



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON, D.C. 20350

~~CONFIDENTIAL~~
IN REPLY REFER TO
Op-0982/ipl
Ser 09P098
21 AUG 1969

~~CONFIDENTIAL~~ - Unclassified when enclosure (1) is removed

From: Chief of Naval Operations
To: Judge Advocate General

Subj: Investigation of Forrestal Fire; return of

Ref: (a) JAG ltr ser 0132 of 12 August 1969

Encl: (1) Copy of findings, recommendations and opinions of investigations into fire on board USS Forrestal (CVA 59) and First, Second and Third endorsements thereon

1. As requested in reference (a) enclosure (1) is returned.

B-6

By direction

DECLASSIFIED

Classified (sensitive) (C) by authority of OPNAVINST 5510.10 (N3-200)
18 Aug 75
B-6 - PG SecCont
(Name)
JUDGE ADVOCATE GENERAL OF THE NAVY

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THIRD ENDORSEMENT on

COM, 070031, ltr of 19 Sep 1967

From: Judge Advocate General
 To: Chief of Naval Operations
 Via: (1) Commander, Naval Air Systems Command
 (2) Commander, Naval Ships Systems Command
 (3) Commander, Naval Ordnance Systems Command
 (4) Chief of Naval Personnel (P-21)

Subj: Inves. - Fire and explosions aboard USS FORRESTAL (CVA 59)
 on 29 July 1967; deaths of 116 persons; presumptive deaths
 of 18 persons (missing or remains incapable of positive
 identification); injuries to 161 personnel; ordered by
 Commander Naval Air Force, U. S. Atlantic Fleet,
 30 July 1967 (C)

Encl: (1) Record of subject investigation with copies of First
 and Second Endorsements
 (2) COM ltr, Op-0211/jm, Ser 0859F0211, dtd 25 October 1968,
 with enclosures

1. (U) Forwarded. All deaths, verified and presumptive, and all
 injuries reported in enclosure (1) occurred in the line of duty and
 not as the result of any misconduct on the part of the individuals
 killed, missing, and injured.

2. (S) The catastrophic fire aboard the FORRESTAL resulted from a
 chain of events starting at about 1051 local time (H01) on
 29 July 1967. The FORRESTAL had been on Yankee Station in the Gulf
 of Tonkin since 24 July, and had been launching air strikes against
 North Vietnam since 25 July. Other carriers in the area were the
 ORISKANY and BON HONORIE RICHARD; the INTREPID was en route Yankee
 Station; the CONSTELLATION was moored in Subic Bay. Captain
 B-6, USN, was commanding FORRESTAL. Rear Admiral
 B-6, USN, was commanding the Task Group comprised of FORRESTAL,
 and Destroyers RUFENUS and TUCKER. Commander B-6
 USN, commanded Carrier Air Wing SEVENTEEN, aboard the FORRESTAL.
 Commander B-6, USN, commanded Fighter Squadron ELEVEN,
 which was assigned to Air Wing SEVENTEEN at the time.

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3. (C) 12 A-4, 12 F-4, and 3 A-6 aircraft were on the deck ready for a launch to begin at about 1100. Each airplane was variously loaded with bombs, missiles, rockets, and 20 mm. ammunition. A preliminary launch of one KA-3B and one EA-1Y had been made at 1050; launches of another KA-3B and one E-2A were in progress. Three RASC aircraft were on the starboard side of the flight deck, abaft the island. A-4E #405, piloted by Lieutenant Commander ^{B. L.} [redacted] USN, was the third aircraft forward of the stern on the port side of the flight deck. An F-4, #110 was spotted on the extreme starboard quarter of the flight deck, headed inboard at approximately a 45° angle to the ship's head. Lieutenant Commander ^{B. L.} [redacted], USN, was pilot; Lieutenant (junior grade) ^{B. L.} [redacted] was preflighting the rear cockpit; eight crewmen were engaged in checking ordnance and assisting in starting and otherwise readying the plane for launch. External electrical power was being supplied to the airplane in connection with starting the starboard engine. Surmisedly due to a combination of material deficiencies and some operational procedures affording less than maximal emphasis upon safety, in the course of switching from externally supplied electrical power to the internal power system of the F-4, sufficient electrical current reached one of three launchers on the port inboard wing station to fire a ZUNI rocket. The rocket crossed the flight deck and struck A-4 #405, some 100 feet away, rupturing the full 400-gallon fuel tank on the A-4 and igniting the jet fuel. A fragment punctured the centerline external fuel tank of another A-4 just aft of the jet blast deflector of catapult #3. Fuel from this tank poured on deck and was ignited. The burning fuel spread aft, fanned by 32 knots of wind from 350° relative and by exhausts of at least three jets forward.

4. ~~(C)~~ Fire quarters, then general quarters, were sounded at 1052 and 1053. An AN-M65 1000-pound bomb fell to the deck from A-4 #405, came to rest in a pool of burning jet fuel, split, and was observed to be burning brightly. Within one and one-third minutes after initiation of the fire, the first hose began to play salt water on the forward boundary of the fire. Some fourteen seconds later, a bomb exploded on the flight deck with 33 personnel in close proximity. This explosion decimated two hose teams and caused 27 other casualties, plus spreading the fire to three A-4 aircraft spotted across the stern. Nine seconds later a second bomb exploded at the after end of the flight deck, even more violently than the first, hurling bodies and debris as far as the bow. The second major explosion extended the fire along 7 F-4's and toward the 3 RASC's on the starboard side abaft

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the island. Further, the second explosion interrupted effective fire fighting efforts on the flight deck. Five other major explosions followed, precluding resumption of effective fire fighting for some five minutes. During that five minutes, however, jettisoning of ordnance, care of the injured, and preparations for further fire fighting were carried on in the shelter of the island. Some 40,000 gallons of jet fuel aboard burning aircraft on the flight deck fed the flames. Fuel flowed over the sides and stern, setting fires on the sides, sponsons, fantail, and in hangar bay 3. The force of bombs exploding on the flight deck penetrated to hangar bay 3, starting fires on the 03, 02, and 01 decks aft. The force of the explosions killed some fifty sleeping night check crew personnel, and others, for a total of 91 killed in the after areas of the ship.

5. (S) The respite following the seven major explosions permitted concentrated damage control efforts, including moving unaffected aircraft forward, jettisoning aircraft that were burning or leaking fuel, establishing fire boundaries, and fighting fire progressively aft. Fire main pressure was maintained at 150 pounds per square inch throughout. Flames on the flight deck were extinguished by 1140, although smoldering continued for some time thereafter. The last fire on the ship was extinguished at 0400 the following morning.

6. (S) One-hundred thirty-four personnel were dead or missing as a result of the fire and explosions; 161 were injured. Damage to the ship - exclusive of aircraft and air equipment damage - was estimated as of 15 September 1967 as being in excess of \$72 million.

7. (S) The Investigating Officers were of the opinion that poor and out-dated doctrinal and technical documentation of ordnance and aircraft equipment and procedures, evident at all levels of command, was a contributing cause of the accidental rocket firing which was the first event in the catastrophic chain. It was recognized that these were high-tempo combat operations, but the investigation considered that approved procedures should have been followed nonetheless with any modifications required to fit combat operational requirements being obtained officially.

8. (S) The Investigating Officers were of the opinion that no blame attached to the Commanding Officer of the FORRESTAL or any of the

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officers of his command; to the Commander of Carrier Air Wing SEVENTEEN; or to the pilot of the plane from which the ZUNI rocket was fired. The Commanding Officer of Fighter Squadron ELEVEN was deemed to have demonstrated poor judgment and supervisory deficiencies in not maintaining clearly prescribed and consistently adhered to procedures, although no specific blame in connection with the fire was attributed to him.

Lieutenant (junior grade) ^{B-6} ~~CONFIDENTIAL~~, USRR, Weapons Branch Officer, Fighter Squadron ELEVEN, was deemed deficient in the degree of supervision and control exercised over personnel in the ordnance branch, but no blame was deemed to attach to him in connection with the fire. The investigation recommended that no disciplinary or administrative action be taken with regard to any persons attached to the FORRESTAL or Carrier Air Wing SEVENTEEN as a result of the fire.

9. (4) Following the fire the FORRESTAL was brought to Naval Air Station, Cubi Point, Republic of the Philippines. The Investigating Officers arrived on board on 3 August 1967 and began proceedings on that date. The investigation continued during some 32 days that the FORRESTAL was engaged in making a transit from the Philippines to the United States.

10. (4) Under date of 26 September 1967, the Commander, Naval Air Force, U. S. Atlantic Fleet, who ordered the investigation, generally approved the findings, opinions, and recommendations. Information copies were forwarded to CINCPAC, NAVAIRPAC, COMSEVENTHFLT, and CTF77. Copies of VOLUME 1, containing findings, opinions, and recommendations, were transmitted to all Atlantic Fleet Carrier Division Commanders.

11. (4) The Commander in Chief, U. S. Atlantic Fleet, under date of 1 December 1967, endorsed the record noting that a cause sine qua non of the casualty was probably the connection of the rocket harness - commonly called the pigtail, rocket cable, or rocket pigtail - the cable making the electrical connection between the Triple Ejector Rack (TER) and the launcher for the rocket - at an early stage of the pre-launch plane preparation, rather than waiting until just before the plane was to be launched from the catapult. NAVNEPS Op 3347 was quoted in pertinent part: "The pigtail connector shall not be plugged into the launcher receptacle until just before take-off."

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Commander I B/B were promoted during the interim.

13. (U) The investigation based therein appear to have been conducted in accordance with pertinent regulations contained in the JAG Manual. The record is routed for information and action within the cognizance of departmental offices addressed, and for ultimate return to this Office to be filed.

