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XRD-55

AEC RESEARCH AND DEVELOPMENT REPORT

GROUP 1
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Incl 3 of 1

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APD-55
Pg 46

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BUREAU OF SHIPS GROUP

TECHNICAL INSPECTION REPORT

DISTRIBUTION LIMITED
CONTAINS WEAPON DATA

U.S.S. GILLIAM (APA57)

GROUP 3

Downgraded at 12 year intervals
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TEST ABLE

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By Authority of *John T. ...* Date *MAY 16 1982* 16 APRIL 1949

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REG. NO. 46
6817

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BUREAU OF SHIPS GROUP
TECHNICAL INSPECTION REPORT

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Classification (Controlled) (Changed to ~~CONFIDENTIAL~~ Information)
by Authority of JOINT CHIEFS OF STAFF JCS 5788/58 DATED 16 APRIL 1969
By *John H. Magallon, Lt. Col.* Date MAY 16 1952

APPROVED:

F. X. Forest,
Captain, U.S.N.

This report contains information the disclosure of which in any manner to an unauthorized person is prohibited by law.

USS GILLIAM (APA67)

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Security Information

~~RESTRICTED DATA~~
ATOMIC ENERGY ACT 1946

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Classification (Controlled) (Changed to ~~CONFIDENTIAL~~ Information)
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By *John H. Magallon, Lt. Col.* Date MAY 16 1952

USS GILLIAM (APA67)

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ATOMIC ENERGY ACT 1946

(17) XRD-55

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TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts After Test; List; General Areas of Flooding; Sources.

The GILLIAM was sunk. The time and manner of her sinking cannot be stated with certainty. The photo on page 12 shows the target array as seen on APQ #7 radar screen shortly before the burst. The arrow points to the position of the GILLIAM. In the photo on page 13, the GILLIAM appears to have broken into 3 pieces. The two extra images may be echos from large component units which were blown off the GILLIAM. The photo on page 14 shows the GILLIAM going down. She disappears from the radar screen 79 seconds after burst. Presumably the GILLIAM sinks shortly after the photo on page 16 was taken. No further image of the GILLIAM is obtained on the screen. A close scrutiny of the pictures taken by the 24 inch tower cameras on Bikini Island between 42 and 50 seconds after the blast reveal a darker spot in the general haze and smoke covering the array. (See photo on page 16). This spot orientates perfectly with the location of the stern of the GILLIAM just before the blast. Furthermore, it is shaped like the stern of an attack transport inclined upward at about 20 degrees. This spot persists for about four pictures or approximately twelve seconds before it disappears.

Based on this indication, the radar pictures and divers reports, it seems reasonable to assume that the GILLIAM sank by the bow in a little over one minute after the blast. Aerial photographs from PBM show no trace of the GILLIAM other than an oil slick at 0901:50 clock time.

Flooding undoubtedly started when the main deck and shell plating at the bow were opened by the blast.

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USS GILLIAM (APA57)

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(b) Structural Damage.

The following information has been obtained from reports by divers and from observation of underwater photographs.

The ship is badly damaged. The damage extends the full length of the ship and from the top of the deckhouse down to the bilge. That part of the ship below the weather deck is largely in one piece. The ship is nearly upright. The stem, one bulkhead, and six to ten feet of the side shell plating are pushed to port and heading about fifty degrees from the centerline of the ship proper. The forward part of the ship is mashed down as though the blast acted like the hammer and the water an anvil. The upper deck at about frame 6 is only a few feet off the bottom. The upper deck at this point rises sharply until at frame 53, the after end of #1 hatch, it is approximately in its normal position.

The weather deck from frame 60 forward was stripped of all deck machinery, deck house, hatch coamings, foremast and other fittings. The sole fixed object noted on this deck was a port 40MM gun off which the shield had been stripped. The deck openings for the hatches and trunks were plainly seen. Around the number one cargo hatch the weather deck is about at its normal height above the bottom of the lagoon. From frame 60 aft the deck is impassable to divers and two attempts to land divers on the deck were abandoned after the conditions were reported as being unsafe. As viewed from the side and above, there is no recognizable part of the superstructure remaining or projecting above the level of the upper deck. The part of the ship that was formerly in this area now comprises the torn mass of wreckage to port of the vessel.

