSTALLATIONS FOR HANDLING AIRCRAFT

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69099 *ENGINE:* R-2600-20 *SERIAL:* 122143

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* F.D. port, frame 95.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns, single .50 cal turret aft. Ten rounds per gun. Bolts removed. Mark XV, Mod 7 bombsight.

EQUIPMENT: As specified for type, less parachute and raft. Five gallon sealed can in cockpit. Temperature paint panel installed.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Sustained light structural damage to cockpit plexiglass, gunners window blown in, flaps buckled and damaged when blown downward by the blast, elevator securing and actuating mechanism damaged. No damage to other components or equipment.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - blown over the side from SARATOGA before the ship sank.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69094 *ENGINE:* R-2600-20 *SERIAL:* 122102

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* F.D., center frame 100.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns, single .50 cal turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - blown over the side from SARATOGA before the ship sank.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

[redacted]: TBM-3E *SERIAL:* 69080 *ENGINE:* R-2600-20 *SERIAL:* 122284

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* F.D., port fantail.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns, single .50 cal gun in turret aft. Ten rounds per gun. Bolts removed. Mark XXIII bombsight.

EQUIPMENT: As specified for type less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread. Airplane secured in steel drip pan.

Fuel and oil tanks: Full. Engine: Operable - not preserved - operated prior to test BAKER.

Combat ready less: Bombs, ammunition, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Airplane sustained light to moderate damage, with port side of fuselage slightly dished, cockpit canopies broken, tail gunner window blown in, flaps buckled and blown downward, elevator hinges and actuating mechanism damaged when elevators were blown violently downward. No damage to other components or equipment.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - blown over the side from the SARATOGA before the ship sank. Aircraft was secured in steel drip pan which was also blown over the side. There was no fire.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTIC GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69095 *ENGINE:* R-2600-20 *SERIAL:* 109607

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* H.D., stbd, frame 120.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns, single .50 cal gun in turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - sank with SARATOGA.

The position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31853 *ENGINE:* R-2600-20 *SERIAL:* 121030

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* F.D., center, frame 120.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed M-2 cannon, twin .30 cal mount aft. Ten rounds per gun. Bolts removed. Mark I, mod 2 bomb director. Two 500 lb. G.P. bombs blind loaded and fuzed.

EQUIPMENT: As specified for type less parachute. Five gallon sealed can in fuselage.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Airplane sustained light damage with fixed cabin assembly dished in, plexiglass in canopy broken, elevator actuating mechanism damaged when elevators were blown down. No other damage to components or equipment.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - blown over the side from SARATOGA before the ship sank.

The position of the target vessel in the BAKER array is shown in the chart in PART "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31839 *ENGINE:* R-2600-20 *SERIAL:* 109724

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* F.D., port, frame 90.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed M-2 cannon. Twin .30 cal mount aft. Ten rounds per gun. Bolts removed. Two 500 lb. G.P. bombs blind loaded and fuzed.

EQUIPMENT: As specified for type less parachutes and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Aircraft sustained light damage with cabin assembly dished in, canopies had plexiglass blown in, aileron linkage distorted so that ailerons were inoperable, flaps slightly distorted and elevators dented at trailing edges. No damage to other components or equipment.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - blown over the side from SARATOGA before the ship sank.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (G14J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31859 *ENGINE:* R-2600-20 *SERIAL:* 121020

TARGET VESSEL: SARATOGA *LOCATION ON VESSEL:* F.D., stbd, fantail.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed M-2 cannon, twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes and raft. Temperature paint panel installed.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread. Airplane secured in steel drip pan.

Engine: Operable - not preserved. Operated prior to test BAKER.

Combat ready less: Bombs, ammunition, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Aircraft sustained light damage with fixed cabin assembly dished, plexiglass panels broken, starboard aileron control linkage broken and aileron jammed, elevator hinges and actuating mechanism damaged when elevator was blown violently down. No other damage to components or equipment.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - blown over the side from the SARATOGA before the ship sank. The steel drip pan in which the airplane was secured was left on deck and sank with the SARATOGA. There was no fire.

The position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31850 *ENGINE:* R-2600-20 *SERIAL:* 121042

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* H.D., stbd, frame 100.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed M-2 cannon, twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes and raft. Five gallon sealed can in cockpit.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - sank with SARATOGA.

The position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31894 *ENGINE:* R-2600-20 *SERIAL:* 123108

TARGET VESSEL: SARATOGA *LOCATION IN VESSEL:* H.D., stbd, frame 90.

ARMAMENT ANL BOMB LOAD: Two 20 mm fixed M-2 cannon, twin .30 cal free guns aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - sank with SARATOGA.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31840 *ENGINE:* R-2600-20 *SERIAL:* 123575

TARGET VESSEL: SARATOGA *LOCATION ON VESSEL:* H.D. stbd, frame 110.

ARMAMENT AND BOMB LOAD: Two 20 mm fixed M-2 cannon, twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: Airplane missing - sank with SARATOGA.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL BUREAU OF AERONAUTICS GROUP (014.3)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69169 *ENGINE:* R-2600-20 *SERIAL:* 122086

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* FD Fwd., frame 25 Port.

ARMAMENT AND BOMBLOAD: Two .50 cal BAM fixed guns fwd., single .50 cal gun in turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachutes and raft. Five gallon sealed can in cockpit. Temperature paint panel installed.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged. This plane transferred from SARATOGA to INDEPENDENCE for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained major damage during Test BAKER, probably as a result of shock and blast effects.

The fuselage on the port side was dished and wrinkled in the engine accessory cowling. From station 170 to station 263, the port side was heavily dished and wrinkled, and the monocoque section may be slightly buckled. The dorsal fin is heavily dished in.

Damage to the starboard side of the fuselage was less severe consisting only of wrinkles, a single long one near the tunnel from station 216 to station 279 and a local one at station 232.

The starboard wing was partially spread and damage was generally light except for a slight distortion of the main spar in the outer panel from station 88 to station 118 as evidenced by failure of rivets attaching the upper wing skin to the spar. (The tip had been damaged before Test BAKER).

The port wing was almost fully spread by the force of the burst. The wing stub section main spar was wrenched downward, and the spar of the outer panel was distorted from station 88 to station 130 as evidenced by wrinkling of skin on the upper surface of the outer panel and stub section. Aft of the main spar, the skin on the upper surface was slightly dished, but framing is intact. The nose section was buckled and wrinkled from station 277 to the tip.

Flaps and ailerons received no appreciable damage except that the starboard aileron ribs at stations 0 and 0.71 were slightly buckled when the batten block restrained them.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69169 Aircraft Damage Report (Cont'd).

In the empennage group, the rudder was blown violently to starboard and struck the elevator. The port side of the rudder was bowed in and slightly buckled. It was operable but slightly stiff. The port stabilizer was buckled near the tip where the jury wing lock pulled out.

The cockpit canopy sustained heavy damage and the external fuel tank was missing.

The high pressure oxygen line was severed. Several aneroid instruments showed slight blast distortion.

Engine, propeller and accessory components were undamaged.

The armament electrical circuits functioned satisfactorily with the exception of the turret amplidyne motors. However, long exposure to the elements without routine upkeep accounted for this discrepancy.

Electronics equipment appeared to have escaped damage by the blast; however, selected units were removed for further laboratory test and analysis.

The position of the INDEPENDENCE in the Test BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SBF-4E *SERIAL:* 31889 *ENGINE:* R-2600-20 *SERIAL:* 122790

TARGET VESSEL: INDEPENDENCE *LOCATION IN VESSEL:* F.D. fwd, frame 40, stbd.

ARMAMENT AND BOMB LOAD: Two 20 mm M-2 fixed cannon, twin .30 cal mount aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type less parachutes and rafts.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged. This plane was transferred from SARATOGA to INDEPENDENCE for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate damage during Test BAKER probably largely as a result of blast and shock effects.

The fuselage port side below the cockpit coaming line was lightly dished and wrinkled from station 182 to station 235. On the same side, the cabin section was dished inward. The starboard side was generally undamaged. Both bomb bay doors were wrenched open and slightly distorted. (It was possible subsequently nearly to close them when hydraulic pressure was built up).

The wing group, including the flaps and ailerons, was completely undamaged.

The damage to the empennage was limited to the rudder which was blown violently to starboard and buckled along the trailing edge when it struck the elevator. It was forced beyond the hinge stops, but hinges and actuation system are intact and appear to be undamaged.

Several sections of plexiglass in the cockpit canopy were shattered or blown out.

Other units of airborne equipment, armament and power plant components were undamaged.

Electronics equipment appeared to have escaped damage in Test BAKER.

The position of the INDEPENDENCE in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: XSC-1 *SERIAL:* 35300 *ENGINE:* R-1820-62 *SERIAL:* 114904

TARGET VESSEL: NEW YORK *LOCATION IN VESSEL:* Catapult, Fwd end.

ARMAMENT AND BOMB LOAD: Two .50 cal fixed BAM guns fwd. Ten rounds per gun. Bolts removed. Inert 100lb. G.P. bomb with live fuzes.

EQUIPMENT: As specified for type less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERA NDITION AND CONFIGURATION: Airplane damaged as shown below. Wings spread.

Fuel and oil tanks: Empty. Engine: Operable - not preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage to structural components. Fuselage aft of the cockpit was buckled and the skin heavily wrinkled. All control surfaces were heavily damaged with some hinge fittings broken. Fabric on control surfaces was lightly burned and charred. Plexiglass panels in the cockpit canopy were blown out. Power plant, armament and airborne equipment undamaged.

During no-load shot tests of the catapult after Test ABLE, this airplane received further damage. The main float was dented and punctured when it struck the catapult cradle. The starboard wing float struck the deck and the starboard wing was strained with possible distortion of the wing lock.

Both wing flap outer panels were removed, having been loosened in Test ABLE.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained major damage during Test BAKER probably resulting largely from shock and blast plus falling or sweeping water.

The entire airplane was tilted on the catapult and cradle to an angle of about 45 degrees to starboard.

The fuselage was further buckled and nearly severed at station 72, being bent downward and to starboard so that the empennage nearly struck the main float. Forward of the cockpit, damage to the fuselage was relatively light, being generally limited to the cowl and intercooler flaps which were blown open and damaged.

The port rear main float strut attachment bolt failed in tension and the other three appear to be strained. The fuselage is slightly askew on the main float strut.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: XSC-1 *SERIAL:* 35300 Aircraft Damage Report (Cont'd.)

Both wings appear to be strained at the wing fold station as e idenced by gaping at the junctures of the center section and outer panels. The upper surface aft of the spar on the starboard wing is heavily dished in. The ailerons were forced into the full left roll position; it was not possible to ascertain whether or not they were damaged. Of the flaps, the outer panels had been removed before the BAKER burst; the remaining stub sections were forced downward, their attachment fittings buckled and their fabric ruptured.

The elevators were forced entirely around (nearly 180°) below the horizontal stabilizers so that their trailing edges were facing forward. The hinges and actuation system were heavily distorted but held.

The rudder was carried away and hanging only by a cable to the vertical fin.

It was impossible to inspect airborne equipment in the cockpit because of the precarious position of the plane.

Armament, power plant components and electronics equipment appeared to have received no additional damage in Test BAKER.

This airplane was exposed on the forward end of the catapult in Test BAKER. During Test ABLE it was located on the after end of the same catapult.

The position of the NEW YORK in the target array for Test BAKER is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SC-1 *SERIAL:* 35561 *ENGINE:* R-1820-62 *SERIAL:* 99855

TARGET VESSEL: NEW YORK *LOCATION IN VESSEL:* Port side main deck frame 80.

ARMAMENT AND BOMB LOAD: Two .50 cal fixed guns forward. Ten rounds per gun. Bolts removed. No special bombs.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as shown below. Wings spread.

Fuel and oil tanks: empty. Engine: Operable - not preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered major damage to structural components. Fuselage turtleback was crushed downward, fuselage was heavily wrinkled and buckled. Main float strut was slightly bent. Plexiglass was blown out in the cockpit canopy. Flap and tail control surfaces were badly damaged including broken attachment fittings. Power plant, armament, electronics and airborne equipment suffered negligible damage.

Both elevators, both flap outer panels and the port flap inner panel were removed, having been loosened in Test ABLE.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained further moderate damage during Test BAKER, probably resulting from shock, blast effect, and falling or sweeping water.

The fuselage, heavily buckled in Test ABLE, showed slight increase in damage. The fuselage might well have been undamaged had it been whole before the Baker blast.

Damage to the main float was negligible.

Both wings appear to have been slightly sprung with distortion occurring at the wing lock pin and surrounding structure as evidenced by very slight gaping at the junctures of the center section and the outer panels. The under sides of both wings were dished in and wrinkled slightly from station 123 to station 182. Both ailerons were forced violently downward, leaving the hinges intact though distorted, damaging the actuation linkage and slightly buckling the ailerons themselves. Outboard flap panels and the port inboard panel were removed after Test ABLE. The remaining flap stub was buckled downward.

In the empennage group, the elevators had been removed before the BAKER burst. The rudder remaining was carried completely away during Test BAKER and was found on deck. The water rudder was blown violently to starboard and jammed.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014),
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: SC-1 *SERIAL:* 35561 Aircraft Damage Repo d.)

The flight controls were inoperative.

No damage was sustained by armament equipment and the power plant.

The oxygen demand regulator diaphragm was ruptured, but no other damage resulted to airborne equipment.

All units of electronic equipment appeared to be undamaged; however, selected units were removed for further laboratory tests and analysis.

This airplane was exposed in the same location on the target vessel for Tests ABLE and BAKER. The chart in Part "C" shows the location of the target vessel in the BAKER array.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77648 *ENGINE:* R-2800-10W *SERIAL:* HP-210951

TARGET VESSEL: PENNSYLVANIA *LOCATION IN VESSEL:* Main deck port side fr. 125.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns, fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: Empty. Engine: Operable - preserved internally.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged. This airplane was transferred from SARATOGA to PENNSYLVANIA for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained major damage during Test BAKER, probably resulting from falling or sweeping water and from blast.