B/B
Acting Judge Advocate General

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Ser 01606 /14
1 December 1967

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SECOND ENDORSEMENT on *B-6*
ltr of 19 September 1967

USN, 070031/1310,

From: Commander in Chief U. S. Atlantic Fleet
To: Judge Advocate General

Subj: USS FORRESTAL (CVA 59) Fire Investigation (U)

Encl: (406)

(407)

(408)

(409)

1. (U) Forwarded.

2. (φ) A review of the voluminous material contained in the Report of Investigation establishes the central fact that a ZUNI rocket was inadvertently fired from an F-4 aircraft (#110) and struck the external fuel tank of an A-4 aircraft (#405) which was clustered in a pack along with other aircraft on the flight deck of the USS FORRESTAL. This inadvertent firing of the rocket resulted in a raging fire. Additionally, although the Report of Investigation contains a considerable amount of information about stray currents, switches, shorting devices, safety pins, external and internal power in the aircraft, it is highly improbable that the rocket would have fired with the resulting damage had the pigtails not been connected to the launcher receptacle until the aircraft was ready for takeoff, as required by pertinent regulations. It is obvious from the testimony of at least two witnesses that the pigtails were connected to the launcher receptacle while the aircraft were clustered in the pack and prior to the starting of the aircraft and their moving to the catapult for takeoff. (Finding of Fact 142).

3. (φ) It may be argued that NAVWEPS OP 3347 which states in

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1 December 1967

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5. (d) In view of the foregoing, and in view of Findings of Fact 237, 239, 240, 243, 244, 245, 246, 247, 248, 250, 252, 262, and 263, it is clearly established that the standard operating procedures of VF-11 were vague and undocumented and command attention from the Commander, Carrier Air Wing

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- pertinent part that "The pigtail connector shall not be plugged into the launcher receptacle until just before takeoff", and NAVWEPS OP 2210 Volume I which states in pertinent part, "Arm the launcher just before aircraft takeoff", are subject to interpretation and that perhaps the ordnance personnel complied with the safety regulations. However, it is an irrefutable fact that the regulations are precautionary and should therefore in all circumstances be interpreted in favor of safety. Further, the sensitivity of the ZUNI rocket and the launching device is well known and the possibility of inadvertent firing of other ordnance should be particularly in the minds of personnel charged with responsibilities in connection with the loading and arming of ordnance on combat aircraft. It is also considered that ordnance personnel are, or should be, well versed in pertinent safety regulations issued in connection with the types of ordnance being handled at any particular time. This fact alone makes a decision to intentionally fail to comply with two (2) published safety regulations all the more incredible.

4. (e) The Weapons Coordination Board in its memorandum dated 29 June 1967 stated with regard to NAVWEPS OP 2210 which forbids the arming of launcher armament until "just prior to takeoff" to have been traditionally interpreted on carriers to mean "on the catapult". Yet, the "Final Recommendation" of the Board was to "Allow connection of rocket pack pigtail prior to aircraft taxi to catapult". Further in this connection, the Report of Investigation establishes the fact that LT ^{B. C.} USN, the Ordnance Officer for Carrier Air Wing SEVENTEEN, and LTJG ^{B. C.} USNR, the Weapons Officer, VF-11, each briefed his superior with regard to the meeting and the "Final Recommendation". It is also noted that the draft memorandum of the Weapons Coordination Board was not, at any time, delivered to or seen by the Commanding Officer, CVA 59, and was not, in fact, disseminated outside of the Operations Department of the ship. (Finding of Fact 229). The Commander in Chief U. S. Atlantic Fleet concurs specifically in Opinions 17 and 18 wherein procedures contrary to those set forth in NAVWEPS OP 3347 and NAVWEPS OP 2210 cannot be amended or superseded except by the issuing authority, in this case, the Naval Weapons System Command. This fact prevails even under high tempo combat operations.

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7. (c) Further in this connection, the Report of Investigation establishes the fact that CAP^{B-6} JSN, was the Commanding Officer of the USS FORRESTAL on the date of the fire having assumed command on 7 May 1966. Although it was the opinion of the Board of Investigation, "That no improper acts of commission or omission by personnel embarked in FORRESTAL directly contributed to the inadvertent firing of the ZUNI rocket from F-4 #110" (Opinion #4) and "That the deaths and injuries resulting from the fire aboard FORRESTAL on 29 July 1967 were not caused by the intent, fault, negligence, or inefficiencies of any person or persons embarked in FORRESTAL" (Opinion #115), it is considered that the conduct of the Commanding Officer and the role played by him in connection with the tragic incident cannot be ignored. Assessment of the appropriate degree of personal responsibility of the Commanding Officer of a ship as large and complex as a modern aircraft carrier for the results of a casualty occurring in but one area of the ship's activities is most difficult. The Commanding Officer, in a broad sense, is responsible for everything that goes on in his ship. Yet, the myriad of activities, the thousands of people, and the vast array of equipment and material that constitute an operating carrier, necessarily limit the direct personal attention which the Commanding Officer can give to each activity. Accordingly, his direction of the activities of the ship is exercised through the issuance of orders, preparation of directives, review of procedures, inspections, and by interviews and counselling of his subordinates. When considering an area as important and potentially dangerous as the handling of rockets, particularly the ZUNI rockets, which are known throughout the Naval Establishment to have inadvertently fired in the past, it is considered only reasonable that a Commanding Officer would have been diligent in showing particular interest in the procedures utilized in loading the weapons aboard an aircraft and the arming of those weapons. On 12 June 1967, the Commanding Officer issued regulations (USS FORRESTAL Instruction 8020.2) which required "POSITIVE COMPLIANCE" with NAVWEPS OP 3347 and NAVWEPS OP 2210. Yet, the Commanding Officer so far as the record indicates did

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not make inquiry concerning compliance with applicable safety regulations and alleges that he was not informed by any of the ship's company. This fact has special significance in light of two factors: (a) the danger involved when less than absolute compliance with safety precautions is authorized or tacitly approved, and (b) it is generally known in the naval aviation community that the activity of the aircraft carrier over which the Commanding Officer can best exercise his leadership, his supervision and enforce his own personal standards on the performance of his subordinates is that on the flight deck of the ship, in this case, where the tragedy occurred.

8. (c) The degree of responsibility of the Commanding Officer for the inadvertent firing of the rocket does not lie in the magnitude of the disaster, but rather in an assessment of his execution of responsibility for proper administration and operation of the ship and its Weapons Department overall. Although he must have been aware of NAVWEPS OP 3347 and NAVWEPS OP 2210 and their safety regulations pertinent to handling of aircraft rockets, since each was referred to in the FORRESTAL Instruction 8020.2, the Commanding Officer directed the Executive Officer and other officers of the ship to task the Weapons Planning Board to develop ordnance handling regulations and procedures which met safety requirements but also incorporated WESTPAC practices. The recommendations of this Board embodied violations of safety regulations promulgated in the NAVWEPS Ordnance Publications. Since he knew also that there was a difference between Atlantic Fleet training procedures and WESTPAC procedures, it would appear that these facts alone should have alerted the Commanding Officer for particular attention to this very area.

. It has been administratively determined that Captain B-6 is currently assigned to the Office of the Chief of Naval Operations. By copy of this endorsement and in accordance with section 0101a(3) of reference (a), enclosure (409) is forwarded to the Chief of Naval Operations for such action as is deemed to be appropriate.

9. (d) It is noted that Section IV, Volume I of the Report of Investigation does not reflect as a Finding of Fact that the Inspector General, U. S. Atlantic Fleet conducted an inspection of damage control readiness of the FORRESTAL on 10 May 1967. It has

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1 December 1967

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been administratively determined that a copy of the report was made available to the Board. FORRESTAL was inspected as a unit of Commander Naval Air Force, U. S. Atlantic Fleet in determining the damage control readiness of the U. S. Atlantic Fleet. The inspections of individual ships were made on short notice and were designed to determine a ship's current capability to maintain water tight integrity, fight fires, and repair damages. As of the date of the inspection, 10 May 1967, FORRESTAL was evaluated by INSGENLANTFLT as unsatisfactory in damage control readiness. Opinion 54, Page 112 of the Report of the Board indicates that the FORRESTAL's material readiness for fire fighting and damage control was at acceptable standards at the time of the fire.

10. (c) Further in this regard, the Report reveals that a substantial number of Air Wing personnel were inadequately trained in the fundamentals of ship's damage control organization and operation. (Paragraphs 311, 316, 326, 330, and 337). The INSGENLANTFLT's inspection aboard the FORRESTAL on 10 May 1967 revealed that the repair parties above the second deck were led by aviation ratings who displayed a lack of damage control organization and knowledge. The report does not indicate whether or not this condition still prevailed on 29 July 1967. Additionally the Report does not list as a Finding of Fact any attempts to maneuver the ship. Further, there is no stated opinion of the Board as to whether maneuvering the ship such as making tight turns to sluice fuel overboard by heeling the ship would have helped or hindered fighting the fire and jettisoning aircraft or ordnance.

11. (c) With respect to Opinion 53 and Recommendation 30, the Commander in Chief U. S. Atlantic Fleet is, and has been, concerned with the high turnover rate of enlisted personnel in the Fleet units. This turbulence is caused by a combination of factors, including the low reenlistment rate as mentioned by COMNAVAIRLANT. Other causes are low manning in supervisory pay grades (E5 to E9), which as of 31 August 1967 was approximately 82% of allowance, inter-Fleet transfers of personnel to support Southeast Asia Operations, an increase in the tempo of Fleet operations, and the commissioning and reactivation of Fleet units. All of these causes place a heavy drain on the

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1 December 1967

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personnel resources available to the Fleet and Type Commanders. The proposal of COMNAVAIRLANT to conduct test manning in the USS AMERICA requires additional amplification and supporting data. Accordingly, COMNAVAIRLANT is requested to provide Commander in Chief U. S. Atlantic Fleet additional information in order to further consider this recommendation.