The shell on the starboard side above the waterline is missing to frame 30. Below the waterline it is crumpled and pushed into the ship. From frame 30 to 46 the upper part of the shell plating is peeled back and curled outboard. The lower part is wrinkled horizontally to the bilge keel. The port shell plating forward of frame 30 is opened out with the outside resting on the bottom of the lagoon. For a view of typically torn shell plating see photos on pages 17 thru 20 inclusive. The port side from frame 30 aft was not investigated. The starboard side of the vessel from

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frame 60 aft has a series of horizontal wrinkles as far down as the bilge keel. In this area there are locations where shell plates are missing, folded into the vessel, and curled outboard and back; but no large areas exhibit one type of behavior. The side as a whole is pushed to port giving the ship an appearance of having a list of about 30 degrees to port as viewed from the bottom of the lagoon. That the ship is on an even keel is shown by the location of the bilge keel which is a normal distance above the bottom of the lagoon. At about frame 155 there is a vertical crack extending to the turn of the bilge and opened up perhaps a foot. Aft of this point the shell loses its pushed-to-port look but retains the horizontal wrinkles. The propellers and rudder are still attached and appear intact.

There is much wreckage strewn about the bottom of the lagoon even forward of the bow. Most of the ships components are twisted and mangled beyond recognition but certain discrete units such as the hawse pipes (which are still around the chain, but about fifty feet forward of the stem), bits, blast gauge tower and 40MM gun are recognizable and reasonably intact. See photos on pages 21 thru 28. A set of bits formerly located at frame 5 were recovered and were quite radioactive two weeks after "A" Day. That the disrupting effect of the blast reached inside the vessel even at the extreme forward part is shown by a report that the chain pipes could be seen more or less leaning against the stem (with the chain still through them) and resting on a pile of chain which would indicate that the chain locker was opened up.

Underwater photographs selected from a total of 60 are included in the picture section of this report. Positive identification of objects shown in the photographs and the orientation on the ship are in most cases very difficult. A sketch of the general damage as reconstructed from diver's reports is shown in sketch on page 38.

(c) Other damage.

Machinery and Electrical Damage Unobserved.

II. Forces Evidenced and Effects Noted.

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(a) Heat.

None of painted frame markings were discernible to the divers.

(b) Fires and Explosions.

Unobserved.

(c) Shock.

The great damage to the weather deck, superstructure and shell plating is attributed to the blast wave.

(d) Pressure.

Air pressures of approximately 2000#/in² existed beneath the burst.

III. Results of Test on Target.

(a) Effect on Propulsion and Ship Control.

Unobservable.

(b) Effect on Gunnery and Fire Control.

Completely destroyed fire control and most of the guns on the GILLIAM. Fighting power of the GILLIAM would have been very poor had she remained afloat.

(c) Effect on Watertight Integrity and Stability.

Completely destroyed the watertight integrity and stability of the GILLIAM.

(d) Effect on Personnel and Habitability.

Unobserved prior to sinking.

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(e) Total Effect on Fighting Efficiency.

Completely destroyed the fighting efficiency of the ship.

IV. General Summary of Observer's Impressions and Conclusions.

(a) Photographs of the burst taken from towers and planes, afterburst photographs of the array from PBM Charlie, the reports of the technical observer in PBM Charlie, the reports of the Bureau of Ships Interim Report, and the divers report are the total available sources of information. A study of this material has been made and, although certain details were unobtainable, the results are compiled here in an attempt to give the story of the ship from the time of bomb burst to the time of sinking.

Unlike the other ships sunk in "A" Test, the GILLIAM was never clearly seen floating after the air burst. The light intensity of burst obscured the GILLIAM in the only slow motion pictures taken (Navy film #18377) during the first few seconds of "A" Test. Thereafter the clouds obscured the GILLIAM.

Triangulation of the burst calculated from aerial and tower views indicate that the GILLIAM was the ship closest to the actual burst. The extensive damage suffered by the GILLIAM would seem to confirm this calculation. Apparently the air blast came from a direction forward, to starboard and almost overhead of the ship's bow.