The fuselage was heavily damaged. The engine accessory cowling was dished in on both sides. Both sides of the monocoque section aft of the cockpit were heavily battered in. On the port side from station 67 1/2 the side was crushed inward. At stations 82 1/2 and 97 1/2 the riveting failed at the seams. At stations 112 1/2 and 127 the cross members pierced the side. On the starboard side, damage was nearly identical, being slightly more severe only between stations 67 1/2 and 82 1/2.

The only damage to the wings consisted of dishing of skin and slight bowing of framing aft of the main spar from station 219 1/2 to the tip, and to the port wing stub where skin in the nose section upper surface is wrinkled, indicating possible distortion of framing. Flaps and ailerons were lightly damaged. Fabric in the center panels of the starboard outboard flap section was ruptured.

The only damage to the empennage group consisted of slight distortion of the end bows of both elevators.

The plexiglass in the cockpit canopy was blown in and the channel tread tail wheel tire was flat.

There was no further damage to armament equipment or to power plant components.

All units of electronic equipment appeared to have escaped damage except the AN-APS-6 radome which was smashed, presumably by the blast. However certain of the units were removed for further laboratory test and analysis.

Position of the PENNSYLVANIA in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 87847 *ENGINE:* R-2800-8W *ENGINE:* 323039-P

TARGET VESSEL: BANNER APA 60 *LOCATION IN VESSEL:* Port side upper deck aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as noted below. Wings folded.

Fuel tank: empty; Oil tank: 17 gals. Engine: Operable - preserved.
Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Airplane structural components were moderately damaged. Fuselage slightly buckled aft of cockpit. Movable controls heavily damaged. Cockpit canopy plexiglass blown in and light fairing dished in. Wing structure essentially undamaged. Plywood ailerons completely shattered. No further damage electronics, armament, or equipment except droppable tank was collapsed and unusable.

The rudder, which was heavily damaged in Test ABLE, and the ailerons, which were shattered, were removed before Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane received no damage during Test BAKER that was distinguishable from damage which occurred in Test ABLE.

During Tests ABLE and BAKER, this airplane was exposed in the same location on the target vessel. The position of the BANNER in the Test BAKER array is shown on the chart in part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77749 *ENGINE:* R-2800-10W *SERIAL:* HP-210913

TARGET VESSEL: BARROW APA 61 *LOCATION IN VESSEL:* Upper deck stbd aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.
Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.
This airplane was transferred from SARATOGA to BARROW for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate damage during Test BAKER, probably resulting from shock and blast effects.

In the fuselage group, the engine accessory cowling was slightly dished in. Aft of the cockpit at station 127, the port side was punctured by the cross member. The top of the turtleback was very slightly wrinkled at station 132 indicating possible buckling of the monocoque section. There was a notable absence of wrinkling and localized dishing of skin on both sides of the fuselage.

The port wing outer panel main spar was slightly twisted and distorted from station 75 to station 95 as evidenced by failure of rivets at the juncture of the main spar and first transverse members. The wing was undamaged outboard of station 95. Movable controls were essentially intact and undamaged.

The starboard wing was blown or jarred from its jury lock, but sustained no damage excepting that to the radome which was cut by the ship's life line.

The empennage group was undamaged, though all battens were fractured.

A section of the plexiglass canopy was blown out.

There was no further damage to airborne equipment, armament or power plant components.

All units of airborne electronic equipment appeared to have escaped damage except the AN/APS-6 radome which was cut in half when the wing was unlocked and collided with the life line of the ship. Selected units of electronic equipment were removed for further laboratory test and analysis.

Position of the BARROW in the Test BAKER target array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 87896 *ENGINE:* R-2800-8W *SERIAL:* P-23117

TARGET VESSEL: BLADEN APA 63 *LOCATION IN VESSEL:* Port side upper deck aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as shown below. Wings spread.

Fuel and oil tanks: Fuel, empty; Oil, 12 gal. Engine: Operable - preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained very light damage. Plexiglass blown in on port side of canopy. Fabric ruptured on lower side of port wing. Rudder slightly distorted and fabric was burned. No other significant damage.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional damage. Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 47265 *ENGINE:* R-1820-56 *SERIAL:* 116097

TARGET VESSEL: BLADEN APA 63 *LOCATION IN VESSEL:* 2nd platform deck cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional damage. Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69188 *ENGINE:* R-2600-20 *SERIAL:* 109490

TARGET VESSEL: BRACKEN APA 64 *LOCATION IN VESSEL:* Upper deck stbd side forward.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM guns fwd. Single .50 cal in turret aft. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachutes and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

This airplane was transferred from SARATOGA to BRACKEN for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate damage during Test BAKER probably largely from blast and shock effects.

Aircraft structural components sustained generally moderate damage. The fuselage on the starboard side sustained light dishing of the dorsal fin and the side at station 122. The engine accessory cowling was lightly dished. On the port side, from station 185 1/2 to station 263 there is one single long wrinkle indicating distortion of structure of the monocoque section.

Both wings were generally undamaged. The port wing jury locking cable was pulled from the port stabilizer.

The only damage to the empennage was that to the rudder which was blown violently to starboard and was twisted about the torque tube. Hinges and actuation are intact and the rudder is operable, though binding.

Cockpit canopy was shattered.

There was no additional damage to airborne equipment, armament units or power plant components. Bomb station distributor and intervalometer removed for further test.

Although airborne electronics equipment appeared to be undamaged, selected units were taken from the plane for further test and analysis.

Position of the BRACKEN in the Test BAKER target array is shown on the chart in part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 78068 *ENGINE:* R-2800-10W *SERIAL:* HP-211412

TARGET VESSEL: BRISCOE APA 65 *LOCATION IN VESSEL:* Upper deck stbd side fwd.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns, fixed. Ten rounds per gun. Bolts removed. Six 5.0" HVAR MK VI Mod 1 with inert motors and heads and live fuse nose and base.

EQUIPMENT: As specified for type, less parachute and life raft. Gunsight MK XXIII Mod 1 in pilot's cockpit.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable, preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.
This airplane was transferred from SARATOGA to BRISCOE for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained major damage as a result of exposure to Test BAKER. Consideration of the nature of the damage indicates that much of it was caused by falling water striking the airplane from slightly to port.

In the fuselage group, engine accessory cowling was heavily dished. Aft of the cockpit commencing at station 67 1/2 the fuselage damage was extremely severe with heavy wrinkling and buckling and rivet failure at seams. At station 112 1/2 the entire monocoque section is buckled and twisted. Cross members punctured the skin. On the starboard side, similar damage was in evidence. Buckling was most severe at station 170. The fuselage adjacent to the empennage is relatively undamaged.

Both wings sustained major structural damage when the entire outer wing panels were twisted intact about the main spars which were distorted from station 75 to station 119. The port wing was further buckled downward at station 168. Wing skin was slightly dished in random panels. The starboard wing radome was shattered and the radar fell to the deck. Movable control surfaces on the wings sustained moderate damage.

The only damage to the empennage consisted of slight buckling of the port stabilizer and elevator. The control actuation system is intact, though cables are slack.

Tail wheel strut was collapsed. External fuel tank was displaced and badly dished. The plexiglass canopy was shattered.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 78068 Aircraft Damage Report (Cont'd.)

Three cylinder mounting lugs securing the engine cowl were broken on No. 10, 12 and 14 cylinders.

Five of the six 5" HVAR's were shaken from their mounts and the suspension lugs of the MK V rear port were bent down in each case.

All electronics units appear to have escaped damage from Test BAKER however certain units have been removed for further laboratory test and analysis.

The position of the BRISCOE in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77960 *ENGINE:* R-2800-10W *SERIAL:* Not readable.

TARGET VESSEL: BRULE APA 66 *LOCATION IN VESSEL:* Upper deck stbd side fwd.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns, fixed. Ten rounds per gun. Bolts removed. One 11.75" MK II Mod 10 Rocket with inert motor and head with MK XVI Mod 1 live base fuse.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane was essentially undamaged. Very slight dishing of accessory cowl. Barely perceptible "oil can" effect between stations 82 1/2 and 112 1/2 on port side of fuselage. No other damage to components or equipment.

This airplane was transferred from SARATOGA to BRULE for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained major damage as a result of exposure in Test BAKER. Careful inspection indicates that much of the damage was caused by falling water striking the airplane from slightly to port.

The port side of the fuselage was heavily battered in aft of the cockpit with numerous failures of seams and definite buckling of the entire monocoque section. Cross braces punctured the side of the fuselage at stations 112 1/2, 127 and 141 1/2. The top of the turtleback was ruptured at station 170.

The starboard side of the fuselage showed little dishing of skin, but seams were all strained, and ruptured locally, showing evidence of heavy loads.

The port wing outer panel main spar was heavily twisted and distorted as evidenced by wrinkling of skin in the nose section from station 75 to station 119. From station 168 to the tip, the upper surface of the outer panel intermediate section was heavily wrinkled in with collapse of the ribs backing it up.

The starboard wing outer panel main spar was twisted in a manner similar to that in the port wing.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77960 Aircraft Damage Report (Cont'd).

The movable controls on the wings were moderately damaged, having been slightly buckled by the force of the explosion and cut by flying debris.

The empennage group sustained comparatively little damage, though all components were slightly buckled as though by high water loads.

The entire airplane structure was punctured and cut by shrapnel-like pieces of flying debris..

The cockpit canopy was shattered and inoperable. The external fuel tank was torn from its retaining straps snapping the forward strap on the starboard side.

Three engine cowl mounting lugs on number 10 and 12 cylinder were broken.

Armament installations received no damage.

The AN/APS-6 radome was smashed when the aircraft was thrown against the rail and the MAF transmitter type AN/ARC-5 was partially crushed. Other units of electronics gear although apparently undamaged are being returned for laboratory analysis.

Position of the BRULE in the Test BAKER target array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 82433 *ENGINE:* R-2800-8W *SERIAL:* Not readable.

TARGET VESSEL: BUTTE APA 68 *LOCATION IN VESSEL:* Upper deck stbd side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as noted below. Wings folded.

Fuel tank: empty; oil tank: 14 gals. Engine: Operable - preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained moderate damage when exposed in Test ABLE. The fuselage was undamaged. Most significant damage was to wing fold hinges which had attachment sheared and displaced. Rudder and fin were damaged and some of the fabric was charred and ruptured. Cockpit canopy plexiglass was blown in. There was no damage to power plant, airborne equipment, armament, or electronic components.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane received no damage during Test BAKER that was distinguishable from damage which occurred in Test ABLE.

During Tests ABLE and BAKER this airplane was exposed in the same location on the target vessel.

Position of the BUTTE in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 88040 *ENGINE:* R-2800-8W *SERIAL:* 212412

TARGET VESSEL: CARTERET APA 70 *LOCATION IN VESSEL:* Upper deck stbd side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft. VG recorder installed.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as shown below. Wings folded.

Fuel tank: empty; oil tank: 5 gal. Engine: Operable - preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane received major structural damage. Engine accessory cowl was dished in, fuselage was buckled. Starboard wing outer panel was carried away as was the rudder. Flaps were blown down and hinges damaged. Power plant, electronics and equipment undamaged. Guns in right wing missing with the wing.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane received no further discernible damage during Test BAKER.

During both tests, ABLE and BAKER, this airplane was exposed in the same location on the target vessel.

The position of the target vessel in the BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 56954 *ENGINE:* R-1820-56 *SERIAL:* 98327

TARGET VESSEL: CARTARET APA 70 *LOCATION IN VESSEL:* 2nd Pltfm deck after cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane was undamaged during Test BAKER.

During Tests ABLE and BAKER this airplane was exposed in the same location on the target vessel.

Position of the target vessel in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 71753 *ENGINE:* R-2800-10W *SERIAL:* 59276

TARGET VESSEL: CORTLAND APA 75 *LOCATION IN VESSEL:* Upper deck stbd side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Paint was scorched on one side of rudder.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional Damage.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

AIRCRAFT: FM-2 *SERIAL:* 56756 *ENGINE:* R-1820-56W *SERIAL:* 117621

TARGET VESSEL: CORTLAND APA 75 *LOCATION IN VESSEL:* 2nd platform deck, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional damage.

Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 77637 *ENGINE:* R-2800-10W *SERIAL:* HP-211516

TARGET VESSEL: CRITTENDEN APA 77 *LOCATION IN VESSEL:* Upper deck, stbd aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM fixed guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.
This airplane transferred from SARATOGA to the CRITTENDEN for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate damage during Test BAKER, probably resulting largely from shock and blast or falling water.

The fuselage was undamaged forward of station 112 1/2. At this station, the cross member punctured the port side. Between stations 112 1/2 and 127, the turtleback was wrinkled indicating possible slight buckling of the section.

The starboard wing was jarred or blown from its jury lock, and the radome was cut striking the ship's life line. The main spar of the outer panel was very slightly twisted and distorted from station 75 to station 95 as evidenced by stretched rivets along the attachment of the upper skin to the framing at the juncture of the spar and No. 1 rib.

The port wing was apparently undamaged.

In the empennage group, components were undamaged. The rudder batten was fractured.

The plexiglass in the port side of the cockpit canopy was broken.

There was no further damage to airborne equipment, power plant and accessory components or armament equipment.

All units of electronic gear appeared to be undamaged except the AN/APS-6 radome was smashed when the aircraft was apparently thrown against the life line. However, selected units were removed for further laboratory test and analysis.

The position of the target vessel upon which this airplane was embarked in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 78086 *ENGINE:* R-2800-10W *SERIAL:* HP-211125

TARGET VESSEL: DAWSON APA 79 *LOCATION IN VESSEL:* Upper deck, stbd side aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.
This airplane was transferred from SARATOGA to DAWSON for Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained major damage during Test BAKER, probably resulting largely from shock, blast effect and falling or sweeping water.

On the port side of the fuselage, the engine accessory cowling was heavily dished in. Aft of the cockpit from station 67 1/2 the side of the fuselage was battered in. At stations 112 1/2 and 127, the cross members punctured the side of the fuselage. Aft of station 127, the side was punctured by flying debris.

The starboard side of the fuselage was moderately dished and wrinkled. Wrinkling of the turtleback between stations 112 1/2 and 127 indicated possible buckling of the entire monocoque section.