12. (X) The Commander in Chief U. S. Atlantic Fleet concurs in the statements contained in paragraph 4 of the First Endorsement. It is recommended that the feasibility of designing a single test set that would enable stray voltage testing of A.C., D.C., and R.F. voltage at the attachment point of the rocket harness be investigated. Such a test set would provide a comprehensive test of the circuitry and limit the possibility of attaching the rocket harness to the LAU 10/A Launchers with any form of stray voltage present in the circuit.

13. (X) In regard to Finding of Fact #293, which states that there are three (3) different ordnance safety pins in service in the Navy that will fit the TER rack, it is recommended that a study be initiated to determine the feasibility of designing a single size safety pin for all Navy aircraft that would render all components of a weapon system safe. Such a pin could be utilized without regard to insuring that the correct pin is inserted into the correct component. This type of safetying method would preclude the possibility of inserting a safety pin into a component and not actually rendering the component safe. It is realized that such a system may not prove to be a feasible retrofit for current operational weapon systems, however, it is felt that such a system would be feasible if included in a design specification during development of future weapon systems.

14.

15. (X) The Board of Investigation affixes responsibility for the deaths and injuries resulting from the fire aboard FORRESTAL on 29 July 1967

B-5 (Opinion #116). In view of the remarks herein before, CINCLANTFLT does not agree with this opinion. Certain instructions and technical publications may have been lacking or inadequate, for which the Air Systems Command may be at fault, but the degree to which this may have contributed to this fire cannot be ascertained, much less can it be ascribed as the only cause for the fire.

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CNAL 012
Ser 0863
26 SEPTEMBER 1967

FIRST ENDORSEMENT on *B-6* N ltr of 19 September 1967

From: Commander Naval Air Force, U.S. Atlantic Fleet
To: [unclear]

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Ser 01606 /14
1 December 1967

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15. (U) Subject to the foregoing, the proceedings, findings of fact, opinions and recommendations, as approved by the First Endorsement, are approved.

B-6

- Copy to:
- CNO
- CINCPACFLT
- COMNAVAIRLANT
- COMNAVAIRPAC
- COMSEVENTHFLT
- NAVAIRSYSOMHQ
- CTF 77
- COMCARDIV TWO
- COMCARDIV FOUR
- COMCARDIV SIX
- COMCARDIV FOURTEEN
- COMCARDIV SIXTEEN
- COMCARDIV TWENTY

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Volume I

7300-47

Enclosure (7) to CNO Letter ser *01591913/4* of *10-25-68*

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CNAL 012
Ser 0863
26 SEPTEMBER 1967

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Subj: USS FORRESTAL (CVA-59) Fire Investigation (U)

6. Certain increases in allowances of OBA's and OBA cannisters can be accomplished. However, prior to a decision on adoption of recommendation 38, detailed value analysis must be applied to the proposition, including preparation of space layout for stowage of added allowances and engineering estimates of cost to provide stowage facilities. Additionally, in the event the decision is made to proceed with the maximum contemplated in the recommendation, implementation should be delayed until line item budgeting and appropriation is accomplished.
7. Recommendation 47 is concurred in. In addition to the labelling of each item of ordnance with cook-off times, it is recommended that a placard be published similar to tables 1 and 2 of Special Weapons Ordnance pamphlet (SWOP) 20-11, giving withdrawal distance, fire fighting/withdrawal time and explosive ignition time. This placard should be readily available at control points such as Flight Deck Control, Primary-fly, the Bridge, Damage Control Central, Central Control and Aviation Ordnance Control Station.
8. Subject to the above, the proceedings, findings of fact, opinions and recommendations of the board of investigation are approved.
9. The board of investigation has exhibited great resourcefulness and ingenuity in its dedication to seek out and to develop every possible source of information touching on the causes of this disaster. All facts and suppositions were explored to determine whether or not they were authentic and provable and, more important, whether they were useful in preventing a similar occurrence in the future. Inaccuracies, including confused and conflicting testimony, have been eliminated. Immediate and future preventative measures have been recommended. This thoroughness on the part of the members and counsel of the board has resulted in a comprehensive report which is of inestimable value to the naval service. By separate correspondence, appropriate commendatory action will be instituted by Commander Naval Air Force, U.S. Atlantic Fleet.

B-6

Copy to:

- CINCPACFLT (complete, less plat film)
- COMNAVAIRPAC (complete, less plat film)
- COMSEVENTHFLT (complete, less plat film)
- CTF 77 (complete, less plat film)
- COMCARDIV TWO (volume I)
- COMCARDIV FOUR (volume I)
- COMCARDIV SIX (volume I)
- COMCARDIV FOURTEEN (volume I)
- COMCARDIV SIXTEEN (volume I)
- COMCARDIV TWENTY (volume I)

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WHICH IS ATTACHED TO INDIVIDUAL VOLUMES.

ALPHABETICAL LISTING OF WITNESSES AND PERSONS
 WHO SUBMITTED STATEMENTS BEARING ON ALL MATTERS
 LESS CASUALTIES AND INJURIES (See alphabetical
 listing of fatalities for statements relating
 thereto - Volume XII)

<u>NAME</u>	<u>RANK</u> <u>RATE</u>	<u>VOLUME</u>	<u>ENCLOSURE</u>
	AO3	VIII	(82A)
	CDR	VIII	(85)
	LT	IV	(30)
		VII	(52)
	GS-13	II	(13)
		VI	(51)
	LT	V	(42)
	LCDR	II	(6)
	AMHC	VII	(64)
	AN	IV	(38)
	LCDR	XI	(166)
	LI2	IV	(37)
	CAPT	IX	(89)
	LCDR	V	(44)
	LCDR	X	(112)
		XI	(172)
	LTJG	XI	(169)
	AMS3	VII	(62)
		X	(105)
	MMCS	V	(40)
	ABHAN	X	(103)
	LCDR	X	(91)
	LCDR	II	(3)
	AE3	X	(93)
	CDR	XI	(156)
	AO1	VIII	(81)
	LTJG	XI	(151)
	CDR	XI	(145)
	AA	VII	(66)
		X	(102)
	GMT1	XI	(180)
	MM1	XI	(186)
	AO3	VIII	(77)
	CWO2	VI	(47)
	PNSN	VII	(69)
	LTJG	X	(117)
	ABH2	XI	(185)
	CDR	IV	(28)
		VII	(53)
		VIII	(88)
	AMH1	III	(22)
	CDR	IV	(31)
		VIII	(86)
	AN	X	(98)
	W-1	XI	(182)
	AMHC	X	(119)
	AN	X	(99)
			(100)
	LCDR	II	(4)

All redactions are B-6

<u>NAME</u>	<u>RANK</u> <u>RATE</u>	<u>VOLUME</u>	<u>ENCLOSURE</u>
	LCDR	X	(120)
	LCDR	IV	(36)
	LCDR (MC)	II	(14)
	AQC	XI	(170)
	AMS1	VIII	(62)
	AQ2	VIII	(80)
	SH3	VI	(46)
	AO3	III	(19)
		VIII	(75)
	AN	X	(107)
	AN	XIII	(403)
		II	(5)
	LCDR	X	(92)
	CDR	X	(133)
		XI	(157)
	AOAA	II	(16)
		VIII	(72)
	ABH1	XI	(168)
	AO1	VIII	(82)
	WO1	XI	(181)
	WO1	XI	(164)
	AQB2	XI	(150)
	MMC	XI	(184)
	AA	VII	(68)
	ADJ3	II	(15)
	AO3	X	(116)
	ENC	V	(39)
	RADM	X	(90)
	LT	XI	(178)
	AEC	IV	(33)
	CDR	V	(45)
		X	(134)
	AO3	V	(41)
		VIII	(79)
	AO1	III	(20)
		VIII	(74)
	LCDR	XI	(155)
	ABH3	XI	(154)
	AE3	X	(109)
	ABHC	X	(118)
	AN	XI	(149)
	LCDR	II	(8)
	AFCM	II	(9)
	LT	XI	(179)
	AA	X	(101)
	LTJG	II	(7)
	AO1	XI	(167)
	LCDR	II	(11)
	ABE3	IV	(32)
	LT	XI	(177)
	LCDR	VI	(48)
	AN	VII	(65)
	LT	XI	(162)
	ABHC	XI	(159)
	WO1	XI	(173)
	AEAN	X	(111)
	GS-11	VI	(50)
		VIII	(87)

All reductions are B-6

<u>NAME</u>	<u>RANK RATE</u>	<u>VOLUME</u>	<u>ENCLOSURE</u>
	AN	XI	(152)
	WOL	IV	(29)
	AOL	III	(21)
		VII	(59)
	AOC	XI	(147)
	LTJG	III	(25)
		VII	(57)
	CDR	VI	(49)
	ABCM	IV	(34)
	AA	VIII	(76)
	SF1	XI	(161)
	LTJG	X	(114)
	ENS	XI	(176)
	LTJG	II	(12)
	AQC	XI	(183)
	WOL	III	(24)
		VII	(56)
	CDR	X	(113)
	AO2	X	(115)
	ADJC	VII	(67)
	AN	XI	(153)
	LCDR	X	(126)
		X	(130)
	AN	X	(97)
	LT	X	(144)
	ABH3	X	(110)
	AT2	X	(104)
	V. AMC	X	(96)
	LT	XI	(171)
	ETN3	X	(106)
	AOC	III	(23)
		VII	(58)
	LCDR	XI	(165)
	LT	IV	(26)
		VII	(55)
		VII	(71)
	AN	XI	(163)
	CDR	II	(17)
	AOAN	XI	(148)
	AA	V	(43)
	LT	X	(108)
	AO2	III	(18)
		VII	(60)
		VIII	(73)
	WOL	X	(94)
	LTJG	X	(95)
	AOL	II	(10)
	MMC	XI	(174)
	LCDR	IV	(27)
		VII	(54)
	AFCM	IV	(35)
	AO3	VIII	(82B)
	LCDR	XI	(146)
	AMHC	XI	(158)
	LTJG	XI	(175)
	AA	XI	(160)

All redactions are B-6

19 SEP 1967

From: Senior Member, Informal Board of Investigation
To: Commander, Naval Air Force, U. S. Atlantic Fleet

Subj: USS FORRESTAL (CVA-59) Fire Investigation

Ref: (a) JAG Manual
(b) COMNAVAIRLANT MSG 092039Z August 1967

Encl: (1) COMNAVAIRLANT MSG 301617Z July 1967 appointing board as modified by COMNAVAIRLANT MSG 031417Z August 1967
(2) Signed statement from each of the twenty parties acknowledging advice of rights
(3) through (406) Testimony, statements and other evidence (see index)

1. The informal investigation ordered by enclosure (1) to inquire into the circumstances surrounding the FORRESTAL fire of 29 July 1967 has been conducted in accordance with reference (a) and the report of said investigation is hereby submitted.