The divers found the GILLIAM lying in about 180 feet of water. In six days diving, it was possible to examine the ship thoroughly along the starboard side, the port bow and the forward deck. Extensive wreckage prevented detailed examination of the remainder of the vessel within reasonable time limits and with adequate safety. Approximately 60 underwater photographs were taken by the divers. Orientation and identification of these photographs was not completed by the divers probably because of the extensive wreckage and the fact that painted frame numbers were not visible. Most of these pictures, which are in the Bureau of Ships files, were not included in the report because of poor definition.

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V. Preliminary Recommendation.

None.

VI. Pre-test Statistics.

(a) Instructions for loading the vessel specified the following.

| ITEM | LOADING |
|--------------------------------|---------|
| Fuel Oil | 50% |
| Diesel Oil | 50% |
| Ammunition | 50% |
| Potable and Reserve Feed Water | 95% |
| Salt Water Ballast | 95% |

The Army Engineers secured a bull dozer, searchlight and generator, fire fighting equipment, radiation and water distilling equipment on the upper deck of the GILLIAM for test purposes. The Bureau of Aeronautics secured a VF airplane on upper deck aft.

Details of the actual quantities of the various items aboard are included in Report 7, Stability Inspection Report, submitted by the ship's force in accordance with "Instructions to Target Vessels for Tests and Observations by Ship's Force" issued by the Director of Ships Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

The GILLIAM at time of burst floated at drafts of 2'9" forward and 17' 9" aft. She had a list of one degree to port.

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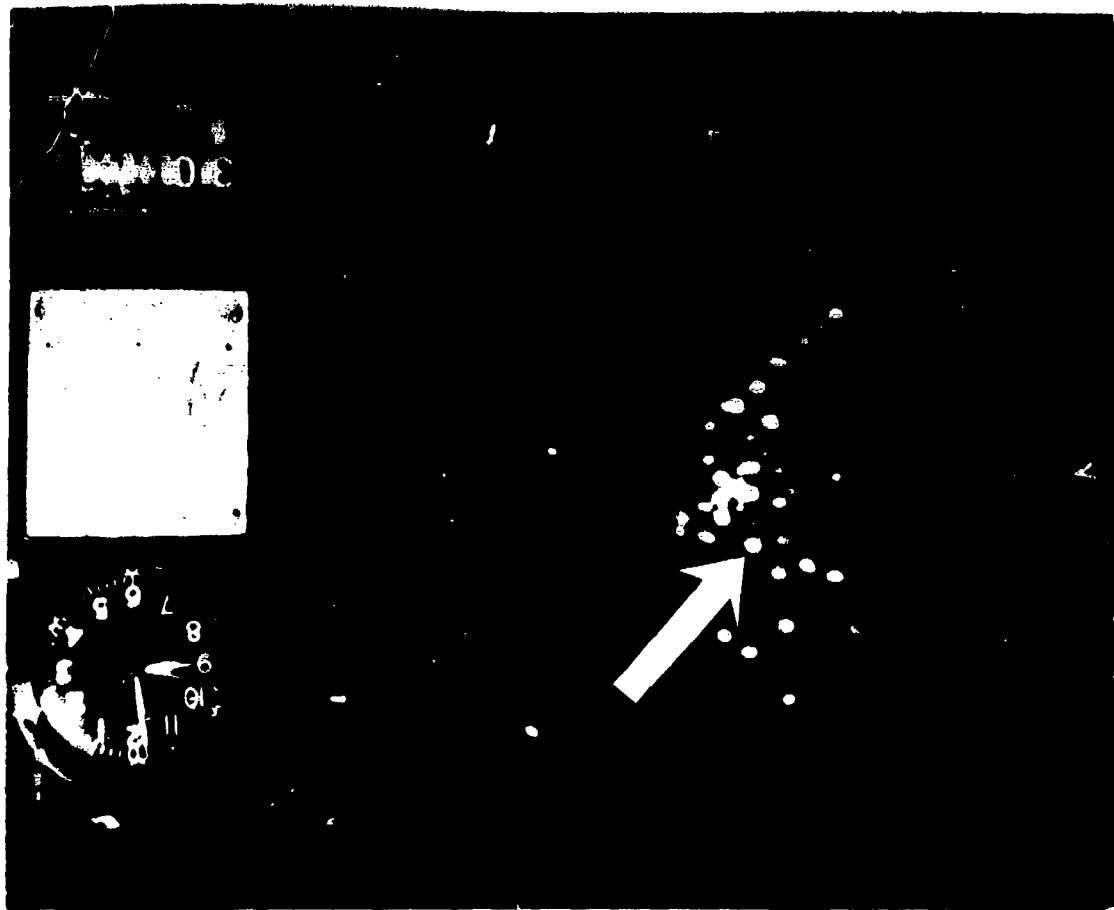
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PHOTOGRAPHS