The starboard wing outer panel main spar was twisted and distorted from station 75 to station 112 as evidenced by failure of rivets along the main spar attachment of the upper skin, and heavy wrinkling of skin in the nose section between those stations. Outboard of station 112 the panel was relatively undamaged.

The starboard wing outer panel main spar was slightly twisted and distorted in a manner similar to that affecting the port wing, but much less severely. It was blown or jarred from its jury lock, the radome being damaged when it struck the ship's life line. Flying or falling debris cut the upper surface of the wing inboard of the radome (two places), shearing some framing.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5N *SERIAL:* 78086 Aircraft Damage Report (Cont'd.)

The empennage group was essentially undamaged. The rudder batten only was fractured.

The plexiglass in the cockpit canopy was shattered and broken.

There was no additional damage to airborne equipment or armament.

Two engine cowl securing lugs on engine cylinders and number 10 and 12 were broken. Propeller and accessory section were undamaged.

Electronics gear appeared to be undamaged except for the AN/APS-6 radome which was smashed when the plane was thrown against the life line. Selected units were removed for further laboratory test and analysis.

Position of the DAWSON in the Test BAKER target array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 73874 *ENGINE:* R-1820-56W *SERIAL:* 99273

TARGET VESSEL: DAWSON APA 79 *LOCATION IN VESSEL:* 2nd platform deck, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts. removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION ANL CONFIGURATION: Airplane damaged as noted below. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained major damage when the overhead hatch pontoons fell and struck it. Fuselage crushed and buckled. Wing tail section, flaps and ailerons crushed. Wing surfaces dented and punctured. Empennage wrenched and damaged. Tail wheel collapsed into fuselage. Main landing gear intact, starboard tire flat. Power plant, airborne equipment and electronics components were undamaged. Armament was undamaged except release cable for MK V bomb release was broken.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane was undamaged during Test BAKER.

During Tests ABLE and BAKER this airplane was exposed in the same location on the target vessel.

Position of the DAWSON in the Test BAKER target array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 88033 *ENGINE:* R-2800-8W *SERIAL:* HP-212059

TARGET VESSEL: FALLON APA 81 *LOCATION IN VESSEL:* Upper deck, stbd side, fwd.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns, fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as noted below. Wings folded.

Fuel tank filled with salt water. Oil tank: Empty. Engine: Operable - preserved.

Standard loading less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained major damage from the ABLE burst. Fuselage was heavily dished in on port side and was buckled aft of cockpit. Main structure of starboard wing was badly wrenched with skin rivet failure at main spar. Plywood ailerons shattered. Other movable control surfaces sustained general heavy blast damage. Plexiglass in cockpit canopy sliding section blown in. Power plant components undamaged. Airborne equipment was undamaged except for hydraulic system (broken line) and the droppable tank which was partially collapsed and released. Armament undamaged except working parts of starboard bomb shackle are binding. Electronics components undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane was washed or blown over the side, the only part remaining consisting of the tail wheel and arresting hook remaining on deck.

This airplane was exposed in the same location on the target vessel for tests ABLE and BAKER. The position of the FALLON in the Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2 *SERIAL:* 74203 *ENGINE:* R-1820-56 *SERIAL:* 99450

TARGET VESSEL: FALLON APA 81 *LOCATION IN VESSEL:* Second platform deck, #2 cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as noted below. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Standard load less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained major structural damage in Test ABLE when overhead hatch pontoons fell and struck it. Fuselage crushed and buckled. Starboard wing dented and punctured. Tail section crushed. Port wing wrenched in addition to being partially crushed and damaged by falling debris. Empennage and landing gear intact. Power plant, airborne equipment, armament, and electronics components were undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane received major damage from secondary causes. It was discovered to be submerged in about nine feet of water and fuel oil in the cargo hold. It was impossible to make an inspection, but it was observed that the airplane had been thrown forward (not enough to strike the bulkhead). It appeared to be resting level indicating that the landing gear was intact and not collapsed.

It was impossible to make an inspection of the power plant, airborne equipment, armament and electronics units although these components appeared to be undamaged.

This airplane was exposed in the same location on the target vessel for Tests ABLE and BAKER. The position of the FALLON in the Test BAKER target array is shown on the chart in part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 71506 *ENGINE:* R-2800-10W *SERIAL:* HP-207278

TARGET VESSEL: FILLMORE APA 83 *LOCATION IN VESSEL:* Upper deck, stbd side aft.

ARMAMENT AND BOMB LOAD: Six BAM .50 cal guns fixed. Ten rounds per gun. Bolts removed.

INSTRUMENTS: As specified for type, less parachute and raft.

EQUIPMENT: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as shown below. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Standard load less: Bombs, ammunition, fuel, safety equipment, and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This aircraft suffered light damage. Fuselage skin on port side aft of cockpit was slightly dished. Canopy had broken plexiglass. Slight damage to jury lock fitting.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained very light damage during Test BAKER, probably resulting from blast alone.

The only damage noted was to the rudder which broke its batten and in so doing had the rib at station 66 1/4 bent slightly to port against the restraint imposed by the batten.

There was no damage to armament, electronic or airborne equipment nor to power plant and accessory components.

This airplane was exposed in the same location on the target vessel for Tests ABLE and BAKER. Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FG-1D *SERIAL:* 87882 *ENGINE:* R-2800-8W *SERIAL:* HP-22562

TARGET VESSEL: GASCONADE APA 85 *LOCATION IN VESSEL:* Stbd side, upper deck aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns fixed. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings spread.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained very light damage during Test ABLE. The fabric on the port side of the rudder was charred and burned. The cockpit canopy plexiglass was cracked but not broken. There was no other damage to structures components or to power plants, armament, airborne equipment and electronic components.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained extreme damage during Test BAKER, probably resulting from shock, blast effect and falling or sweeping water.

The fuselage skin about the engine and engine accessory cowling was heavily dished. About half of the cowl flap sections were carried away and the remainder were blown open. The section around the cockpit is generally intact and undamaged back to station 218 where the monocoque section is broken entirely in two. The after part of the fuselage, separated entirely from the rest of the airplane is generally intact from station 260 aft and the tail wheel is undamaged. The starboard main landing gear scissors and strut were broken, the strut failing where it attaches to the axle forging. The entire airplane was thrown forward and to port, lightly striking the ship's structure.

The starboard wing suffered extremely heavy damage. The outer panel attachment was wrenched downward and twisted as evidenced by a discontinuity of the upper surface at the wing fold. The wing panel was crushed and twisted about the main spar which was heavily buckled at station 100. All wing covering, both fabric and metal was damaged.

AIRPLANE: FG-1D *SERIAL:* 87882 Aircraft Damage Report (Cont'd.)

The port wing was less heavily damaged. Its main spar was apparently intact. Wrinkles on the under side from station 96 1/2 to the tip indicate distortion of the framing about the main spar. The wing near the tip was damaged as though by falling debris with fabric rupture and denting of framing.

In the empennage group, both elevators were forced violently downward and were buckled near the hinge line with failure of both fabric and framing.

The plexiglass in the cockpit canopy was broken out, and the auxiliary fuel tank was torn from its shackle and collapsed.

Three instruments on the instrument panel were smashed and the flight controls were inoperative. There was no hydraulic pressure in the system and the starboard landing gear strut was broken.

Ammunition boxes and feed release chutes were bent out of line by the collapse of the wing structure. The back plate release latch was broken on one gun, when the wing hit the deck.

The propeller hub apparently suffered no external damage when the airplane was thrown forward against the bulkhead.

All units of electronics gear appeared to have escaped damage from the blast, however, certain selected items were removed for further laboratory test and analysis.

The airplane was exposed in the same location on th target vessel for both Tests ABLE and BAKER. Position of the GASCONADE in Test BAKER array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

TARGET: FM-2 *SERIAL:* 74277 *ENGINE:* R-1820-56W *SERIAL:* 112543

TARGET VESSEL: GASCONADE APA 85 *LOCATION IN VESSEL:* 2nd platform deck, #2 cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and life raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate damage as a result of exposure to Test BAKER. The damage is believed to have been caused entirely by underwater shock transmitted to the airplane via the ship's structure.

The fuselage and port wing sustained slight secondary damage consisting only of localized denting when the port wheel collapsed. The failure occurred when a tie down cable sheared the two lower beams of the upper drag link, apparently upsetting the counter balance and permitting the knee to fold.

There was no damage to other structural components of this airplane.

Units of airborne equipment, armament and the power plant were undamaged.

Airborne electronics equipment in the plane appeared to have escaped damage from the blast, however, selected units were removed from the airplane for further laboratory test and analysis.

This airplane was exposed in the same location on the target vessel for Tests ABLE and BAKER. Position of the GASCONADE in the Test BAKER target array is shown on the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: TBM-3E *SERIAL:* 69197 *ENGINE:* R-260[illegible]-20 *SERIAL:* 122145

TARGET VESSEL: GENEVA APA 96 *LOCATION IN VESSEL:* Upper deck, stbd side, fwd cargo hold.

ARMAMENT AND BOMB LOAD: Two .50 cal BAM fixed guns. Single .50 cal turret. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment, pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.
This plane was transferred from SARATOGA to the GENEVA for exposure in Test BAKER.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional damage.
Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: F6F-5 *SERIAL:* 58662 *ENGINE:* R-2800-10W *SERIAL:* Not readable.

TARGET VESSEL: NIAGARA APA 87 *LOCATION IN VESSEL:* Port side, upper deck, aft.

ARMAMENT AND BOMB LOAD: Six .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete, less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.

Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Plexiglass was blown out of cockpit canopy. Dorsal fin and starboard wing tip dented.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional damage. Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

This airplane was exposed in the same location on the target vessel for Tests ABLE and BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: FM-2P *SERIAL:* 74675 *ENGINE:* R-1820-56W *SERIAL:* 11847

TARGET VESSEL: NIAGARA APA 87 *LOCATION IN VESSEL:* 2nd platform deck, cargo hold.

ARMAMENT AND BOMB LOAD: Four .50 cal BAM guns. Ten rounds per gun. Bolts removed.

EQUIPMENT: As specified for type, less parachute and raft.

INSTRUMENTS: Complete less clock. *OXYGEN:* Installed and charged.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane intact and operable. Wings folded.

Fuel and oil tanks: empty. Engine: Operable - preserved.
Combat ready less: Bombs, ammunition, fuel, safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: Undamaged.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: No additional damage. Position of the target vessel in the BAKER array is shown in the chart in Part "C" of this report.

This airplane was exposed in the same location on the target vessel for Tests ABLE and BAKER.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: PB2Y-5H *SERIAL:* 7052 *ENGINES:* R-1830-92 *SERIAL:* P-138399, P-138428, P-138440, P-138386.

LOCATION OF AIRCRAFT: Moored in target area.

ARMAMENT AND BOMB LOAD: None, this is a hospital airplane.

EQUIPMENT: As specified for type, less parachutes and life rafts.

INSTRUMENTS: Complete, less clock.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as shown below.

Fuel tank: 900 gallons. Oil tanks: 160 gallons.

Engines: Operable - not preserved. Engines operated before and after Test ABLE.

Standard load less: Safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained major damage in Test ABLE. The port side of the hull was dished inward, damage being most pronounced in the monocoque section aft of the waist hatch. All hatches on the port side except that to the navigator's compartment were blown in. The starboard side was apparently undamaged. In the wing group, the only damage was to the port bomb bay doors which were partially collapsed inward. There was no damage to the empennage group. Electronic components and airborne equipment were undamaged.

The damaged hatches of this airplane were jury repaired to keep the hull from shipping water.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate damage during Test BAKER, probably from blast effect.

The port side of the hull was further dished in and wrinkled in the same areas as were damaged in Test ABLE. The hatch doors which had been temporarily repaired after Test ABLE failed again, being blown inward.

The starboard side of the hull sustained no appreciable damage.

The port wing nose section was cut slightly by flying debris outboard of the No. 1 engine, but there was no damage to framing.

The empennage group generally appeared to have suffered very slight dishing of both fabric and metal covering.

Airborne equipment was undamaged.

All engines were started without incident and power plant components functioned satisfactorily. Engines and propeller were given a standard pre-flight check and the plane was taxied around the target array.

Selected units of electronic equipment were removed and tested. The selected units functioned normally.

The position of this seaplane in the Test BAKER array is shown in the chart in Part "C" of this report.

DIRECTOR OF SHIP MATERIAL-BUREAU OF AERONAUTICS GROUP (014J)
TEST BAKER
AIRCRAFT DAMAGE REPORT

AIRPLANE: PB2Y-5H *SERIAL:* 7085 *ENGINES:* R-1830-92 *SERIAL:* P-357700, P-357729, P-357547, P-357554.

ARMAMENT AND BOMB LOAD: None. This is a hospital plane.

EQUIPMENT: As specified for type, less parachutes and life rafts.

ELECTRONICS: Standard equipment for type installed and operable.

GENERAL CONDITION AND CONFIGURATION: Airplane damaged as shown below.

Fuel tank: 1100 gallons. Oil tanks: 160 gallons

Engines: Operable - not preserved. All engines operated before and after Test ABLE.

Standard load less: Safety equipment and pyrotechnics.

REPORT OF DAMAGE TEST ABLE: This airplane sustained major damage in Test ABLE. The hull, above the water line, on the port side was heavily dished in. Forward, below the pilot's compartment, the skin was dished with slight bowing of framing. The anchor hatch and the navigator's compartment hatch were blown in. Aft, the beaching gear hatch, the midship's hatch and the waist hatch were all blown in. The monocoque section of the hull aft of the waist hatch was heavily dished in with failure of framing backing up the skin. At station 706, the riveting failed along the seam. The port side was lightly damaged; the waist hatch only was blown in. The only damage to the wing group consisted of collapse inward of the bomb bay doors. The empennage was undamaged. There was no damage to electronics or airborne equipment.

The hatch doors were jury repaired after Test ABLE in order to keep water from washing into the hull.

ADDITIONAL DAMAGE SUSTAINED IN TEST BAKER: This airplane sustained moderate further damage during Test BAKER, probably resulting largely from blast and high waves.