PRELIMINARY STATEMENT

1. The members of the board, upon receipt of enclosure (1), proceeded expeditiously from their respective stations at Quonset Point, R. I., Virginia Beach, Virginia and Jacksonville, Florida to NAS Cubi Point, Republic of the Philippines, all arriving on 3 August 1967. On that date the Board was convened aboard USS FORRESTAL. Counsel for the Board, who traveled from Atsugi, Japan, arrived at Cubi Point on 31 July 1967, as FORRESTAL was standing in. Upon arrival, counsel for the Board met with and commenced assisting the preliminary investigation that had been ordered by COMCARDIV 2 immediately after the fire. That investigative body, consisting of CARDIV 2 staff personnel, CAPT B-6
CDF B-6 CDR B-6 ENS B-6 and LI B-6
B-6 FORRESTAL's Legal Officer, gathered evidence that proved invaluable to this Board. CDR B-6, CDR B-6 and ENS B-6 continued to ably assist the Board throughout the investigation. The decision to order an independent preliminary inquiry was prudent as it not only produced important information which was immediately available to the Board upon their arrival at Cubi Point, but also uncovered and committed certain key witnesses in writing while events were still fresh

in their minds and before they had discussed the matters with others.

2. After a thorough reading and briefing of material developed by the preliminary investigation, the Board was faced with the problem that FORESTAL would be departing Cubi Point for CONUS without means for bringing additional personnel aboard once underway. This would require the Board to rely entirely on the witnesses, counsel for parties and other essential personnel who would be embarked for the 32 day transit. The Board and counsel therefore were forced to devote almost the entire time remaining in port to administrative matters and screening potential witnesses so that statements and testimony could be taken from all who would not be making the transit. The Board was greatly aided in this job by Assistant Counsel, LCDR B-6 and LT B-6 Flag Secretary and Aide to the Senior Member. In addition LT B-6 provided expert assistance to LCDR B-6 in preparing the record of the investigation as did LT B-6 USNR, Legal Officer, B-6 who arrived 11 August, and served as an assistant counsel until 2 September providing much needed help during that period.

3. Parties had to be designated as soon as possible and accorded their rights in order that enough counsel could be obtained for those requesting same before departure of the ship. The Board took testimony immediately from those witnesses who were leaving the ship and by 6 August enough information had been obtained to enable the Board to make considered decisions as to who should be designated parties. Such determinations were made on 6 August with the following twenty persons designated as parties:

✓	B-6	USN,	Commanding Officer, USS FORESTAL (CVA-59)
✓	B-6	, USN,	Commanding Officer, VF-11
✓	B-6	, Jr., USN,	Commander, Carrier Air Wing 17

	USN	Air Officer, USS FORRESTAL (CVA-59)
	N	Engineering Officer, USS FORRESTAL (CVA-59)
	USN	Carrier Air Wing 17 Senior LSO and pilot of aircraft #110 on 29 July 1967
	USN,	Hangar Deck Officer, USS FORRESTAL (CVA-59)
	USNR,	Damage Control Assistant, USS FORRESTAL (CVA-59)
	Jr., USN	VF-11 Maintenance Officer
✓	USN,	Carrier Air Wing 17 Ordnance Officer
	USN,	Flight Deck Officer, USS FORRESTAL (CVA-59)
✓	USN,	VF-11 Div. Off. Avionics/Weapons Div.
	USNR	VF-11 Weapons Branch Officer
	USN	Fire Marshall, USS FORRESTAL (CVA-59)
	USN	Air Gunner, USS FORRESTAL (CVA-59)
	USN	VF-11 Assistant Avionics/Weapons Div. Off.
	USN,	VF-11 Weapons Branch Chief
✓	USN	VF-11 Leader of an ordnance team
	USN	VF-11 Plugged-in Rockets on aircraft #110
	USN	VF-11 Conducted stray voltage test on aircraft #110

Since A02 and A0AA were patients at the Naval Hospital, Subic Bay, R. F. counsel for the Board informed them of their designation as parties at the hospital on the night of 6 August. Their rights were also explained to them at that time and they both signed statements acknowledging the explanation of their rights. (Enclosure (2)).

All redactions are B-6

Neither of these parties desired counsel at that time. The next morning, 7 August 1967, the remaining 18 parties were informed of their designation by the Board. Their rights were explained to them by counsel and they all signed statements acknowledging that their rights had been explained to them (Enclosure (2)). These 18 parties desired counsel certified in accordance with Article 27b, UCMJ. The Commanding Officer, USS FORRESTAL was the only party who requested counsel by name. He first requested CAPT _____, USN and when CAPT _____ as declared to be not available a request was made for CDR _____ USN. When notification was received that he too was unavailable a request was made to the convening authority by CAPT _____ requesting a qualified and experienced law specialist. Ultimately LCDR _____, USN was made available and arrived aboard FORRESTAL on 10 August 1967. He served as counsel for CAPT _____ from that date throughout the investigation. Other counsel arrived during the period 7 August to 11 August and represented parties as follows, from the time they arrived throughout the investigation:

a. LT _____ USNR arrived 10 August 1967, from the Law Center, Norfolk, Virginia and served as counsel for CDR _____ LCDR I and LT _____.

b. LT _____ USNR arrived 10 August 1967 from COMFAIRWING THREE, NAS, Brunswick, Maine and served as counsel for CDR _____, LT _____ and AO2 _____.

c. LT _____ USNR arrived 10 August 1967 from COMNAVPHIL and served as counsel for CDR _____, LCDR _____ and LT _____.

d. LT _____, USNR arrived 10 August 1967 from NAS, Jacksonville, Florida and served as counsel for LTJG _____, AO2 _____ and AOAA _____.

e. LTJG _____, Jr. arrived 10 August 1967 from NAS, Jacksonville, Florida and served as counsel for CDR _____, LCDR _____, CWO2 _____ and WO1 _____.

All redactions are B-6

f. LTJG _____ rived 7 August 1967 from COMNAVBASE, Subic
and served as counsel for LCDR _____, WO1 _____ and AOC _____
All counsel were certified in accordance with Article 27b, UCMJ. On
10 August 1967 LT _____ on his own initiative talked to parties
and _____ at the Naval Hospital Subic and they changed their decision
in regard to representation by counsel. LT _____ represented them from
10 August throughout the investigation. All rights were fully accorded
all the parties. The Board in determining those who were to be designated
as parties looked at the duties and responsibilities that were inherent
in certain billets. If the duties and responsibilities appeared to have
a direct relationship to matters bearing on either the initiation of the
fire or the fighting of the fire, the individual filling the billet was
designated a party. If there was doubt in any case, the Board leaned
towards designation rather than against, to insure that the right to
counsel was afforded before getting underway.

3. Although considerable latitude in the manner of proceeding is afforded
an informal board, it was initially decided by the Board that a formal
hearing room procedure would be utilized whenever parties testified or
whenever it became apparent that a potential witness' testimony might
be controversial to any party. This was done to ensure that the parties'
rights were fully protected. In addition, witnesses who would not be
making the transit aboard ship were called to preserve their testimony
verbatim. The remainder of the testimonial evidence was gathered through
use of written statements. All statements were taken under oath when
practicable and if a witness, in addition, testified before the Board
he reaffirmed his statement, or statements, under oath. Several
witnesses made more than one written statement before they testified,
some of which were unsigned. All these statements were verified by the
witness when he testified and are included in this report in the enclosure
with the witness' testimony. All witnesses who testified before the

All redactions are B-6

Board did so under oath and each witness was informed of his rights under Article 31, UCMJ before he testified. In screening the witnesses to be called and the statements to be used in this report, the Board read approximately 1900 statements.

4. As soon as the Board reported to FORRESTAL a tour of the damaged areas was taken. After that, numerous places of interest on the ship were visited and revisited by the Board together and singly. The following are experiments which were conducted aboard ship at the Board's request and are described in the facts and enclosures:

- a. Two separate overall tests of flight deck fog foam stations.
- b. Static firing of a ZUNI rocket from an F-4B aircraft.
- c. Re-creation of what was reflected in the first few minutes of the Flat film by using flash bulbs on the after portion of the flight deck.
- d. Tests to determine the effectiveness of the LAU-10/A shorting device.
- e. Several tests of the electrical system of the F-4 and associated equipment by Mr. *B-6* and CDR *B-6*

5. One of the preliminary acts by the Board was to request two experts, one in ordnance and the other in the electrical field. In response to this request Mr. *B-6* from Naval Weapons Center, China Lake, California and Mr. *B-6* from Naval Missile Center, Pt. Mugu, California, reported aboard FORRESTAL at Cubi Ft., R. P. and stayed aboard until 2 September 1967. They greatly assisted the Board throughout the investigation and their testimony and statements appear as enclosures (50), (51) and (87). These enclosures must be read for a full understanding of the events of 29 July 1967 aboard FORRESTAL. As an additional aid to the reader there is attached to the preliminary statement a glossary of terms, colloquialisms, and abbreviations used throughout this report and a compendium on the circuits and equipments which are pertinent to the firing of a ZUNI rocket from a LAU-10/A launcher suspended from a TER-7

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on an F-4B aircraft. Both of these documents were prepared by CDR B-6
B-6 USN, whose service as a technical assistant and general advisor
to the Board was immeasurable.