TEST ABLE



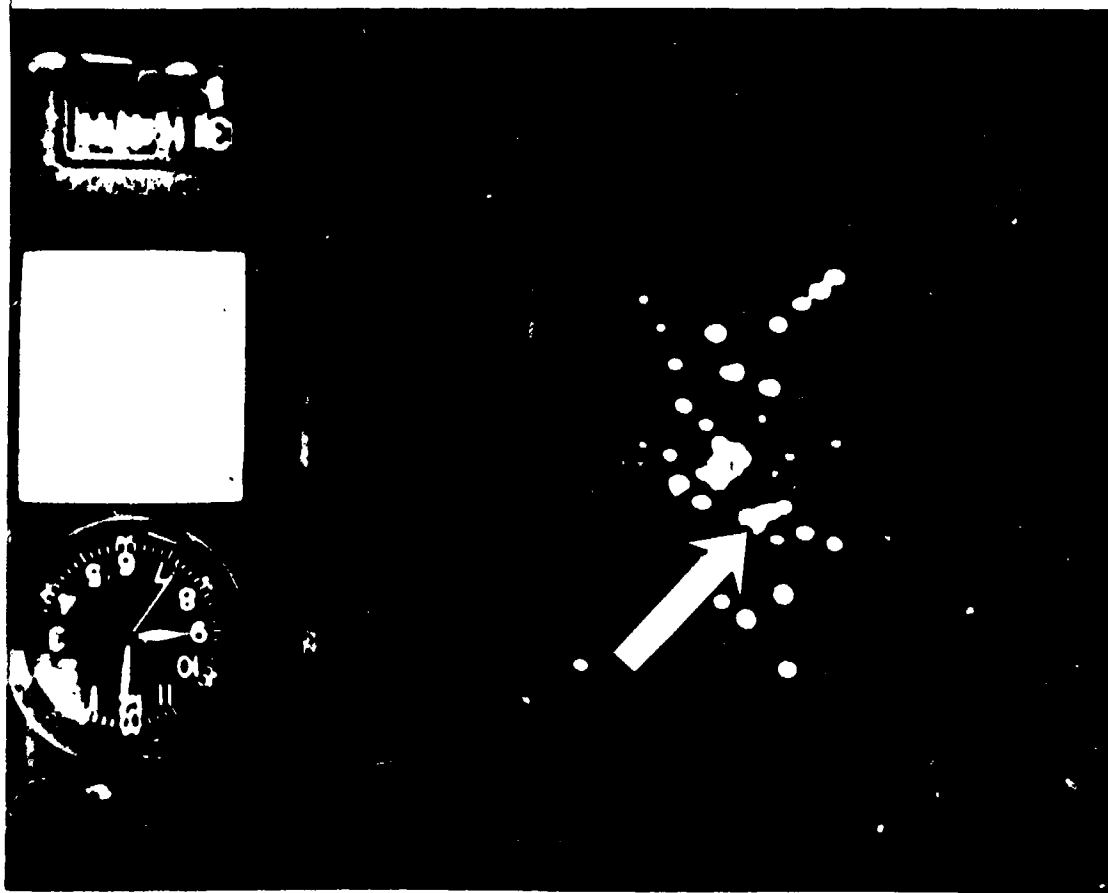
APQ #7 Radar Scope Picture #3011. View of target array before burst as seen on APQ #7 #1 radar scope located on Aomoen Island. Burst will occur at clock time of 0900:28. Arrow points to GILLIAM.