The port side of the fuselage, damaged in Test ABLE, was further dished in generally the same locations. All hatches on the port side, which had been temporarily repaired after Test ABLE, were blown in again. The frame around the midships hatch, which itself comprises a larger hatch door, was heavily buckled inward. The battering in of the fuselage aft of the waist hatch was increased, and the seam failure at station 706 was considerably enlarged. The hull below the waterline was apparently undamaged and water tight.

AIRPLANE: PB2Y-5R *SERIAL:* 7985 Aircraft Damage Report (Cont'd.)

The wings and empennage were generally undamaged.

The 3 1/2 inch Manila line, attached to the snubbing posts, backing up the steel mooring pendant, parted, but the pendant held.

Airborne equipment and armament equipment (bomb bay doors) were undamaged.

All engines were started with no difficulty and all power plant components functioned properly.

Select units of electronics equipment, when tested, operated normally.

The chart in Part "C" shows the location of this seaplane in the Test BAKER array.

REPORT OF DAMAGE TO SHIPS' INSTALLATIONS
FOR HANDLING AIRCRAFT

USS SARATOGA (CV-3)

(A) ARRESTING GEAR AND BARRIERS:

From observation made by divers and from study of aerial photographs taken at altitudes between 500 and 1700 feet it was found that the flight deck from aft of the original position of the after elevator to the stern received the most serious damage. Starting about fifteen feet from the stern of the flight deck and inboard about the same distance from each side, there was a deep depression running as far forward as the elevator. The depression reached its maximum depth just aft of the elevator, of twelve feet.

Although no diving operations have been reported to date on the interior of the ship immediately below the flight deck; it is assumed that the arresting gear engines mounted in the overhead in the area of the indentation suffered sufficiently to have misalignment of the cylinder support frames.

The deck sheaves and the fairlead sheaves outboard of the depressed area probably received little or no damage.

There was no evidence of any broken deck pendants or purchase cables hanging over the sides of the ship or lying loose on the flight deck.

From the observations made prior to the sinking and from the observations of the divers the flight deck in the area of the barriers was flush and unbroken, from which it is assumed that the barrier stanchions were intact.

(B) CATAPULTS (Starboard and Port - H-2, Mod. 1):

The forward section of the flight deck appeared to be intact and undamaged by the underwater blast.

The starboard and port catapult launching tracks showed no evidence of being out of alignment or distorted in any way. The deck was not buckled or distorted.

The structural integrity of the forward area of the ship where the catapult machinery was housed appeared from the observations made to be intact and undamaged. It is assumed, therefore, that the catapult machinery housed therein received little or no damage.

There was no evidence of the towing or retrieving cable having parted or broken.

(C) AIRPLANE CRANE:

The airplane crane at the time of the underwater blast was stored in its normal stowage position on the starboard side of the flight deck forward of the island structure.

The crane as observed was in its normal position and appeared to be undamaged by the Test BAKER blast.

The boom on the airplane crane appeared to be intact and undamaged.

There was no evidence of the edge of the flight deck being buckled or folded up in the vicinity of the crane. The structure forming the base and housing for the hoisting equipment appeared to be intact and undamaged.

(D) ELEVATOR:

The elevator platform as observed from the aerial photographs taken at an altitude between 600 and 1700 feet showed that the platform was dished in considerably in the center slightly to port to a depth between four to six feet. The port side of the elevator had been depressed downward about three feet and the whole platform tilted to starboard, so that the starboard side of the platform extended above the flight deck level about one foot.

It was impossible to ascertain the amount of damage that had been caused to the hoisting machinery housed below the second deck of the ship.

The elevator at the time of the underwater blast was in the "locked-up" position.

USS INDEPENDENCE (CVL-22)

(A) ARRESTING GEAR:

(1) Arresting gear engine: The arresting gear engine of the five units that were detached from the overhead and deposited on the hangar deck were removed from the ship by the ship's force prior to Test BAKER in order to prepare the ship for the underwater blast.

(2) Purchase cables; The purchase cable on all the sets was removed from the ship during the period prior to Test BAKER by the ship's force.

(3) High pressure pipe: The high pressure piping, with the exception of piping to sets Nos. 3 and 4, which was removed from the ship by the ship's force, remained in the overhead.

(4) Constant pressure valve: There was no change in the condition of the constant pressure valves as a result of being exposed to Test BAKER.

(5) Deck sheave assemblies: All of the deck sheave assemblies were checked for weakening of their foundations and operating condition and were found to be in good condition. They showed no evidence of damage due to the blast.

(6) Deck pendants: All of the deck pendants with the exception of wire number one were removed from the ship prior to Test BAKER by the ship's force. Deck pendant from wire number five had been removed and shipped to Naval Air Material Center, Philadelphia for testing prior to Test BAKER.

(7) Yielding elements: All of the yielding elements were intact, but were inoperable due to damage to the deck as a result of the air blast in Test ABLE.

(8) Arresting gear control stations; The control stations did not receive any additional damage as a result of Test BAKER.

(B) BARRIERS:

(1) The barrier stanchions: All of the barrier stanchions were intact and could be operated by hand. Air operation of the stanchions was impossible due to the lack of air supply on board the INDEPENDENCE.

(2) The barrier stanchion actuating cylinders: The actuating cylinders for the stanchions were all in good condition. Their foundations were not displaced or damaged by the underwater atomic bomb blast.

(3) The barrier cables: The barrier cables on the ship were removed by the ship's force prior to Test BAKER in order to facilitate preparation for the test.

(C) CATAPULT - Starboard (H2, Mod. 1):

(1) Track and shuttle system: There was no visible damage to the track or the shuttle on the flight deck. The towing and retrieving cables appeared to be in good condition. The sheave foundations were in good condition.

(2) Compartment: There was very little damage to the compartment. One of the storage lockers, attached to the bulkhead, was displaced and on deck.

(3) Piping: There was no increase in the damage to the piping as a result of Test BAKER.

(4) Crosshead rails: There was no visible evidence of the crosshead rails being distorted or displaced as a result of the underwater blast.

(5) Air flask and accumulators: The accumulator sustained no visible damage and gave no evidence of being displaced by any shock that the ship might have received as a result of the blast.

(6) Gravity tank: The gravity tank showed evidence of the supports being bent and the weld to the overhead showed cracks in the painted surface. Other than this, there was no increase in damage to the gravity tank.

(7) The oil gear pumps and motors: There was no evidence of damage to the pumps or the motors. The rotors turned easily when rotated by hand.

(8) The oil and air charge: There was no oil or air charge in the accumulator prior to Test BAKER. All of the oil had leaked out of the system as a result of loose connections produced by Test ABLE.

(9) Condition of catapult: The general condition of this catapult was good with no increase in damage as a result of the underwater atomic bomb blast.

(D) CATAPULT - Port (H2, Mod. 1):

(1) Flight deck track and shuttle: The flight deck track and shuttle system were in good condition. There was no visible damage to the foundations of the sheaves below the flight deck. The towing and retrieving cables appeared to be in good condition.

(2) Compartment: There was no increase in the damage to the compartment.

(3) Crosshead rails: There was no evidence of any increase in the amount of twist in the port crosshead rail or the starboard rail.

(4) Gravity tank: There was no visible increase in damage to the gravity tank. The supports to the overhead gave no signs of having been weakened in any way by the underwater blast.

(5) Sump tank: There was no evidence of the sump tank being displaced any more as a result of Test BAKER.

(6) Oil gear pumps and motors: There was no increase in damage to the motors. The rotors were rotated easily by hand.

(7) Air flask: There was no evidence of the air flask having been moved from its foundation. There was no evidence of the manifold being bent between the air flask and the accumulator.

(8) Pump selector control panel: The control panel did not receive any additional damage due to Test BAKER.

(9) Oil and air charge: There was no oil or air charge in the accumulator prior to Test BAKER. All of the oil and air had previously leaked out of the system via loose connections produced by Test ABLE.

(10) General condition of catapult: There was no change in the condition of this catapult. Major overhaul would be required to place this catapult in operating condition as a result of damage sustained during Test ABLE. However, no additional work would be required as a result of Test BAKER.

(E) AIRPLANE CRANE:

The airplane crane had been replaced to its original position by the ship's force prior to Test BAKER. However, complete operation of the crane had not been restored. The hydraulic rotating equipment had not been restored nor had all of the other minor parts which serve to make the crane fully operable.

There was no evidence of the kingpost having been raised or jarred out of place by the blast.

There was no evidence of any damage to the crane's limited operating condition as a result of being exposed to Test BAKER.

(F) ELEVATORS:

The elevator platforms were both blown out of the flight deck by the blast of Test ABLE.

The hoisting gear above the hangar deck gave no evidence of any increase in damage that could be attributed to Test BAKER.

The elevator machinery below the hangar deck appeared to be in good condition. There was no evidence of the machinery having been displaced or distorted.

USS ARKANSAS (BB-33)

The ship was sunk as a result of the underwater atomic bomb blast and no observations were made prior to the sinking.

USS NEW YORK (BB-34)

(A) CATAPULT:

The catapult showed evidence of shock damage to close inspection of the mountings. The securing bolts used in holding the track in place on top of the turret were found to be elongated and loosened. The bracing for the stern of the catapult which was secured to the facing of the turret was fractured and bent slightly upward. No-load shots could not be fired due to the inadequate securing of the catapult to the turret. The catapult mechanism showed no signs of shock other than in the securing of the track.

(B) AIRPLANE CRANE (Starboard):

There was no visible evidence of the crane having been dislocated by the blast. The foundation showed no signs of any distortion. The electrical conduit leading to the electrical motors on the crane appeared to be in good condition. There was no evidence of the electrical motors having been damaged by the blast. It was impossible to test the crane under operating conditions due to the lack of electrical power on the ship at the time of the inspection of this equipment.

(C) AIRPLANE CRANE (Port):

There was no visible evidence of the crane having received any damage as a result of Test BAKER. The foundation showed no signs of distortion or dislocation. The electrical equipment appeared to be in good condition. It was also impossible to test this crane under operating loads due to the lack of electrical power on the ship at the time of the inspection.

USS NEVADA (BB-36)

(A) CATAPULT:

There was no visible evidence of any increase in damage to the catapult as a result of exposure to Test BAKER. The distortion of the deck at the forward edge of the training track had not been increased. The two forward carriage cars which were mounted on the training track were still about eight inches above the track. The structure of the catapult did not receive any new damage.

(B) AIRPLANE CRANE:

There was no visible evidence of any damage to the base of the crane or its foundation on deck. The lower section of the boom was still in the same place as after Test ABLE, folded over the stern of the catapult.

USS PENNSYLVANIA (BB-38)

(A) CATAPULT:

There was no visible evidence of any damage to the foundation. The foundation showed no signs of any distortion or dislocation as a result of the bomb blast.

The catapult was not dislocated or distorted in any way and sustained no damage by the blast.

(B) AIRPLANE CRANE:

The base of the crane was intact and undamaged.

There was no evidence of any increase in damage to the airplane crane.

Both the catapult and crane were inoperable prior to Operations Crossroads as a result of previous battle damage to electrical equipment.

USS PENSACOLA (CA-24)

(A) CATAPULTS:

The catapults had been removed prior to Operation Crossroads.

The pedestal installed on the port side as a foundation for a catapult showed no signs of any distortion or movement at its base and remained intact and substantially undamaged by the blast.

(B) AIRPLANE CRANE:

There was no evidence of any increase in damage to the crane as a result of the blast.

The foundation and training gears on the boat deck were intact. There was no visible indication of any distortion or displacement of this material due to the blast.

The boom and backstays were undamaged.

The electrical conduits to the hoisting and training motor appeared to be in good condition.

There was no electrical power on board ship at the time of the inspection making it impossible to test the crane under operating conditions.

USS SALT LAKE CITY (CA-25)

(A) CATAPULTS:

The catapults had been removed prior to Operation Crossroads.

The pedestals installed on either side of the ship as foundations for the catapults remained intact and substantially undamaged by the blast.

There was no evidence of any distortion or dislocation at the base of the pedestals.

(B) AIRPLANE CRANE:

There was no evidence of any increase in damage to the crane as a result of the blast.

On close inspection of the foundation and base of the crane it was revealed that there had been no displacement of this material.

All of the electrical conduits to the hoisting and training motors appeared to be in good condition.

There was no evidence of any displacement of this electrical equipment.

V - LISTS OF AERONAUTICAL MATERIALS RETURNED FOR LABORATORY ANALYSIS

Description of Items Returned after Test ABLE	Model and Ser. No. Airplane taken from	Target Vessel	Cross-roads Red Tag No.	Destination
Port aileron section	FG-1D 88033	FALLON	11034	BuAer-- Res. and Dev. Division
Rate of Climb Indicator	FM-2 55266	CRITTENDEN	11041	BuAer - Airborne Equip. Division
Engine Gage Unit	FM-2 55266	do	11040	do
Altimeter and airspeed Indicator	FM-2 55266	do	11039	do
Manifold Pressure Gage	FM-2 55266	do	11038	do
Remote Compass Transmitter	FM-2 55266	do	11037	do
Oxygen demand regulator	FM-2 55266	do	11035	do
RPM Indicator	OS2U-3 5384	PENNSYLVANIA	11029	do
Port Flap Section	OS2U-3 5342	do	11016	BuAer - Res. and Dev. Division
Skin Sample - Port Flap	OS2U-3 5342	do	11015	BuAer - Airborne Equip. Division
Fabric Sample - Flap	OS2U-3 5342	do	11014	do
Fuel and Oil Pressure Gage	OS2U-3 5384	do	11013	do
Generator	OS2U-3 5342	do	11009	BuAer - Power Plant Division
Airspeed Indicator	OS2U-3 5342	do	11008	BuAer - Airborne Equip. Division
MK VIII Mag. Compass	OS2U-3 5342	do	11001	do
Altimeter	OS2U-3 5342	do	11002	do
MK II Life Raft	OS2U-3 5342	do	11003	do
Left Magneto	OS2U-3 5342	do	11004	BuAer - Power Plant Division
Port Flap Section	FG-1D 87847	BANNER	11033	BuAer - Res. and Dev. Division
Fabric - Port Side Rudder	FG-1D 87847	do	11036	BuAer - Airborne Equip. Division
Right Magneto	OS2U-3 5765	NEVADA	11019	BuAer - Power Plant Division
Rear Cockpit Instrument Panel	OS2U-3 5765	do	11017	BuAer - Airborne Equip. Division
Fabric - Port Side Rudder	FG-1D 87882	GASCONADE	11050	do
Right Magneto	OS2U-3 5342	PENNSYLVANIA	#	Air Material Command Col Davidson
Rear Cockpit Instrument Panel	OS2U-3 5342	do	#	do
Generator	OS2U-3 5384	do	#	do
MK VIII Mag. Compass	OS2U-3 5384	do	#	do
Altimeter	OS2U-3 5384	do	#	do
MK VIII Magnetic Compass	OS2U-3 5765	NEVADA	#	do
Left Magneto	OS2U-3 5765	do	#	do
.50 Cal. BAM gun, Ser.No. 120459		INDEPENDENCE	11032	NATC Patuxent River, Maryland
.30 Cal. BAM gun, Ser.No. 30993		NEVADA	11021	do
Arresting gear sheave pin		INDEPENDENCE	11026	NAMC Phila., Penna.
Arresting Gear Pendant		do	11056	do
Swaged fitting-barrier & cable		do	11028	do
Arresting gear & bushing sheave		do	11027	do

#NOTE: This material removed from target airplanes by BuAer Group and delivered to U.S. Army Group aboard U.S.S. WHARTON for shipment to Wright Field.