6. There were certain conflicts that arose in the testimony during the
hearings and the Board resolved these conflicts based on all the evidence,
together with evaluations of the witnesses as they appeared and reacted...
to questioning. All the conflicts that were considered important by the
Board have been clearly resolved in the findings of fact and opinions.
Testimony that was considered to be false is so labeled in the opinions.
No disciplinary action is recommended for those witnesses who are believed
to have testified falsely, however, since it is considered that proof of
an offense would be almost impossible.

7. One apparent conflict, or question, is left dangling in the testimony
without an answer. That is the part played by B-6, A01, in the
sequence of events on 29 July. B-6, a member of Fighter Squadron
11, was the safety petty officer in charge of the composite catapult
arming crews while FORRESTAL was on the line.

It was thought at one point during
the investigation that B-6 might have some important information to
offer to the Board and several questions were put to certain witnesses
concerning B-6 pursuant to dispatch request by the Senior Member
information was ultimately received in the mail while at sea summarizing
an interview of B-6 conducted at Portsmouth Naval Hospital by an
agent of ONI. This report revealed that B-6's testimony, if called
as a witness, would not differ in marked degree from any other VF-11
witness who was called.

8. By reference (b) authority was granted to omit the requirement for
line of duty/misconduct determinations for all those injured by the fire

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and explosions. In accordance with reference (b) injury reports and medical record entries are to be made by Commanding Officers of injured personnel and appropriate medical commands. Although detailed medical documentation of all injuries has not been included in this report, a summary of all injuries can be found in enclosures (328) and (329) and an LOD/Misconduct opinion is expressed in regard to the injuries.

9. One of the most important items of evidence utilized by the Board was the Flat tape from the morning of 29 July 1967. At the time the fire started the Flat camera was trained on a ~~KA-3B~~^{KA-3B} being readied for launch from the port bow catapult. While trained in this direction the camera photographed the flame and smoke from the ZUNI rocket which was reflected from the plexiglass Flat booth window. The Flat camera was then turned aft and trained on the burning A-4's on the port quarter. The camera remained in this position throughout the fire on the flight deck and the resultant tape presents vivid evidence of the fire and explosions. The original Flat tape and a kinescope copy of this tape are forwarded with the original report of investigation.

10. The preliminary statement is supposed to reveal the difficulties encountered in the investigation. No difficulties mentioned can overshadow the sheer weight of clerical problems involved in producing a thirteen volume record. Much assistance was furnished by FORRESTAL but the real credit for producing this record goes to:

YNC : COMFAIRQUONSET
YNC *B-b* USS FORRESTAL (CVA-59)
YNC NAS KEY WEST
YNI : HS-2

Their talent at reporting and transcribing, along with all their other myriad yeoman abilities made production of this record a matter that was never a real problem for the Board. Their competent assistance was of the highest value to the Board.

GLOSSARY OF TERMS, COLLOQUIALISMS AND ABBREVIATIONS

Numerous terms used in testimony and introduced into the record were incomplete, colloquial in nature, or inaccurate. In view of the technical nature of many of the equipments or functions which were fundamental to the investigation, it was considered advisable to prepare this section to provide the reader with a clear understanding of terms of reference.

Definitions or descriptions, synonyms or colloquialisms of the most important terms associated with carrier operation of the F-4B aircraft/Triple Ejector Rack/LAU-10/A Launcher combination have been included. The descriptions of ordnance items are related specifically to the production model actually in use at the time of the accident.

Several official publications in which a term appeared did not always use consistent nomenclature. Definitions for some terms were not provided. The board therefore made arbitrary selections of definitions in those cases. Some abbreviations commonly used aboard carriers have also been included and will be used in the body of the report without further amplification.

- Aero 3A Launcher A rail launcher with detent and contact point for carrying and launching an AIM - 9 B (Side-winder) missile. Usually mounted on the lower outboard side of the LAU-17/A pylon of the F-4B aircraft but may also be mounted on the inboard side. When installed, a safety pin interrupts the electrical firing circuit. Also referred to as Aero 3, S/W launcher.
- Aero 7A Launcher A launcher which carries an AIM-7 (Sparrow *III*) missile in a semi-submerged position at one of four stations under the fuselage of an F-4B aircraft. Incorporates a launcher safety pin which prevents inadvertent ejection of the AIM - 7 missile.
- Aero 27A Bomb Rack The centerline (external stores station 5) ejector bomb rack of the F-4B aircraft. Carries a variety of external stores including a 600 gallon fuel tank or a MER or TER.
- AN-M65 Bomb General purpose 1000 lb bomb of World War II design, properly designated AN-M65A1. Bombs of this type aboard FORRESTAL were loaded with 555 lbs of Composition B in 1953. Also referred to as "fat bomb" because of high aerodynamic drag characteristics.
- Armament Safety Override Switch Switch with holding relay supplied from right 28 V DC bus. Mounted above left rear console in front cockpit. Bypasses Landing Gear Control Armament Safety. Used for circuit continuity checks. Also called armament override switch.

"Bomb Farm"	A colloquialism used in reference to a designated area on either the flight or hangar deck where unfuzed bombs are collected temporarily until either struck below into magazines or loaded on aircraft.
Bomb Release Switch	Final switch in bomb/rocket release circuit. Located on upper left portion of pilot's control stick grip. Commonly referred to as pickle, bomb pickle, bomb button, firing button.
"Cat (s)"	Catapult(s).
CBU Rocket Switch	A three-positioned switch located in the tail cone of a TER (or MER) which controls the mode of release or firing of CBU and rockets.
Composition B	The explosive mixture contained in AN-M65A1 bombs and the MK24 warheads of the ZUNI. The mixture ratio is 59% RDX, 40% TNT and 1% wax.
"Conflag " Station	Conflagration station. A compartment in a hangar bay located well above deck level to give an unobstructed view of the deck below. Equipped with controls to close hangar bay doors and activate fire-fighting systems.
"Dog Bone"	See Weapons Control Panel
Ejector Rack Safety Pin	Pin providing a mechanical safety for each ejector rack hook. If pin can be inserted after loading, locking of hooks is assured. Each ejector rack requires two pins. Also referred to as rack pin, mechanical pin, mechanical safety pin, L-shaped pin.
Explosive Bolt	See LAU-17/A Explosive Bolt
Frangible Fairing	Composition paper cover attached to the forward and aft ends of rocket launchers to reduce aerodynamic drag. The fairing is destroyed readily when the first rocket in the launcher is fired. Also referred to as fairing, cover, nose dome, dome, nose cover.
H-6	An explosive mixture contained in MK82 and M117 general purpose bombs. The mixture ratio is 40% RDX, 38% TNT, 17% Aluminum and 5% wax.

HCFF

High Capacity Fog Foam System designed for combating severe "Class B" fires on the hangar deck and flight deck. Intended to provide large quantities of foam in a relatively short time. There are 17 HCFF foam generators, with 300 gallon foam liquid reservoirs, installed on the second deck. These large generators are designed to furnish fog foam to monitors and hoses on the hangar deck and to hoses on the flight deck. Individual stations are activated remotely from hangar and flight deck stations by opening a stop valve and energizing the system by depressing an electrical switch.

Home-Step Switch

This three-position toggle switch is mounted on the tail cone at the rear of the TER-7 or MER-7. The circuit is energized whenever aircraft power is available. Placing the switch in the HOME position will cause the internal stepper to rest on the number one station of the rack and the homing light to illuminate. If the switch is then placed to the OFF position, the rack will deliver sequential single or automatic firing or release impulses according to the setting on the Release Mode Selector Switch. If the switch is placed in the STEP position, the next station in sequence will be selected, facilitating circuit continuity ground checks. Although the functions remain unchanged, the switch positions for HOME and STEP in the -527 TER/MER are reversed from those in the -505 or -521 TER/MER.

"Huffer"

Colloquial term for an aircraft starting tractor.

HYTROL (Valve)

Acronym for hydraulic control. Used alone to refer to a valve in the HCFF system.

In the pack

The location of an aircraft on the flight deck, usually in close proximity to other aircraft, where there is no assurance that the area ahead of the aircraft will not be obstructed by people or other aircraft between the time the aircraft is manned and the time it is taxied forward for launch.

Intervalometer

An electrical device for timing the firing of rockets or release of bombs. Individual intervalometers are incorporated in the F-4B Weapons Control System, the TER, and the LAU-10/A launcher.

Intervalometer pin

See TER Electrical Safety Pin.

JBD Jet Blast Deflector. A two-positioned steel ramp which is raised behind aircraft being launched from a catapult to prevent high velocity jet exhaust gas from travelling down the flight deck.

LAU-3A/A Launcher A 19 round launcher for 2.75 in. rockets. An rf filter, an rf barrier and a breaker switch make it safe for use in a RADHAZ environment. The breaker switch function is similar to that of the shorting device in the LAU-10/A. Also called LAU-3, LAU-3/A.

LAU-7/A Missile Launcher Launcher for the AIM-9B or -9D Sidewinder missile. Mounted on the lower inboard or outboard side of the LAU-17/A pylon. Also called the LAU-7 launcher.