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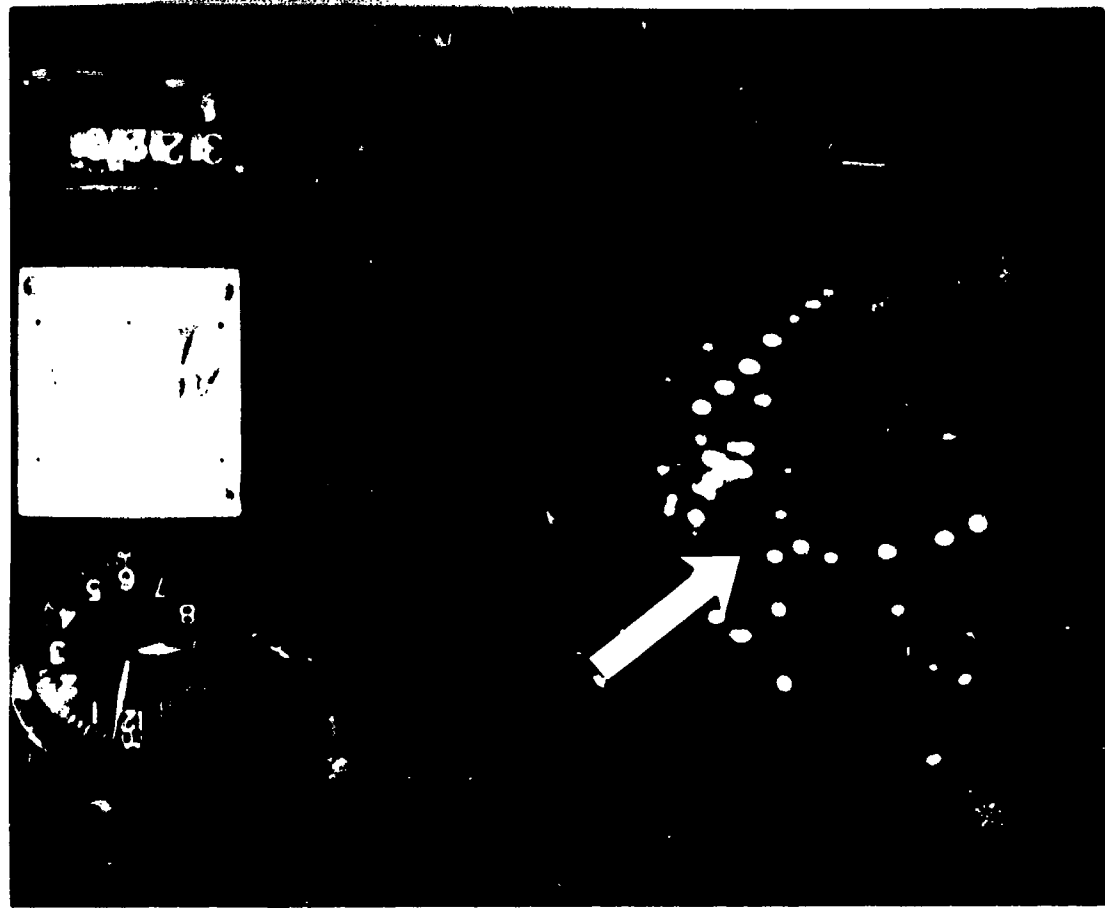
APQ #7 Radar Scope Picture #3141. Target array 8 1/2 seconds after burst. Note 3 plps in place of GILLIAM'S former spot.