Description of Items Returned after Test Baker	Model and Ser. No. Airplane Taken From		Target Vessel	Cross-roads Red Tag No.	Destination
Water Pressure Regulator **	FG-1D	87847	BANNER	11063	BuAer-Power Plant Division
Carburetor	SC-1	35561	NEW YORK	11073	do
Carburetor **	FG-1D	87847	BANNER	11062	do
Tank Pressure Regulator	F6F-5N	77648	PENNSYLVANIA	11077	do
Carburetor	FG-1D	87882	GASCONADE	11060	do
Two Spark Plug Leads	F6F-5N	78068	BRISCOE	11064	do
Generator	F6F-5N	77637	CRITTENDEN	11061	do
Water Regulator	FG-1D	87832	GASCONADE	11083	do
Supercharger Regulator	FG-1D	87882	GASCONADE	11065	do
Two Spark Plug Leads	F6F-5N	77637	CRITTENDEN	11093	BAGR-CD for AAF
Two Spark Plug Leads	F6F-5N	78068	BRISCOE	11094	do
Magneto	F6F-5N	77637	CRITTENDEN	11092	do
Carburetor	FG-1D	88040	CARTERET	11078*	do
Supercharger Regulator	FG-1D	88040	CARTERET	11091*	do
Fuel Tank Pressurizing Unit	F6F-5N	77749	BARROW	11090*	do
Rubber Tubing from Access.Sect.	F6F-5N	78068	BRISCOE	11089	BuAer-Airborne Equip.Division
Rubber Tubing from Access.Sect.	F6F-5N	77637	CRITTENDEN	11088	do
Instrument Panel	FG-1D	82433	BUTTE	11070	do
Remote Indicating Compass	TBM-3E	69188	BRACKEN	11054	do
Five Engine Gages	F6F-5N	78068	BRISCOE	11055	do
Instrument Panel	F6F-5N	77749	BARROW	11066	do
Gyro Horizon	F6F-5N	77749	BARROW	11071	do
Engine Instrument Panel	F6F-5N	77648	PENNSYLVANIA	11076	do
Cylinder Head Temperature Gage	FG-1D	87882	GASCONADE	11072	do
Directional Gyro	FG-1D	87882	GASCONADE	11075	do
Magnetic Compass	F6F-5N	78068	BRISCOE	11052*	do
Fuel Pressure Gage	SC-1	35561	NEW YORK	11069	do
Access Door	F6F-5N	78068	BRISCOE	11095	BuAer-Exp. and Dev. Div.
Fabric and Skin Samples	F6F-5N	78068	BRISCOE	11084	do
Fabric and Skin Samples	F6F-5N	77637	CRITTENDEN	11085	do
Instrument Panel	TBM-3E	69188	BRACKEN	11203	BAGR-CD for AAF
Instrument Panel	FG-1D	87847	BANNER	11067	do
Magnetic Compass	SC-1	35561	NEW YORK	11068	do

**Note: These two items not returned. They were disassembled on board USS WHARTON

Description of Item	Model and Ser. No. Airplane Taken From		Target Vessel	Cross-roads Red Tag No.	Destination
Browning Aircraft Machine Gun .50 Cal. Fixed Starboard Gun Serial 2040098	FG-1D	87882	GASCONADE	11100	Naval Air Test Center, Patuxent River, Maryland-Armament Test Division
BOX containing:	--	--	--	11099	do
Illuminated Sight Mk 8 Mod 8	TBM-3E	69169	INDEPENDENCE	-	do
Station Distributor Mk 3 Mod 1	TBM-3E	69169	do	-	do
Station Distributor SD-1	TBM-3E	69188	BRACKEN	- #	do
Gun Solonoid Type G-19	SC-1	35561	NEW YORK	-	do
Control Trigger Electric Mk 5 Mod I No. 98045	FG-1D	87847	BANNER	- #	do
No. 3998	FG-1D	87882	GASCONADE	-	do
Bomb Shackle, Type AN-B-100	FG-1D	87882	GASCONADE	-	do
Bomb Release Control Intervalometer K-2	TBM-3E	87882	GASCONADE	- #	do

All items removed from target vessels in Test Baker placed aboard LST 661 due to high Radioactivity and will be shipped at a later date. Items marked # free of radioactivity have been shipped.

LIST OF AIRBORNE ELECTRONIC EQUIPMENT REMOVED FROM TARGET VESSELS (TEST BAKER) AND STOWED ON THE STERN OF USS FULTON FOR RETURN TO THE UNITED STATES FOR ANALYSIS AND TEST.

DESCRIPTION	AIRCRAFT	BU. NO.	VESSEL
RT-18/ARC-1	F6F-5N	77648	PENNSYLVANIA
RT-18/ARC-1	FG-1D	87882	GASCONADE
TN-8/APZ-1	FG-1D	87882	GASCONADE
T-21/ARC-5	FG-1D	87882	GASCONADE
R-4A/ARR-2	FG-1D	87882	GASCONADE
R-26/ARC-5	FG-1D	87882	GASCONADE
AN/APX-2	F6F-5N	77648	PENNSYLVANIA
RT-7/APN-1	F6F-5N	77648	PENNSYLVANIA
R/4A/ARR-2	FM-2	74277	GASCONADE
TN-8/APX-1	FM-2	74277	GASCONADE
C-45/ARC-1	FM-2	74277	GASCONADE
AN/APX-2	F6F-5N	77960	BRULE
R-4A/ARR-2	F6F-5N	77960	BRULE
MD-5B/APS-3	F6F-5N	77960	BRULE
RT-18/ARC-1	F6F-5N	77960	BRULE
RT-23/ARC-5	F6F-5N	77960	BRULE
AN/APX-2	F6F-5N	78086	DAWSON
RT-7/APN-1	F6F-5N	78086	DAWSON
RT-18/ARC-1	F6F-5N	78086	DAWSON
AN/APX-2	F6F-5N	77637	CRITTENDEN
R-23/ARC-5	F6F-5N	77637	CRITTENDEN
R-4A/ARR-2	F6F-5N	77637	CRITTENDEN
RT-18/ARC-1	F6F-5N	77637	CRITTENDEN
RT-7/APN-1	F6F-5N	77637	CRITTENDEN
APS-6(Rec)	F6F-5N	77637	CRITTENDEN
APS-6 (Rect Pwr)	F6F-5N	77637	CRITTENDEN
RT-18/ARC-1	FM-2	74277	GASCONADE
RT-7/APN-1	F6F-5N	77960	BRULE
AN/APX-2	F6F-5N	77749	BARROW
C-56/APX-2	F6F-5N	77749	BARROW
TN-8/APX-1	FG-1D	87847	BANNER
RT-18/ARC-1	FG-1D	87847	BANNER
RT-18/ARC-1	F6F-5N	77749	BARROW
RT-1/APN-1	F6F-5N	77749	BARROW
R-26/ARC-5	FG-1D	87847	BANNER
T-20/ARC-5	FG-1D	87847	BANNER
R-4A/ARR-2	F6F-5N	77749	BARROW
R-23/ARC-5	F6F-5N	77749	BARROW
ND-7/ARC-5	FG-1D	87847	BARROW
R-4A/ARR-2	FG-1D	87847	BANNER
RT-5/A/APS-4	TBM-4E	69169	INDEPENDENCE
ARMY	TBM-3E	69169	INDEPENDENCE
RT-18/ARC-1	TBM-4E	69169	INDEPENDENCE
T-47/ART-13	TBM-3E	69169	INDEPENDENCE
AN/APX-2	TBM-3E	69169	INDEPENDENCE
ID-11/APS-4	TBM-3E	69169	INDEPENDENCE
RT-7/APN-1	TBM-3E	69169	INDEPENDENCE
R-4A/ARR-2	TBM-3E	69169	INDEPENDENCE
R-26/ARO-5	TBM-4E	69169	INDEPENDENCE

VI - BUREAU OF AERONAUTICS GROUP ORGANIZATION MANUAL

ORGANIZATION MANUAL FOR BUAER GROUP (014J)

SECTION I - GENERAL

100. MISSION

The mission assigned to Joint Task Force one is "To determine the effects of the Atomic bomb upon naval vessels in order to gain information of value to the National Defense." The general purpose of the Bureau of Aeronautics participation is to determine the effects and radius of effectiveness of the atomic bomb on various types of surplus aircraft and selected aviation equipment disposed in the target area. In order to carry out the above mission the Bureau of Aeronautics Group is responsible under the Director of Ship Material:

(1) For all that pertains to the planning, correlation and implementation of the aircraft target exposure program.

(2) For the collection of data, analysis of results and preparation of reports pertaining thereto.

(3) For furnishing technical advice, liaison and assistance relative to standard and special aeronautical material, including pilotless aircraft and related equipment, in order to insure the full and proper execution of the responsibilities of the Bureau of Aeronautics to the Commander, Joint Task Force One and Operation Crossroads.

SECTION II - ORGANIZATION

200. THE BUREAU OF AERONAUTICS GROUP

In order to carry out the mission most effectively personnel of the Bureau of Aeronautics Group have the following assignments:

CODE NO		TITLE
014J	--	Head of BuAer Group
014J	-	Executive Assistant
014Jp	-	Aircraft Power Plants
014Jp	-	Assistant Aircraft Power Plants
014Ja	-	Aircraft Armaments
014Ja	-	Assistant Aircraft Armaments and BuOrd Liaison
014Ja	-	Assistant Aircraft Armaments
014Je	-	Aircraft Electronics and BuShips Liaison
014Je	-	Assistant Aircraft Electronics
014Js	-	Aircraft Structures
014Js	-	Assistant Aircraft Structures
014Jm	-	Aircraft Equipment
014Jm	-	Assistant Aircraft Equipment
014Jc	-	Catapults and Arresting Gear
014Jc	-	Assistant Catapults and Arresting Gear

CODE NO TITLE
Chief Clerk
Records and Correspondence Clerk

014Jr - Rear Echelon at Washington, D.C. and Liaison for Pilotless Aircraft

*Organization chart of the Bureau of Aeronautics Group is attached, **APPENDIX I***

201. ORGANIZATION OF BUREAU OF AERONAUTICS GROUP WHEN FUNCTION AS A TARGET INSPECTION TEAM

In order systematically and efficiently to cover the inspections of target aircraft and aviation equipment before and after each bomb blast the Bureau of Aeronautics Group is organized into a tar inspection team as follows:

(1) Head of BuAer Inspection Team.
(2) Technical Analysis and Inspection Report Coordinator.
(3) Aircraft Power Plant Group.
(4) Aircraft Armaments Group.
(5) Aircraft Electronics Group.
(6) Aircraft Structures Group.
(7) Aircraft Equipment Group.
(8) Catapults and Arresting Gear Group.

*Organization chart of the Bureau of Aeronautics Inspection Team is shown in **APPENDIX II***

202. ORGANIZATION TO CARRY OUT MISCELLANEOUS FUNCTIONS

The Bureau of Aeronautics Group is a military organization and as such is organized to carry out certain military and miscellaneous functions for the group and to establish liaison with those officers assigned these functions under the Director of Ship Material and Joint Task Force One. The following duty assignments are set up to cover these functions:

(1) Head of BuAer Group, Historian.
(2) Executive Assistant, Assistant Historian.
(3) Operations Officer.
(4) Personnel Officer.
(5) Logistics and Material Officer.
(6) Photographic Officer.
(7) Welfare and Athletic Officer.
(8) Safety Officer.
(9) Boat Officer.

*Assignments of these collateral duties to personnel of the Bureau of Aeronautics Group are shown in **APPENDIX III***

203. PERSONNEL OF BUREAU OF AERONAUTICS GROUP

(a) QUALIFICATIONS OF PERSONNEL

Personnel of the BuAer Group were carefully selected with the following qualifications and requirements in mind:

(1) General ability of the individuals.
(2) Wide technical knowledge and experience in the particular field to which assigned.
(3) Representation on BuAer Group of laboratory and test activities under the Cognizance of BuAer, such as the Naval Air Material Center, Philadelphia, Pennsylvania and the Naval Air Test Center, Patuxent River, Maryland.
(4) Representation on BuAer Group of the U. S. Marine Corps.

*Roster of personnel of the BuAer Group is attached, **APPENDIX III**.*

(b) TRAINING OF PERSONNEL

Since BuAer Group personnel were selected primarily for wide technical knowledge and experience in their particular fields. little technical training is required and personnel are already fully versed in their duties with respect to maintenance and inspections of the target aircraft and equipment before Test "A."

Some training of the group as a target inspection team has been experienced in the preliminary inspections of aircraft loaded on target vessels in continental ports. Additional training of the inspection team will take place at Pearl Harbor and in the target area before Test "A" so that the team will perform its functions quickly, accurately and efficiently in the short time available between Tests "A" and "B."