LAU-10/A Launcher A four round launcher for the 5.0 in ZUNI rocket. Two electrical receptacles in line with removable suspension lugs except either a shorting device or a rocket harness. A selector switch mounted on the rear bulkhead provides a choice of single or ripple fire. An intervalometer mounted inside the forward bulkhead moves off a normally shorted position if more than 5 volts DC and 2 amperes are introduced into the firing circuit and causes one or all four rockets to fire depending on the position of the selector switch. After the launcher is suspended from the ejector rack, frangible fairings may be attached at both ends of the launcher to reduce aerodynamic drag. Also called ZUNI pod, ZUNI Launcher, ZUNI LAU-10 pod, LAU-10, ZUNI, rocket pod.

LAU-10/A Receptacle Dual purpose receptacle which accepts either a shorting device or a rocket harness. Each LAU-10/A launcher has two receptacles, one forward and one aft. Also called receptacle, rocket receptacle.

LAU-10/A Selector Switch A two-position toggle switch mounted on the aft bulkhead of the LAU-10/A launcher to provide for alternate selection of single or ripple fire.

LAU-17/A Pylon Wing pylon attached to inboard under side of wing by an explosive bolt forward and a support attachment aft. Contains the male portion of the pylon electrical disconnect in the upper forward portion of the pylon. Carries one AIM-7 missile on rails or one or two AIM-9 missiles on Aero 3A or LAU-7/A launchers mounted on the lower inboard and outboard sides of the LAU-17/A. When a pylon adapter is bolted on to the LAU-17/A pylon, which precludes carriage of an

-4

AIM-7, either a TER or a MER can also be carried. When installed, the LAU-17/A Safety Pin prevents current from reaching the explosive bolt and, if carried, the AIM-7 motor, but does not affect electrical circuits of the TER or AIM-9 missiles. Also called Inboard Pylon, Wing Missile Pylon, Pylon, Wing Pylon, LAU-17.

LAU-17/A Pylon Adapter Provides a means of suspending a TER or MER from the LAU-17/A pylon.

LAU-17/A Pylon Explosive Bolt An explosive bolt in the pylon which, when fired, causes the pylon to separate from the wing. Also called Explosive Bolt.

M117 Bomb A 750 lb. general purpose bomb of post-World War II design, properly designated M117A1. Contains 393 lbs of H-6 explosive. Also referred to as 117.

MER A/A 37B-6 Multiple Ejector Rack. Part numbers of the three Type 7 models are 5821500-505, -521, -527. Consists of six bomb ejector units, arming solenoids, control units and circuits which enable it to carry, arm and eject six MK81 or MK82 series bombs, or carry, fire and eject three rocket launchers, or carry, dispense and eject three CBU. Also called MER, MER-7, MER 527 or 527 MER.

Mezzanine Term used to refer to the 01 level aboard carrier, particularly those areas or compartments aft with direct access to the hangar deck.

Mickey Mouse Colloquial term used by witnesses in reference to sound attenuators or to entire flight deck helmet which includes sound attenuators. Synonymous with colloquial term "Mickey Mouse ears" or "ears".

Missile The word used commonly to refer to a guided, rocket propelled missile such as Sidewinder, Sparrow or Shrike.

MK 82 Bomb A slender 500 lb bomb of post-Korean War design with low aerodynamic drag characteristics. Loaded with 192 lbs of H-6 explosive.

Non-propulsive Attachment A device which is locked into the exit cone of a rocket nozzle in such a way as to cause the thrust to be neutralized. Used only on the AIM-9B Sidewinder missile. Also called NPA, Non-propulsive unit, NPU, thrust neutralizer.

OBA	Oxygen Breathing Apparatus. Provides the wearer with a supply of oxygen and respiratory system independent of the surrounding atmosphere. Oxygen is provided by chemical contained in a replaceable metal cannister. Naval personnel engaged in fire-fighting replace the cannister every 30 minutes when the timer on the apparatus sounds a warning signal.
"Pickle"	See Bomb Release Switch.
"Pigtail"	See Rocket Harness
Pylon Electrical Disconnect	The mating connections used to complete all electrical circuits between the aircraft wing and the LAU-17/A pylon. Consists of a receptacle (part number 32-75031-3) in the wing, a plug (part number 32-75031-5) in the pylon and an adapter (part number 32-75031-7) which provide a clean jettison capability and facilitate installation. Also referred to as the 101 pin connector, 101 connector.
Rocket	The word used commonly to refer to an unguided missile propelled by the reaction from gases formed by burning propellant.
Rocket Harness	Cable used to make an electrical connection between the TER and the LAU-10/A launcher. Commonly called the pigtail, rocket cable, rocket pigtail.
Safe-Arm Switch	See shorting device. Also may refer to a lever on the AIM-7 missile used to interrupt the motor firing voltage.
Shorting Device	A sliding switch on the LAU-10/A Launcher which in the SAFE Position causes electrical signals to be shorted to ground. The sliding action of the switch handle causes, through a ramp and spring, the insertion or removal of a metal cone between the pins in the receptacle. Locks in the armed position but does not have a detent in the safe position. Shorting devices are installed in both LAU-10/A receptacles during production. Loading or assembly crews remove device from the receptacle which is to be used for connection with the rocket harness. Also called LAU-10 safety, slide switch, safety and arming device, safe-arm switch, shorting switch.

Sidewinder	Sidewinder is a guided missile which homes passively on infra-red energy. Two models designated AIM-9B and AIM-9D are carried by F-4B aircraft. The LAU-7/A launcher is compatible with both models but the Aero 3A launcher can only carry the AIM-9B. Also referred to as AIM-9, S/W, S/W-9B, or S/W-9D.
Sparrow	Sparrow is a semi-active radar homing missile designated AIM-7E. Although Sparrows can be launched from a LAU-17/A pylon of the F-4B aircraft, the missiles are normally carried on fuselage Aero 7A launchers in order to facilitate the carriage of Sidewinders and TERS on the LAU-17/A pylon. Also referred to as AIM-7, SP III, SP 7#.
"SPUD"	Spray nozzle attached to the end of a salt water applicator.
Stray Voltage	An unwanted voltage which has been imposed on the firing circuit of a weapon system. If not detected, arming of the weapon system allows the voltage to be passed to the initiating element of the weapon. Depending on its magnitude inadvertent firing of the weapon may result.
Tanker	An aircraft capable of refueling another aircraft in flight. Used primarily to mean a KA-3B aircraft.
TER	A/A37B-5 Triple Ejector Rack. Part numbers of the three Type 7 models are 5821520-505, 5821520-521, and 5821520-527. Consists of three bomb ejector units, arming solenoids, control units and circuits which provide the flexibility required to carry, fire, and eject rocket launchers, carry, arm and eject bombs, and carry, dispense and eject CBU. Also called TER, TER-7, and referred to as 527 TER, TER 527 or new TER.
TER Electrical Safety Pin	The pin (part number 4815967-1) which is installed in a receptacle in the tail cone of either a TER or MER to interrupt the firing or release circuit. Also referred to as TER pin, TER safety pin, Intervalometer pin.
TER Safety Pin	See TER Electrical Safety Pin
Transient Voltage	A momentary increase (or decrease) in normal circuit voltage caused by interrupting the circuit, changing the source of the current, or changing the load on the circuit.

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Umbilical	an electrical cable or wafer used to connect a missile to a launcher.
Weapons Control Panel	Panel in the F-4 front cockpit used to select and control the release or firing of weapons carried on the MERS or TERS. Also referred to as the "dog bone".
Weapons Switch	Two position toggle switch on Multiple Weapons Control Panel which performs the functions of a master armament switch. Interrupts circuit between the Bomb Release Switch and all MMR/TER when in CONV OFF-NUCL ON position because the bomb transfer relay is not energized. Referred to as Master Arm, Master Arm Switch, Master Armament Switch and armament Master Switch.
Yankee Station	Area in the Gulf of Tonkin used by TF 77 attack carriers when launching offensive strikes against targets in North Viet Nam.
Yellow Equipment	Generic term for equipments used in support of ground test and operation of aircraft. Such as tractors, starters, mobile avionics or hydraulic test equipments, oxygen carts, bomb skids, wheel chocks, tie-down chains, tow bars and boarding ladders. Also referred to as yellow gear.
ZUNI	A five inch folding fin aircraft rocket with a variety of warheads and fuzes which is carried in a LAU-10/A launcher. Commonly used as a flak suppression weapon by installing an M414A1 VT fuze in a Mk 24 General Purpose Warhead.
ZUNI rod, ZUNI Rocket Pod	See LAU-10A Launcher

F-4B Aircraft - Zuni Rocket

A study of the publications and documents listed below was conducted by CDR I - *B-6* USN, 498079/1310, Air Warfare Officer, Staff, Commander Carrier Division TWO, to produce this compendium on the equipments and circuits which are pertinent to the firing of a Zuni rocket from a LAU-10/A launcher suspended from a TER-7 at external stores station number 2 of a 153 --- series F-4B aircraft.

Bibliography

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"Maintenance Instructions Manual - Navy Model F-4B, F-4J and RF-4B Armament Systems", NAVAIR 01-245FDB-2-7 (1 July 1966).

"NATOPS Flight Manual Navy Model F-4B Aircraft", NAVAIR 01-245FDB-1 (Changed 1 May 1967).

"Operation, Maintenance and Overhand Instructions, Triple Ejector Rack (Type 7)", NAVAIR 11-75A-40 (Changed 15 Apr 67).

Statements and Testimony of Mr. *B-6* (Contained in Vol I and Vol V of the Record).

Statements and Testimony of Mr. *B-6* (Contained in Vol V and Vol VII of the Record).

External Stores Station Number Two of F-4B Aircraft #110

A brief description of the mechanical and electrical design features of the equipment which was installed at external stores station #2 on the port wing of F-4B aircraft #110 will aid in understanding how a Zuni rocket could have been fired from that station.