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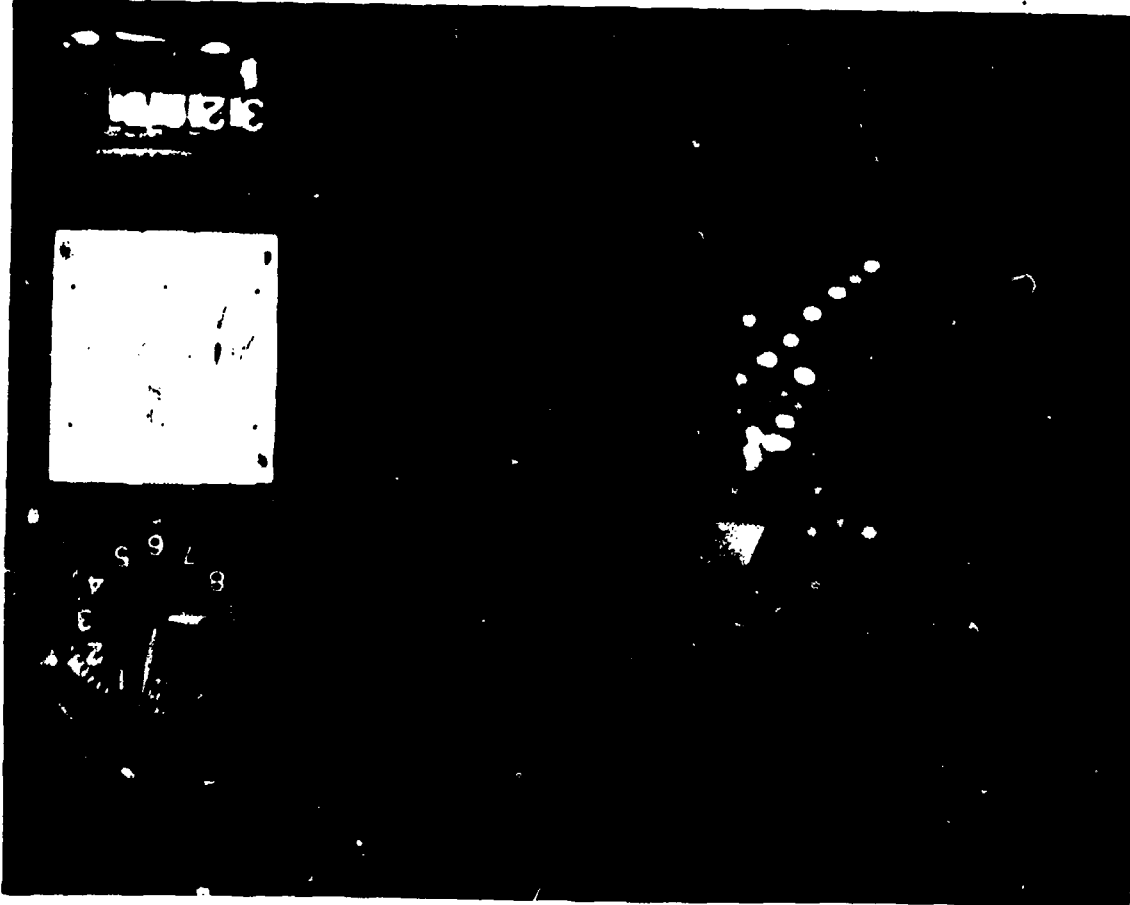
APQ #7 Radar Scope Picture #3220. GILLIAM going down.