SECTION III - DUTIES AND RESPONSIBILITIES

300. DUTIES OF BUREAU OF AERONAUTICS GROUP

(a) 014J - HEAD OF BUAER GROUP

The Head of the Bureau of Aeronautics Group is responsible for translating the desires of the Bureau of Aeronautics into workable procedures consistent with Crossroads policy. He is responsible for opera ons of the BuAer Group under the Director of Ship Material and for establishing liaison with all essential elements of Task Force One. He shall insure effective execution of the mission of the BuAer Group in accordance with the approved plans and shall comply with all policies and directives issued by the Director of Ship Material or higher authority.

(b) 014J - EXECUTIVE ASSISTANT

The Executive Assistant shall act as the principal assistant and adviser to the Head of the Bureau of Aeronautics Group in all matters pertaining to the administration and operation of the group. He may issue in the name of the Head of the Bureau of Aeronautics Group such orders and instructions as are necessary to carry out his policies. He coordinates all BuAer Group activities, issues necessary instructions to effect this coordination, allots the work of preparing plans, reports or correspondence relating to these activities and transmits resulting drafts to the Head of the BuAer Group for approval. He exercises general supervision over all administrative work, coordinates activities of the Target Inspection Team and supervises the technical analysis and preparation of technical and historical reports. He carries out such additional duties as may be assigned by the Head of the BuAer Group.

(c) 014Jp - AIRCRAFT POWER PLANTS

The Head of the Aircraft Power Plant Group acts as technical adviser to the Head of the Bureau of Aeronautics Group on power plant matters, coordinates the work of the Power Plant Inspection Group, and supervises the preparation of technical reports on aircraft power plants. He shall establish effective liaison with the Power Plants Division of the Bureau of Aeronautics to insure transmission of the desires of that division in connection with Crossroads to the Head of the BuAer Group. He makes recommendations concerning the selection of power plant test items, the condition of tests and the establishment of appropriate procedures for loading, maintenance, inspection and reporting of power plant items under his cognizance. He shall perform such additional duties as the Head of the BuAer Group may direct.

(d) 014Jp - ASSISTANT AIRCRAFT POWER PLANTS

The Chief Petty Officer assistant acts as a member of the Power Plant Inspection Group, performs the detailed inspections of power plant equipment and generally assists the Head of the Power Plant Group as he may direct.

(e) 014Ja - AIRCRAFT ARMAMENTS

The Head of the Aircraft Armaments Group acts as technical adviser to the Head of the Bureau of Aeronautics Group on aircraft armament and ordnance matters, coordinates the work of the Armament Inspection Group, and supervises the preparation of technical reports on aircraft armaments. He shall establish effective liaison with the Armament Division of the Bureau of Aeronautics to insure transmission of the desires of that division in connection with Crossroads to the Head of the BuAer Group. He shall establish effective liaison with the Bureau of Ordnance through the BuOrd Group under the Director of Ship Material to insure the necessary coordination on aircraft ordnance items. He makes recommendations concerning the selection of aircraft armament test items, the condition of tests and the establishment of appropriate procedures for the loading, maintenance, inspection and reporting of armament items under his cognizance. He shall perform such additional duties as the Head of the BuAer Group may direct.

(f) 014Ja - ASSISTANT AIRCRAFT ARMAMENTS

This officer assists the Head of the Aircraft Armaments Group in all matters pertaining to aircraft armaments, acts as a member of the Aircraft Armaments Inspection Group and performs such additional duties as the Head of the Aircraft Armaments Group or higher authority may direct.

(g) 014Ja - ASSISTANT AIRCRAFT ARMAMENTS

The Chief Petty Officer assistant acts as a member of the Aircraft Armaments Inspection Group, performs the detailed inspections of aircraft armaments and generally assists the Head of the Aircraft Armaments Group as he may direct.

(h) 014Je - AIRCRAFT ELECTRONICS

The Head of the Aircraft Electronics Group acts as technical adviser to the Head of the BuAer Group on airborne electronics and electrical equipment and matters relating thereto, coordinates the work of the Aircraft Electronics Inspection Group, and supervises the preparation of technical reports on aircraft electronic and electrical equipment. He shall establish effective liaison with the Bureau of Ships through the BuShips Group under the Director of Ship Material to insure coordination on airborne electronics items. He makes recommendations concerning the selection of aircraft electronic test items, the condition of tests and the establishment of appropriate procedures for the loading, maintenance, inspection and reporting of electronic and electrical items under his cognizance. He shall perform such additional duties as the Head of the BuAer Group may direct.

(i) 014Je - ASSISTANT AIRCRAFT ELECTRONICS

This officer assists the Head of the Aircraft Electronics Group in all matters pertaining to aircraft electronics, acts as a member of the Electronics Inspection Group and performs such additional duties as the Head of the Aircraft Electronics Group or higher authority may direct.

(j) 014Js - AIRCRAFT STRUCTURES

The Head of the Aircraft Structures Group acts as technical adviser to the Head of the BuAer Group on aircraft structural matters, coordinates the work of the Aircraft Structures Inspection Group, and supervises the preparation of technical reports on aircraft structures. He shall establish effective liaison with the Research and Development Division of the Bureau of Aeronautics to insure transmission of the desires of that division concerning Crossroads to the Head of the BuAer Group. He makes recommendations concerning the selection of aircraft structural test items, the condition of tests and the establishment of appropriate procedures for loading, maintenance, inspection and reporting of aircraft structural items under his cognizance. He shall perform such additional duties as the Head of the BuAer Group may direct.

(k) 014Js - ASSISTANT AIRCRAFT STRUCTURES

This Chief Petty Officer assists the Head of the Aircraft Structures Group in all matters pertaining to structures, acts as a member of the Structures Inspection Group, makes the detailed inspections of aircraft structural items and generally assists the Head of the Aircraft Structures Group as he may direct.

(l) 014Jm - AIRCRAFT EQUIPMENT

The Head of the Aircraft Equipment Group acts as technical adviser to the Head of the BuAer Group on matters relating to aircraft equipment, coordinates the work of the aircraft equipment inspection group and supervises the preparation of technical reports on aircraft equipment. He shall establish effective liaison with the Airborne Equipment and Maintenance Divisions of the Bureau of Aeronautics to insure transmission of the desires of those divisions concerning Crossroads to the Head of the BuAer Group. He makes recommendations concerning the selection of aircraft equipment test items, condition of tests, and the establishment of appropriate procedures for loading, maintenance, inspection and reporting of aircraft equipment items under his cognizance. He shall perform such additional duties as the Head of the BuAer Group may direct.

(m) 014Jm - ASSISTANT AIRCRAFT EQUIPMENT

This Chief Petty Officer assists the Head of the Aircraft Equipment Group in all matters pertaining to equipment, acts as a member of the Aircraft Equipment Inspection Team, makes the detailed inspections of items of aircraft equipment and generally carries out such duties as the head of the Aircraft Equipment Group may direct.

(n) 014Jc - CATAPULTS AND ARRESTING GEAR

The Head of the Catapults and Arresting Gear Group acts as technical adviser to the Head of the BuAer Group on matters relating to target ship catapults, arresting gear and barriers, aircraft arresting gear and methods of securing target aircraft for heavy weather. He coordinates the work of the Catapults and Arresting Gear Group and supervises the preparation of technical reports on items under his cognizance. He shall establish effective liaison with the Ships' Installations Division of the Bureau of Aeronautics to insure transmission of the desires of that division in connection with Crossroads to the Head of the BuAer Group. He makes recommendations concerning the catapult and arresting gear test items, condition of tests, methods of securing target aircraft, and the establishment of procedures for maintenance, inspection and reporting of test items under his cognizance. In this connection he shall supervise the activities of the catapult and arresting gear crews on target vessels during inspections and operation of the catapults, arresting gear and barriers. He shall perform such additional duties as the Head of the BuAer Group may direct.

(o) 014Jc - ASSISTANT CATAPULTS AND ARRESTING GEAR

This Chief Petty Officer assists the Head of the Catapults and Arresting Gear Group in all matters pertaining to ship's catapults, arresting gear and barriers, aircraft arresting gear and methods of securing target aircraft for the tests. He acts as a member of the Catapults and Arresting Gear Inspection Group, performs the detailed inspections of equipment under the cognizance of this group and generally assists the Head of the Catapults and Arresting Gear Group as he may direct.

(p) CHIEF CLERK

The Chief Clerk acts as administrative assistant to the Head of the BuAer Group, is in charge of the BuAer administrative and clerical office and acts as assistant to the Personnel Officer. He directs the clerical work of the BuAer office, is responsible for the accurate maintenance of pertinent files and records and supervises the typing and preparation of all correspondence and reports. He is responsible for the receipt, despatch, recording, routing and filing of all correspondence. He shall perform such additional duties as the Head of the BuAer Group may direct.

(q) RECORDS AND CORRESPONDENCE CLERK

This Chief Yeoman acts as assistant to the Chief Clerk and performs such duties as the Chief Clerk or higher authority may direct.

(r) 014J5 - REAR ECHELON AND LIAISON FOR PILOTLESS AIRCRAFT

The mission of the Rear Echelon is "To act as the administrative representative of Commander Joint Task Force One at the Navy Department after his departure from Washington, D.C., in order to facilitate the expeditious accomplishment of Operation Crossroads." The Rear Echelon for the BuAer Group acts as the administrative representative of the group head during his absence from the Navy Department, Washington, D.C., and in addition has the very important program involved in the preparation and delivery of drones, drone control aircraft and related equipment and instrumentation required to outfit the SHANGRI LA for employment in the frone operational program. He shall establish effective liaison with the Deputy Task Force Commander for Aviation to insure satisfactory coordination with the operational staff on the drone program. He shall establish effective liaison with the Pilotless Aircraft Division of the Bureau of Aeronautics in connection with the material aspects of the drone program and shall act as technical adviser and special assistant to the Head of the BuAer Group on matters relating to drones. He shall prepare the necessary historical and technical reports on items under his cognizance. He shall be prepared to proceed as directed to the target area in connection with the drone program when his technical advice is required. He shall perform such additional duties as the Head of the BuAer Group may direct. Upon the departure of the Head of the BuAer Group from the Navy Department he shall report to the Joint Task Force One Rear Echelon for such duties as he may direct.

301. DUTIES OF BUREAU OF AERONAUTICS INSPECTION TEAM

(a) INSPECTIONS

(1) PURPOSE OF INSPECTIONS

The BuAer Group is organized to function as an inspection team. The purpose of the inspections before and after each test is to make a thorough analysis of the extent of damage to and the physical condition of each item of test equipment under BuAer cognizance, in order to relate the damage to known war damages and to determine any additional or unusual effects upon the aircraft or aviation equipment. The results will be related to the instrumentation program of BuShips, BuOrd and other instrumentation groups under the Technical Director to establish insofar as possible the nature, extent and causes of any changes in the test items.

(2) SCOPE OF INSPECTIONS

The BuAer Group is responsible for conducting inspections of:

a. Catapults and arresting gear.
b. Embarked or moored target aircraft and aviation equipment.

(3) NUMBER OF INSPECTIONS

The BuAer Group will conduct the following inspections:

a. Preliminary inventory and inspection of embarked target aircraft and equipment prior to departure of target vessels for Bikini.
b. Final inspection of embarked aircraft and aviation equipment and moored seaplanes at the target area to determine physical condition just prior to each test.
c. Inspection of embarked aircraft and aviation equipment and moored seaplanes as soon after each blast as target areas and target vessels are declared safe for inspection parties.

(4) INSPECTION REPORTS

Upon completion of each inspection the prepared report forms will be filled out by each technical inspection group for items under the cognizance of the group. In the target area the note books being furnished by the Director of Ship Material will be used for field inspections. Field notebooks as well as all other inspection notes, rough drafts, etc., will remain a part of the official files of the BuAer Group and will be kept in the BuAer office. Reports will be turned in daily for technical analysis and coordination by the Inspection Report Coordinator for the BuAer Group.

(b) HEAD OF BUAER INSPECTION TEAM

(1) HEAD OF BUAER INSPECTION TEAM

The Head of the BuAer Inspection Team accompanies the team on all inspections and supervises the activities of the technical groups. He is responsible for carrying out all of the prescribed inspections, insures that all targets are adequately covered and coordinates activities of the BuAer Inspection Team with those of other teams under the Director of Ship Material and Commander Joint Task Force One. He shall familiarize himself with ComJoint-TaskForOne Operation Plan No. 1-46, Annex "X", Reboarding and Inspection Plan and other existing instructions to insure compliance with the master plans and policies in the conduct of inspections. He shall insure that sufficient data is collected to determine the effects of the bomb, radius of effectiveness, relation of damage to distance from the bomb, and data necessary to relate the damage to the instrumentation data and phenomena compiled under the Technical Director. He is responsible for making the required damage reports and for such other duties in connection with target inspections as may be prescribed by the Director of Ship Material.

(2) TECHNICAL ANALYSIS AND INSPECTION REPORT COORDINATOR

This officer acts as the principal assistant to the Head of the BuAer Inspection Team. He shall accompany the inspection team on inspections when practicable and invariably in the absence of the head of the team. He shall make the necessary on-the-spot analysis and technical review of information obtained to insure that complete data are recorded and shall keep an up-to-date record of the over all pattern of inspection and damage observation. He shall establish liaison with the Inspection Control Officer, the Coordinating and Technical Service Officer and the Target Inspection Officer on the Director of Ship Material staff to assist in the planning and scheduling of inspections by the BuAer team and the coordination of the inspections with those of other teams. He shall carry out such additional duties as may be directed by the Head of the BuAer Inspection Team.

(3) AIRCRAFT TECHNICAL INSPECTION GROUPS

The BuAer Inspection Team is divided into six technical groups covering the main categories of aeronautical material involved, viz:

Aircraft Power Plant Group,
Aircraft Armaments Group,
Aircraft Electronics Group,
Aircraft Structures Group,
Aircraft Equipment Group,
Catapults and Arresting Gear Group.