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LAU-17/A Inboard Pylon. The LAU-17/A pylon, the basic building block of the inboard station, was designed to carry and launch one AIM-7 (Sparrow) missile from its rail or, alternatively, one or two AIM-9 (Sidewinder) missiles from either Aero 3A or LAU-7/A launchers mounted on the sides of the lower portion of the pylon. The LAU-17/A pylon is attached to the wing by an explosive bolt forward and a mounting cam aft. When its jettison circuit is energized, either individually by using the missile control panel or along with all other stations by activation of the external stores emergency release switch, the pylon and any missiles or other stores attached separate from the wing. To aid clean separation, all of the electrical circuits entering the pylon are collected in the pylon electrical disconnect, a 101 pin cannon plug with mating adapter. The LAU-17/A has a receptacle for a safety pin which, when installed, interrupts both the jettison circuit and the Sparrow motor firing circuit. Another receptacle on the side of the launcher is used to check for stray voltage in those two circuits before the safety pin is extracted.

LAU-7/A Launchers. The LAU-7/A is compatible with both the AIM-9B and AIM-9D missiles. The LAU-7/A has a safety pin which, when installed, locks the AIM-9 in place by mechanically preventing movement of the missile detent and also prevents completion of the firing circuit by mechanically holding two solenoids in an open position.

-527 TER When other than AIM-7 or AIM-9 missiles are to be carried on the inboard wing stations, a TER is suspended from an adapter which is bolted to the LAU-17/A pylon. Like other triple ejector racks, the -527 TER consists of three 14 inch suspension ejector racks with Aero 2B arming units, a control unit, and wiring circuits required to fire rockets, dispense CBU bomblets and eject bombs, rocket launchers or CBU

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containers. Bombs may be ejected in either an armed or safe condition. The tail cone assembly at the aft end of a wire bundle support assembly houses a home-and-step control toggle switch, a press-to-test homing indicator light, a release mode selector switch, and a receptacle for an electrical safety pin. Harness assemblies which pass through the adapter to connect with terminals in the LAU-17/A pylon supply power to homing and stepping circuits of the -527 TER whenever aircraft power is available. If the stepper circuit is homed, power is directed first to TER station #1 (center line) and then sequentially to station #2 (left shoulder looking forward), and #3 (right shoulder). Power is supplied to each LAU-10/A rocket launcher by a rocket harness (commonly called "pigtail") which connects the appropriate receptacles at the after portion of the TER to the aft receptacle of each launcher. The LAU-10/A launcher can be ejected from the TER, in which case the rocket harness will be retained by a wire bale connected to the TER receptacle.

LAU-10/A Launcher. This launcher is used as a shipping container for four Zuni rocket motors and as a launcher for four complete Zuni rounds. In addition to five suspension lug wells to make it compatible with a variety of bomb racks, the launcher has a spring-loaded detent mechanism for each tube, an intervalometer, a selector switch for pre-flight selection of either single or ripple fire, and two five-pin electrical receptacles wired in parallel which can accept either a shorting device or a rocket harness. When the LAU-10/A launcher is to be suspended from a TER, the aft shorting device is removed to permit connection between the rocket harness and the launcher. Since the receptacles are wired in parallel, any electrical power which passes through the rocket harness should be shunted to ground if the remaining shorting device is in the safe position. Any electrical power

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which passes the shorting device will be directed to the intervalometer which, in the zero position, grounds all of the rocket squibs. If the power exceeds approximately 10 watts, the intervalometer will move from the grounded position to station #1 and direct power to the contact band of the rocket in launcher tube #1 (lower left, looking forward). Since only approximately .08 watts are required to activate the motor ignition squib, a Zuni rocket will be fired whenever the impulse to the launcher has been sufficient to cause the intervalometer to step. If the selector switch has been set on ripple and the firing pulse lasts approximately one-half second, all four rockets will be fire by a single pulse.

F-4B Aircraft Rocket Firing Circuit

Assuming that no malfunctions exist, there are nine conditions which must be fulfilled in order to complete the electrical circuit to fire a Zuni rocket from an F-4B aircraft on deck. Although the conditions are listed below in a logical order, the sequence is not important from an electrical standpoint, since the circuit is in series. The conditions, most of which are actually specific switch positions, are:

1. Electrical power available to the aircraft distribution system.
2. Weapons Switch in CONV-ON-NUCL-OFF position.
3. Weapons Selector Switch in RKTS DISP position.
4. Station Selector Switch in INBD WING position.
5. Rocket harness connected to LAU-10/A launcher.
6. TER electrical safety pin removed.
7. Shorting device in the armed position.
8. Armament Safety Override Switch depressed.
9. Bomb Release Switch depressed.

Aircraft Power. Electrical power may be supplied from either an external source or from either or both of the engine driven alternating

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current (AC) generators which supply three phase 115/200 volt 400 cycle AC power and, using transformers and rectifiers, 28 volt AC and direct current (DC) power to the aircraft distribution system. Excepting possibly during the brief period of transition from one power source to the other when the numerous magnetic fields of electrical motors, generators, and wiring throughout the aircraft will be collapsed and reconstituted resulting in inductive currents, electrical power is distributed in the same manner irrespective of the original source.

Multiple Weapons System Control Panel. This panel provides control for firing, release, sequencing, and arming of the various external stores carried on stations 1, 2, 5, 8 and 9. The panel, mounted in front of the pilot's control stick, contains a Weapons Selector Switch, Station Selector Switch, Weapons Switch, Step Reset Switch, Bomb Arming Switch, and Interval Selector Switch. Only the Weapons Selector Switch, Station Selector Switch and Weapons Switch affect the ability to fire a rocket.

Weapons Switch. Power is not supplied to either the CONV-ON-NUCL-OFF or CONV-OFF-NUCL-ON position of this switch which performs the function of a master armament switch, unless the landing gear handle is raised or the Armament Safety Override Switch is depressed. These two provisions are incorporated for the specific purpose of preventing inadvertent release of external stores or firing of rockets while retaining the capability of performing circuit continuity checks when desired.

Weapons Selector Switch. The position of this rotary switch controls the type and release method of external stores. This switch must be in the RKTS DISP position in order to permit normal firing of a rocket. This switch is customarily placed in the BULL PUP position when not in use since that circuit is inactivated when the Aero 5A launcher for the BULL PUP missile is not installed. Placing this switch in the RKTS DISP

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position permits power to close the select rockets relay incorporated in each TER.

Station Selector Switch. This rotary switch has five positions in use: OFF, OUTBD WING (#1 and #9), INBD WING(#2 and #8), CTR (#5), and all (#1, #2, #5, #8 and #9). Reject relays are energized when this switch is in the OFF position and prevent normal station selection signals from going to any of the stations.

Bomb Release Switch. This switch, commonly called the "pickle", is a spring loaded button mounted on the left upper portion of the control stick grip. When depressed, with power available from the armament bus, the circuit from the armament bus to the bomb switch transfer relay will be closed and power will be directed to either the special weapons release circuit or the multiple weapons release circuit. The bomb release switch is used to fire rockets as well as to release bombs depending on the position of the Weapons Selector Switch

Armament Safety Override Switch. This spring-loaded push type switch, mounted above the left console at the rear of the pilot's cockpit, is used to bypass the armament safety feature of the landing gear control when it is desired to make continuity checks of the bomb release and rocket firing circuits. Once depressed with power available, the switch is held in place until its holding coil is de-energized by the interruption of electrical power.

LAU-17/A Inboard Pylon. This pylon has been described previously.

-527 TER. This rack has been described previously.

LAU-10/A Launcher. This launcher has been described previously.

Electrical Safety Features Associated with the Armament Systems

Armament Safety feature in the landing Gear Control. A cam-operated switch in the landing gear control mechanism serves to interrupt all

power to the armament bus when the control handle is in the down position. The position of this switch does not affect the capability to jettison external stores or fuselage missiles. It should also be noted that the homing and stepping circuits of the TER are energized whenever aircraft power is available.

Left Main Gear Scissor Switch. The position of this sealed unit plunger switch mounted on the upper scissor link of the left main landing gear, controls the capability to jettison all fuselage missiles and all external stores. When the landing gear strut is fully extended, the switch closes completing a circuit from the 28 volt DC Essential Bus to the EXT STORES EMER REL switch mounted on the pilot's forward left console. The position of this switch has no effect on normal release or firing circuits which are completed by closing the Bomb Release Switch.

Emergency Stores Switch. This switch directs 28 volt DC power from the Essential Bus to energize the EXT STORES EMER REL Switch when the landing gear control handle is raised. This switch does not affect normal release or firing circuits.

FINDINGS OF FACT

SECTION I

BACKGROUND AND ENVIRONMENT

1. That on the morning of 29 July 1967, USS FORRESTAL (CVA-59), Captain *B-6* ISN, 105702/1310, Commanding Officer, was operating on Yankee Station in the Gulf of Tonkin as a part of Task Group 77.6.
2. That FORRESTAL chopped to COMSEVENTHFLT at 080001Z July 1967,
3. That FORRESTAL arrived on Yankee Station 24 July 1967, and first launched strikes against targets in North Vietnam at 0600H, 25 July 1967.
4. That on the morning of 29 July, Commander Carrier Division TWO, Rear Admiral *B-6* ISN, 078676/1310, was embarked with his staff as CTG 77.6, Commander Attack Carrier Striking Group, comprised of USS FORRESTAL (CVA-59), USS RUPERTUS (DD-851), with Commander Destroyer Division THIRTY-TWO embarked, and USS TUCKER (DD-875).
5. That friendly U. S. Naval carrier forces in the near vicinity were:

<u>TASK DESIGNATION/COMMANDER</u>	<u>FLAGSHIP</u>	<u>ESCORTS</u>
a. CTG 77.0/CTG 77.8 COMCARDIV NINE RADM <i>B-6</i>	USS ORISKANY (CVA-34)	USS MACKENZIE (DD-836) USS MCORE (DD-747)
b. CTG 77.7 COMCARDIV SEVEN RADM <i>B-6</i>	USS BON HOMME RICHARD (CVA-31)	USS FECHTELER (DD-870) USS SPROSTON (DD-577)

6. That CTG 77.5, Captain *B-6* embarked in USS INTREPID (CVS-11) with USS BAUSELL (DD-845) and USS PORTERFIELD (DD-682) in company was enroute Yankee Station.