These technical groups make up, together with the head, the BuAer Inspection Team. Each group is responsible for carrying out the prescribed inspections, filling out the prepared inspection forms, collection and recording of all essential data and making the necessary field inspection analysis and technical reports. This will include follow up and reporting on the laboratory analysis of test items under the cognizance of each group which are returned to continental laboratories for further study. The Aircraft Armaments Group and Aircraft Electronics Groups shall coordinate their inspections, collecting and recording of data and technical reports with the BuOrd and BuShips Groups under the Director of Ship Material to insure adequate coverage and reporting to each bureau group respectively on items of mutual interest. The Catapults and Arresting Gear Group shall similarly coordinate inspections with the BuShips Group and may use the catapult and arresting gear crews aboard target vessels in order to determine whether the gear is operable before and after each test. Insofar as practicable, with the possible exception of the Aircraft Electronics Group based on the AVERY ISLAND, the BuAer Inspection Team will remain together during the conduct of all inspections. The Head of each group is responsible for adequate coverage of test items under their cognizance.

302. COLLATERAL DUTIES OF BUREAU OF AERONAUTICS GROUP

The BuAer Group is organized to carry out certain military and miscellaneous duties and to establish liaison with those officers assigned similar functions under Joint Task Force One or the Director of Ship Material as follows:

(a) HEAD OF BUAER GROUP - HISTORIAN

The Head of the BuAer Group has additional responsibilities in connection with the preparation of historical summaries of the activities of the BuAer Group. These reports constitute a complete historical record of the part played by the Bureau of Aeronautics and the BuAer Group in Operation Crossroads together with the personalities and activities involved. They form the basis of material for the final technical reports of the group, for the periodic press releases, and for periodic status reports of the progress of the aircraft exposure program. These reports shall be submitted in accordance with the general requirements of the Joint Task Force ONE Historian and when called for by the staff or Director of Ship Material Historian. It is anticipated that copies of these reports may be furnished to interested Bureaus of the Navy Department when released by the Commander Joint Task Force One.

(b) EXECUTIVE ASSISTANT - ASSISTANT HISTORIAN

The Executive Assistant has additional duties as Assistant Historian. He is responsible for the recording of factual data, for the compilation of up to date biographical sketches of key personnel and for the maintenance of complete records of all reports, correspondence and data for inclusion in the historical reports.

In this connection he shall keep a running history of the activities of the BuAer Group, prepare the Weekly Status Reports of the BuAer Group to the Director of Ship Material and maintain up to date progress charts of the aircraft exposure program and the inspections in connection therewith. He shall coordinate the collection of data, information and reports from the technical sections of the BuAer Group for historical purposes. In the absence of the Head of the BuAer Group he shall prepare any historical reports called for and shall establish effective liaison with the historians on the staffs of Commander Joint Task Force One and the Director of Ship Material.

(c) OPERATIONS OFFICER

The Operations Officer shall assist the Head of the BuAer Group and the Executive Assistant in matters relating to aircraft and other operations of interest to the BuAer Group. In this connection he has the following specific responsibilities:

(1) Follow the progress of the aircraft drone operations aboard the SHANGRI-LA at the target area and report matters of interest to or requiring action by the BuAer Group in connection with the material aspects of the drone program.

(2) Follow the program of other operational aircraft units such as the Photographic and other aircraft on the SAIDOR, photo reconnaissance PBM airplanes, Seaplane Transport Squadron (VPB-32), Air-Sea Rescue Squadron VH-4, the Helicopter Unit, etc., in order to report matters of interest to or requiring material assistance of the Head of the BuAer Group.

(3) Coordinate with the Director of Ship Material Coordinating and Technical Service Officer at the target area, requirements of the BuAer Inspection Team for boats to transport the team to and from targets.

(4) Schedule flight time in available aircraft at Pearl Harbor and the target area for aviators requiring flight time.

(5) Make up any required watch lists for officers of the BuAer Group.

(6) Perform any additional duties as the Head of the BuAer Group may direct.

(d) PERSONNEL OFFICER

The personnel officer shall act as assistant to the Head of the BuAer Group in all matters pertaining to personnel. He is responsible for the following:

(1) Procurement of personnel as necessary to the maintenance of essential personnel records and reports.

(2) Endorsement of orders, arrangements for transportation, etc., in connection with all movements of the BuAer Group.

(3) Act as adviser to the Head of the BuAer Group on all matters pertaining to quarters, messing, medical care, pay, insurance and similar matters of a personal nature.

(4) He shall prepare any watch, quarter and station bills required of the BuAer Group, and shall be responsible for musters, leave, liberty and discipline of enlisted personnel.

(5) He is responsible for setting up and supervising the work of the BuAer Group administrative and clerical office.

(6) He shall establish liaison with CJTF-1 Assistant Chief of Staff for Personnel (J-1) and with the Director of Ship Material Personnel Officer to insure compliance on personnel matters with all staff policies and requirements.

(7) He shall perform such other duties as the Head of the BuAer Group may direct.

(e) LOGISTICS AND MATERIAL OFFICER

The Logistics Officer acts as assistant to the Head of the BuAer Group on all material and logistic matters. Specifically he has the following responsibilities:

(1) He establishes the requirements, prepares the plans and supervises the delivery of all special equipment or material necessary for the support of the target exposure plan.

(2) He provides for mimeographing of sufficient inspection report forms or other office supplies or report forms required by the BuAer Group.

(3) He shall provide the necessary clothing and equipment required for target inspection teams such as tools, flashlights, work clothes, etc.

(4) He shall supervise the shipment and return to the United States of special test items for further laboratory analysis.

(5) He shall establish effective liaison with the Assistant Chief of Staff for Logistics (J-4) and with the Director of Ship Material on matters relating to supply and logistics.

(6) He shall familiarize himself with schedules, instructions and policies relating to air and surface lift for shipment of material required by the BuAer Group.

(7) He performs such additional duties as the Head of the BuAer Group may direct.

(f) PHOTOGRAPHIC OFFICER

The Photographic Officer acts as technical adviser and assistant to the Head of the BuAer Group in all matters pertaining to photography. He shall have the following specific duties:

(1) He shall familiarize himself with the staff policies, instructions, security measures, etc., in regard to photography, including the use of personal cameras, and shall instruct the photographers assigned the BuAer Group and supervise the taking and recording of all photographs.

(2) He shall provide adequate photographic coverage of target aircraft and aviation equipment.

(3) He shall insure that all photographs are properly marked for identification, required forms filled out for the JTF-1 Staff and Director of Ship Material photographic files, and shall maintain accurate files and records of all photographs. He shall collect negatives, forward them to the required center for printing and insure that one properly marked print of each picture taken is returned to the BuAer Group for file or that missing photographs are retaken.

(4) He shall familiarize himself with the Photographic Plans and shall keep a running history of matters of interest for inclusion in the BuAer History concerning photography.

(5) He shall establish effective liaison with the Director of Photography for Joint Task Force One and the Director of Ship Material, Photographic Officer on photographic matters.

(g) WELFARE AND ATHLETIC OFFICER

The Welfare and Athletic Officer acts as assistant and adviser to the Head of the BuAer Group in all matters pertaining to welfare and athletics. He has the following responsibilities:

(1) He is responsible for welfare, recreation and athletics for all personnel of the BuAer Group.

(2) He shall promulgate information on all recreation facilities available such as officers' club, beer parlor, library, swimming facilities, movies, etc.

(3) He shall provide athletic equipment and arrange athletic events for recreational periods.

(4) He shall establish effective liaison with the Chief of Staff for Personnel (J-1) and Welfare and Athletic Officers under the Director of Ship Material to insure adequate facilities are available and augment these facilities and equipment as necessary for the BuAer Group.

(5) He shall perform such additional duties as may be directed by the Head of the BuAer Group.

(h) SAFETY OFFICER

The Safety Officer acts as assistant to the Head of the BuAer Group in matters pertaining to safety. Specifically he has the following responsibilities:

(1) He shall familiarize himself with all safety plans, procedures and instructions in order to keep the BuAer Group informed on these matters.

(2) He shall establish effective liaison with the Safety Officer on CJTF-1 Staff and Medical and Safety Officers under the Director of Ship Material on matters relating to safety.

(3) He shall study the Safety Annexes and Appendices to the JTF-1 Operation Plan No. 1-46 as well as the Re-entry and Salvage plans in order to keep the BuAer Inspection Team fully informed on all safety items in connection with target area re-entry and boarding and inspection of target ships after Tests "A" and "B".

(4) He shall prepare plans showing location of explosives, inflammable materials, chemical warfare items or any other hazardous materials with respect to aircraft in order to warn the BuAer inspection team of existing hazards during target inspection.

(5) He shall maintain up to date information on radiological clearance of target ships for inspection, progress of salvage operations on damaged vessels with embarked target aircraft and salvage operations of moored seaplanes in connection with inspection of these targets by the BuAer Group.

(6) He shall insure that BuAer Group is adequately instructed and prepared for extensive inspection trips or visits away from the WHARTON where exposure to tropical sun or other hazards may cause personal injury.

(7) He shall perform such additional duties as the Head of the BuAer Group may direct.

(i) BOAT OFFICER

The Boat Officer is in general responsible to the Head of the BuAer Group for the condition of boats assigned to the Group and matters relating to operation of these boats. Specifically he has the following duties:

(1) He shall insure that all boats are properly maintained and are kept in operating condition.

(2) He shall insure that all essential and emergency equipment is in the boats at all times.

(3) He shall instruct the coxswains and crews of BuAer boats in the Rules of the Road and in the proper handling of the boats.

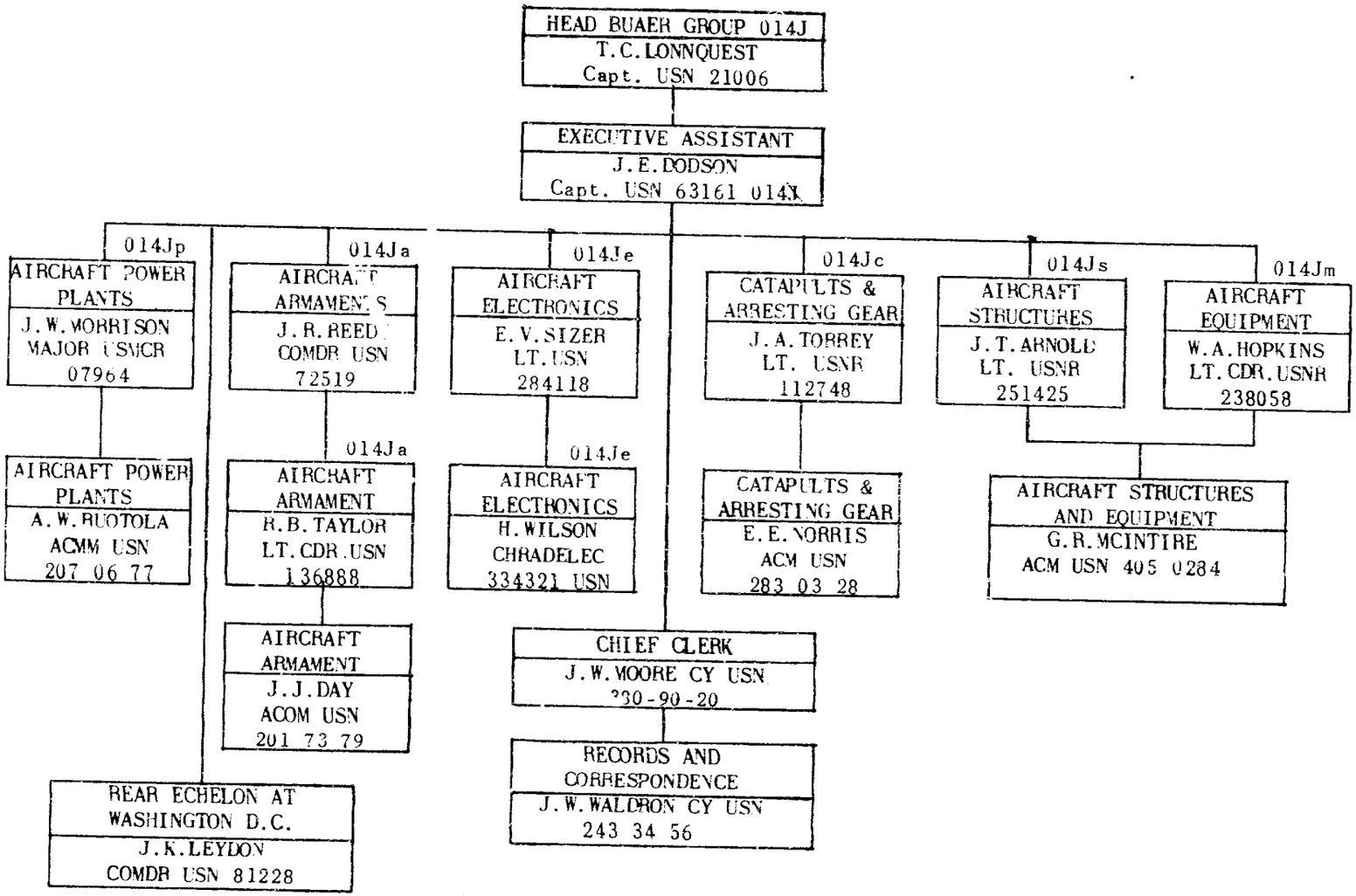
(4) For important trips he shall go along as boat officer in charge of the crew and the boat.

(5) In the target area or other ports he shall familiarize himself and the boat crews with the locations of all vessels containing target aircraft or important officers on CJTF-1 staff which the Head of the BuAer Group may be required to visit officially.

(6) He shall perform such additional duties as the Head of the BuAer Group may direct.

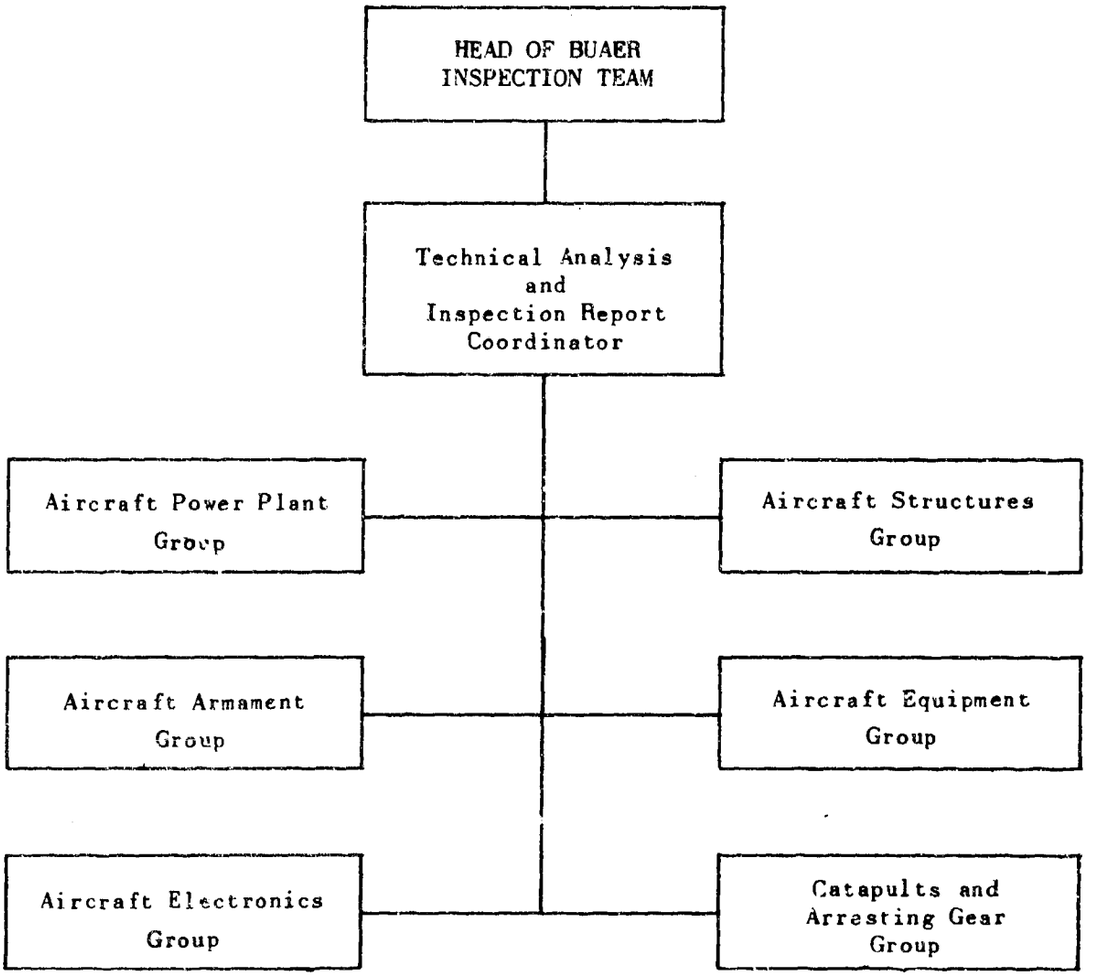
In addition to the specific functions outlined above it is expected that all officers and enlisted personnel of the BuAer Group may be required to stand such watches and perform military duties as the Director of Ship Material or higher authority may direct.

OPERATION CROSSROADS TECHNICAL DIRECTION SHIP MATERIAL
BUREAU OF AERONAUTICS GROUP



APPENDIX II

ORGANIZATION CHART UNDER BUAER INSPECTION TEAM



APPENDIX III

ROSTER OF PERSONNEL BUAER GROUP

CODE NO.	NAME	RANK	FILE NO.	TITLE	ADDITIONAL OR COLLATERAL DUTIES	PERMANENT DUTY STATION
014J	T. C. LONNQUEST	CAPT USN	21006	HEAD BUAER GROUP	Head BuAer Inspection Team; Historian; Head of Technical Analysis and Review Board	BuAer
014J	J. E. DODSON	CAPT USN	63161	Executive Assistant	Technical Analysis & Inspection Report Coordinator. Asst. Historian	Power Plant Division BuAer.
014Ja	J. R. REEDY	Comdr USN	72519	Aircraft Armaments Group	Welfare and Athletics, Safety	NATC Patuxent
014Jr	J. K. LEYDON	Comdr USN	81228	Rear Echelon Washington, D.C.	Liaison Pilotless Aircraft	Pilotless Aircraft Div BuAer
014Jp	J. W. MORRISON	Maj. USMCR	07964	Aircraft Power Plants Group	Operations, US Marine Corps Liaison Personnel	NATC Patuxent
014Js	J. T. ARBOLD	Lt. USNR	251423	Aircraft Structures Group		NATC Patuxent
014'	H. B. TAYLOR	Lt. Cdr.USN	136888	Aircraft Armaments Assistant	Liaison with BuOrd Group	NOTS Inyokern
014Jm	W. A. HOPKINS	Lt.Cdr.USNR	238058	Aircraft Equipment Group	Logistics and Material	Airborne Equipment Div BuAer
014Jc	J. A. TORREY	Lt.Cdr.USNR	112748	Catapults & Arresting Gear Group	Boat Officer	NAMC Philadelphia.
014Je	E. V. SIZER	Lt. USN	284118	Aircraft Electronics Group	Photography Liaison with BuShips Group	Airborne Coordinating Group NRL
014Je	H. WILSON	ChRadElec	334321	Aircraft Electronics Assistant	Liaison with BuShips Group	Airborne Coordinating Group NRL
	J. J. DAY	ACOM USN	201 73 79	Aircraft Armaments Assistant	None	NATC Patuxent
	E. E. NORRIS	ACM USN	283 03 28	Catapults & Arresting Gear Assistant	None	NAMC Philadelphia
	G. R. MCINTIRE	ACM USN	405 02 84	Aircraft Structures & Equipment Ass't	None	NAMC Philadelphia
	A. W. RUOTOLA	ACM USN	207 06 77	Aircraft Power Plants Assistant	None	FAW-5 Norfolk
	J. W. MOORE	CY USN	380 90 20	Chief Clerk	None	CJTF-1
	J. W. WALDRON	CY USN	243 34 56	Records-Correspondence	None	CJTF-1

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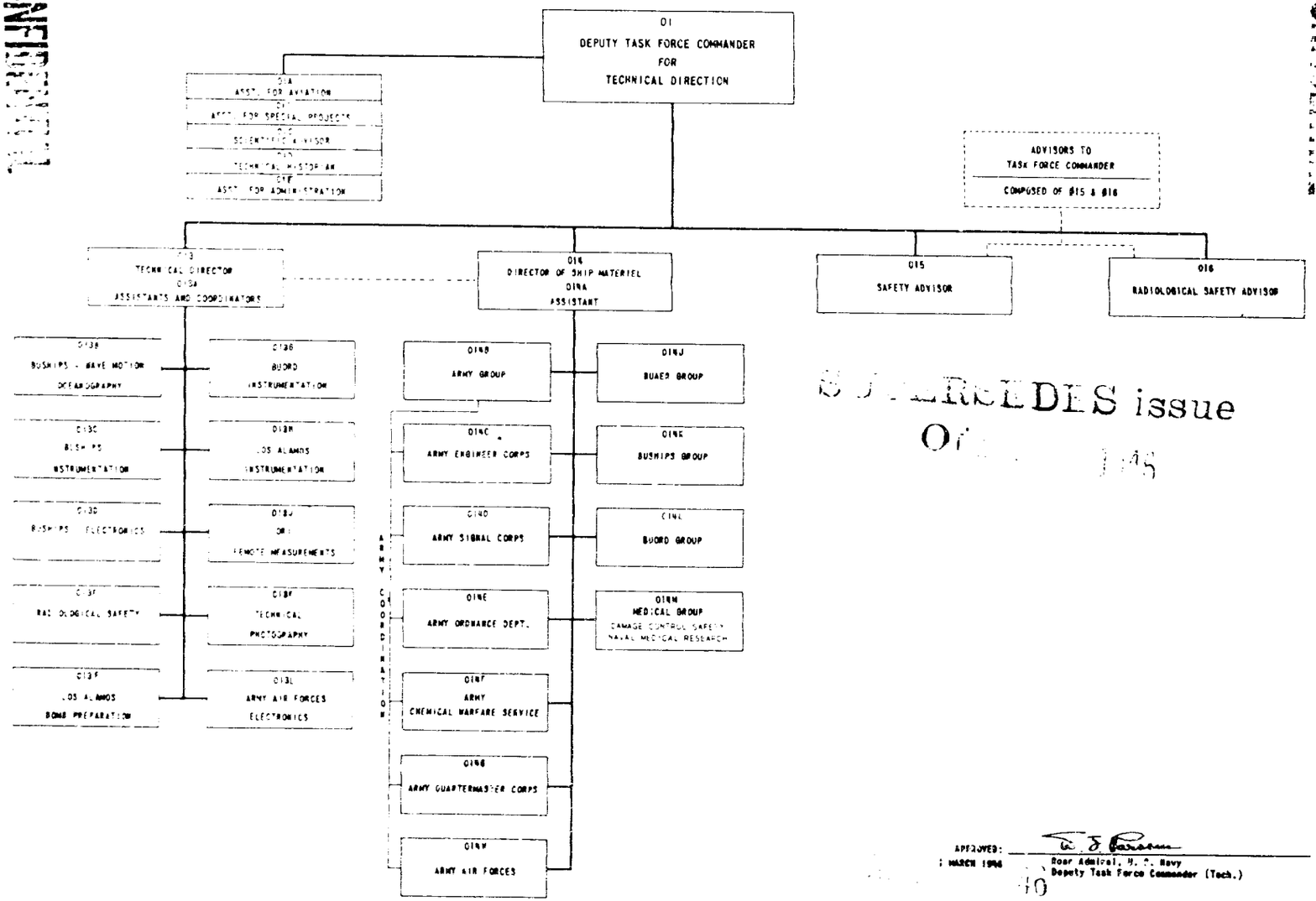
COMMANDER JOINT TASK FORCE ONE

STAFF ORGANIZATION - DEPUTY TASK FORCE COMMANDER FOR TECHNICAL DIRECTION



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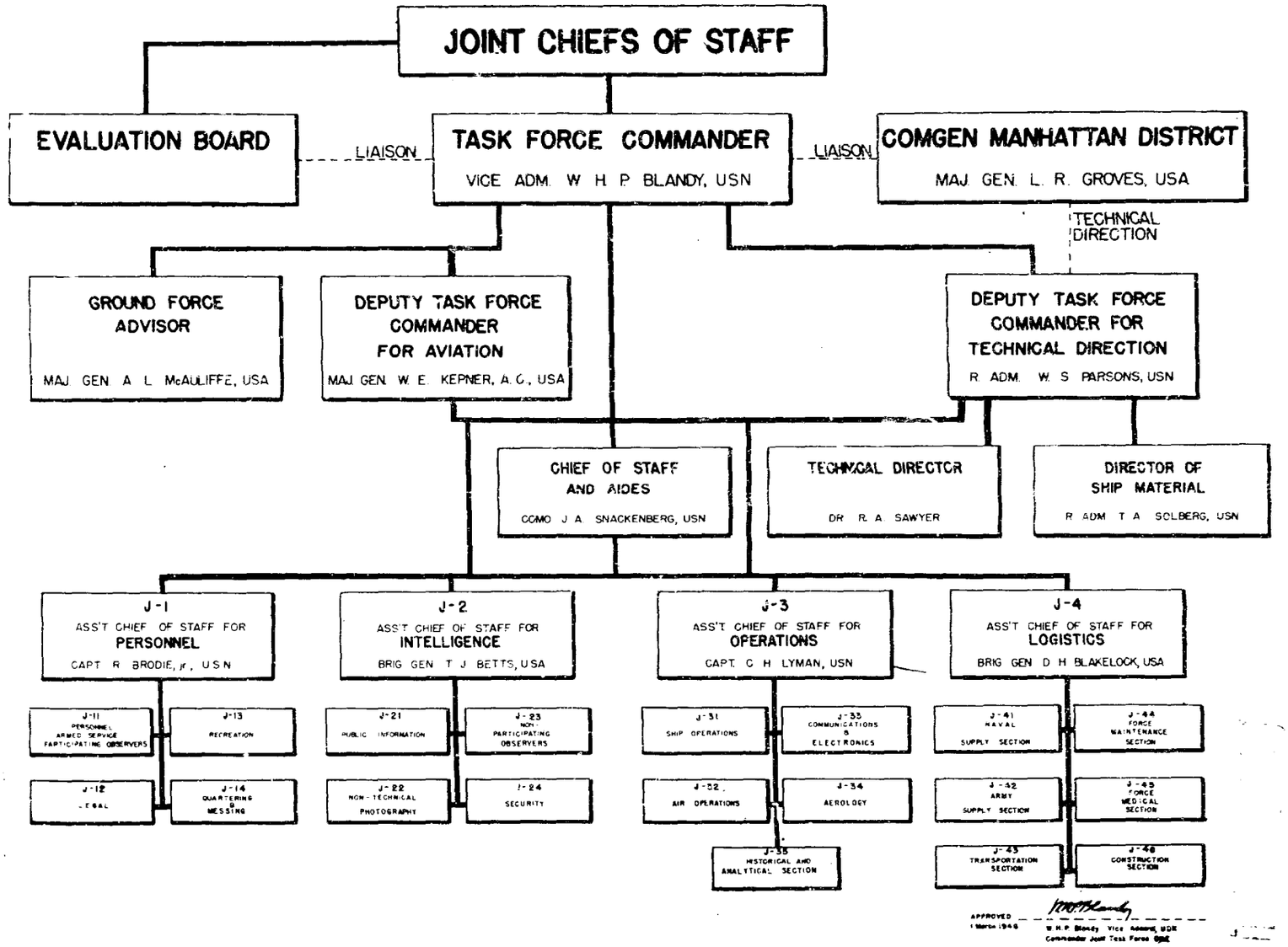
Of [redacted] 45

APPROVED: 1 MARCH 1946

Rear Admiral, U. S. Navy
Deputy Task Force Commander (Tech.)

CONFIDENTIAL

JOINT TASK FORCE ONE STAFF ORGANIZATION



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