7. That CTF 77, Commander Attack Carrier Striking Force SEVENTH Fleet, RADM *R-6* embarked in USS CONSTELLATION (CVA-64), was moored at Subic Bay, R. P.

8. That Commanding Officer, USS FORRESTAL (CVA-59), was Commander Task Unit 77.6.1, and was OTC (Officer in Tactical Command) of that unit.

9. That USS FORRESTAL (CVA-59) was engaged in high tempo combat operations involving air strikes against targets in North Vietnam.

10. That Attack Carrier Air Wing SEVENTEEN (CVW-17), comprised of the following squadrons and a detachment, was embarked in USS FORRESTAL (CVA-59):

- a. Commander Attack Carrier Air Wing SEVENTEEN and staff.
- b. Fighter Squadron 11 (VF-11).
- c. Fighter Squadron 74 (VF-74).
- d. Attack Squadron 46 (VA-46).
- e. Attack Squadron 106 (VA-106).
- f. Attack Squadron 65 (VA-65).
- g. Reconnaissance Heavy Attack Squadron 11 (RVAH-11).
- h. Carrier Airborne Early Warning Squadron 123 (VAW-123).
- i. Heavy Attack Squadron 10 Detachment 59 (VAH-10 DET 59).

11. That detachments embarked in and attached to the ship were:

- a. Helicopter Combat Support Squadron 2 Detachment 59 (HC-2 DET 59)
- b. Helicopter Antisubmarine Squadron 2 Detachment 59 (HS-2 DET 59)
- c. Carrier Airborne Early Warning Squadron 13 Detachment 59
(VAW-13 DET 59)
- d. Fleet Air Reconnaissance Squadron 1 Detachment 59 (VQ-1 DET 59)

12. That the aircraft assigned to the squadrons and detachments embarked in USS FORRESTAL (CVA-59) and the numbers actually on board, airborne or based ashore at 1051H, 29 July 1967, were:

<u>Squadron or Detachment</u>	<u>Type Aircraft</u>	<u>Number Assigned</u>	<u>Number on Board</u>	<u>Number Airborne</u>	<u>Number Ashore</u>
VF-11	F-4B	12	12	0	0
VF-74	F-4B	12	10	2	0
VA-106	A-4E	14	14	0	0
VA-46	A-4E	14	14	0	0
VA-65	A-6A	9	8	0	1
RVAH-11	RA-5C	6	5	0	1
VAW-123	E-2A	4	2	0	2
VAH-10 DET 59	KA-3B	5	2	2	1
VQ-1 DET 59	EA-3B	1	0	1	0
VAW-13 DET 59	EA-1F	2	1	1	0
HC-2 DET 59	UH-2A	3	3	0	0
HS-2 DET 59	SH-3A	4	2	2	0
CVA-59	C-1A	1	0	1	0

13. That weather and sea conditions were:

- a. Cloud cover 2000 feet scattered, higher broken.
- b. Visibility 10 miles.
- c. Temperature 87 degrees F.
- d. Dew point 78 degrees F.
- e. Humidity 74%.
- f. Wind 030 degrees true, 6 knots.
- g. Sea state calm.
- h. Sea temperature 88 degrees F.
- i. Altimeter setting 29.60.

14. That FORRESTAL was in material condition Yoke which had been checked at 0700H, 29 July 1967.

15. That on 29 July 1967, the fifth day of combat operations on Yankee Station, FORRESTAL was scheduled to launch strikes as shown in the Air Plan, enclosure (124).

16. That aircraft on deck for the 1100H scheduled launch were actually loaded (see enclosure (13) to enclosure (89)) with ordnance as follows:

<u>NO. & TYPE A/C</u>	<u>SIDE NOS.</u>	<u>ORDNANCE LOADING</u>
8 A-4	306, 316, 405, 407, 410, 414, 416, 417	2 AN-M65A1 1000 lb. bombs 35 rounds 20mm ammunition
3 A-4	301, 310, 314	2 MK82 500 lb. bombs 2 AGM-45 (Shrike) missiles 35 rounds 20mm ammunition
1 A-4	412	4 M117 750 lb. bombs 35 rounds 20mm ammunition
3 F-4	110, 202, 212	2 AIM-9B (Sidewinder) missiles 2 AIM-7E (Sparrow III) missiles 6 LAU-10/A launchers with 4 ZUNI rockets each
2 F-4	106, 204	One AIM-9D missile 2 AIM-7E missiles 6 LAU-10/A launchers with 4 ZUNI rockets each
2 F-4	101, 112	One AIM-9B missile One AIM-9D missile 2 AIM-7E missiles
2 F-4	105, 206	2 AIM-9D missiles 2 AIM-7E missiles
1 F-4	200	One AIM-9B missile 2 AIM-9D missiles 2 AIM-7E missiles
1 F-4	210	2 AIM-9B missiles One AIM-7E missile
1 F-4	113	2 AIM-9B missiles 2 AIM-7E missiles
3 A-6	505, 510, 511	18 MK82 500 lb. bombs 2 LAU-10/A launchers with 4 ZUNI rockets each

17. That because of the types of ordnance exposed to radiation and the types of radiation present, RADHAZ measures were not required and no RADHAZ condition was in effect.
18. That flight quarters on 29 July 1967 was sounded at 0400H.
19. That at 1025H pilots were directed to man aircraft.
20. That the aircraft spot at 1051H was approximately as shown in enclosure (10) to enclosure (89).
21. That at 1046H FORRESTAL turned into the wind, preparatory to launch, coming to course 050 degrees T, speed 27 knots.
22. That on launching course, wind over the deck was 32 knots from 350 degrees relative.
23. That at 1051H crews had manned aircraft and starting was in progress; some were started, some were not. Two aircraft, one KA-3B and one EA-1F, had been launched at 1050H. Launch of a second KA-3B and one E-2A was in progress. Above launch was preliminary to the 1100H launch.
24. That at 1051H A-4E #405, pilot LCDR Fred D. WHITE, USN, 627870/1310, was in the third aircraft forward of the stern on the port side of the flight deck, with engine running.
25. That A-4 #405 carried the following stores:
 - a. 400 gal. centerline fuel tank. (full)
 - b. 2 AN-M65A1 1000 lb. bombs.
 - c. 35 rounds 20mm gun ammunition.

26. That at 1051H men were positioned around F-4B BUNO 153061 modex #110 approximately as shown in enclosure (139), starting the aircraft, checking it, and preparing it for flight. Their functions at this

time were:

<u>Name</u>		<u>Assigned Duty</u>	<u>Duty being performed at 1051H, 29 July:</u>
LCDR	JW 17 LSO	Pilot	In forward cockpit; starting starboard engine.
LTJG	VF-11	RIO	Preflighting rear cockpit.
AMH1	VF-11	Line Supervisor	Standing by to assist plane captain.
AO1	VF-11	Team leader of a VF-11 conventional weapons loading team	Awaiting signal from pilot to check Sidewinder.
AO2	VF-11	Member, VF-11 weapons loading team.	Inspecting load, having homed port TER-7 and plugged in LAU-10s.
AO3	VF-11	Member, VF-11 weapons loading team.	Had just actuated the home/step switch on port TER-7. His arm was on port inboard LAU-10/A waiting for WILSON.
AOAA	VF-11	Member, VF-11 weapons loading team.	Preparing to make stray voltage check on starboard rocket harnesses.
AN	VF-11 Div	Driver of starting tractor.	Awaiting completion of engine start.
AMSAN (Deceased)	VF-11	Plane Captain #110	Believed to be on starboard side of #110.
AN	VF-11 Div	Tractor Driver	Removing tow bar from #110.

27. That at 1051H, LCDR _____, USN, _____ pilot of F-4 #110 had started his starboard engine and was switching from external to internal electrical power, preparatory to starting his port engine.

All redactions are B-6.

28. That F-4 #110 was loaded with ordnance on external stores stations as follows:

a. Station 2 (port inboard) - One AIM-9B (Sidewinder) missile. Three LAU-10/A launchers with four ZUNIs each.

b. Station 3 (port aft fuselage) - One AIM-7E (Sparrow III) missile.

c. Station 5 (centerline) - One full 600 gallon external fuel tank.

d. Station 6 (starboard forward fuselage) - Same as Station 3.

e. Station 8 (starboard inboard) - Same as Station 2.

29. That each ZUNI on F-4 #110 had a MK24 warhead, a M414A1 VT nose fuze and a MK191 Mod 1 base fuze.

30. That after pilot [redacted] had manned F-4 #110, tractor driver [redacted] drove up and parked his MD3A tractor forward of and close to the starboard wing of F-4 #110.

31. That [redacted] connected up the starting unit and electrical power from his tractor to F-4 #110.

32. That on signal from pilot [redacted] provided starting air and electrical power to F-4 #110.

33. That at 1051H, [redacted] was sitting on his tractor, watching pilot [redacted] in F-4 #110 and observing [redacted] go through the starting procedures.

34. That line supervisor [redacted] who was checking the starting progress and preparation for launch of VF-11 F-4's, was standing generally in front of F-4 #110 at 1051H. He was not aware of the location of [redacted] or what they were doing.

35. That after pilot [redacted] had manned F-4 #110 and after [redacted] had supplied external electrical power to the F-4, [redacted] began conducting stray voltage checks on #110.

All redactions
are B-6.