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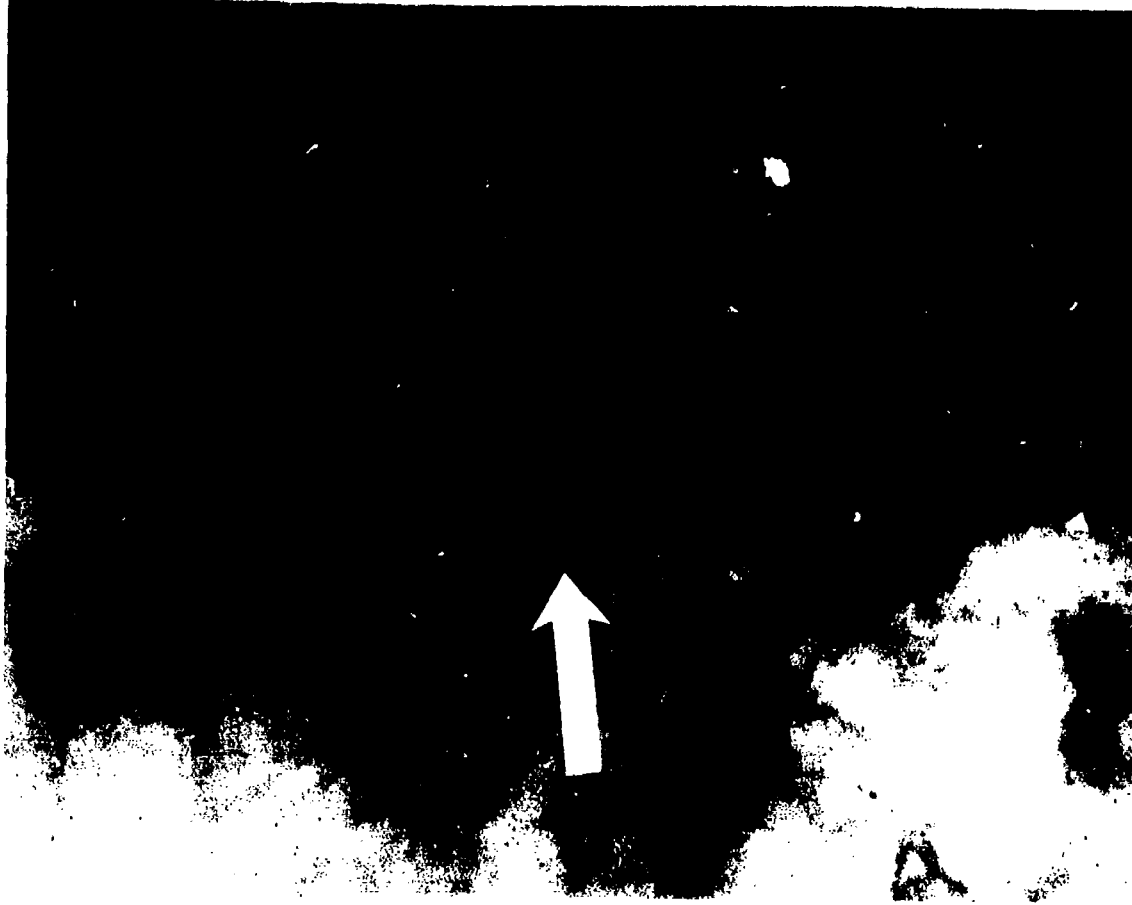
APQ #7 Radar Scope Picture #3225. GILLIAM has disappeared 79 seconds after burst.

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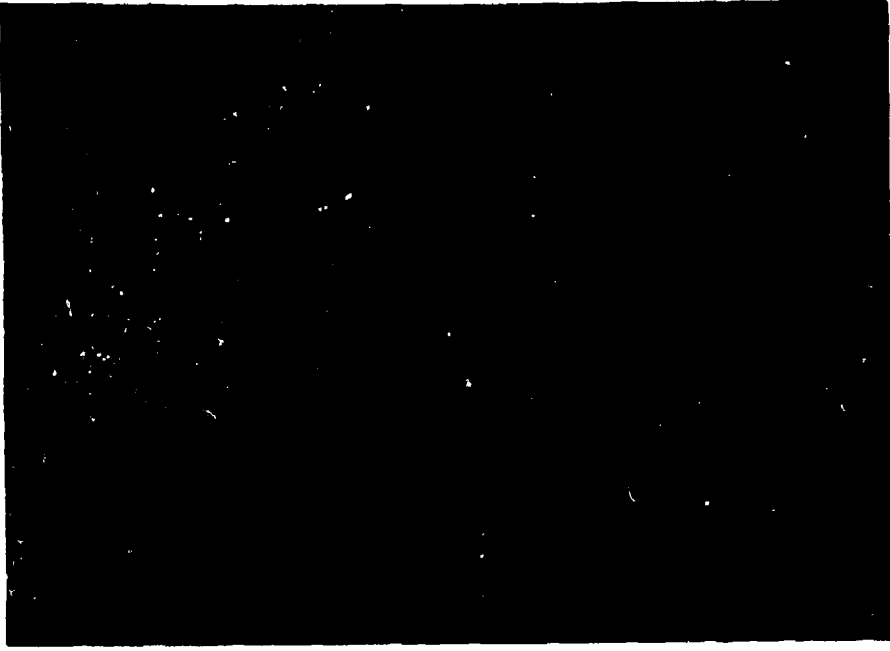
DA-CR-T2-11-11/(-11) 1 July 46/24"/Bikini Secret. Print #14. Bikini tower view showing dark spot suspected to be the GILLIAM.

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CR6-8-17-16 (Underwater). Another view of same area as covered in the photo on page 17.

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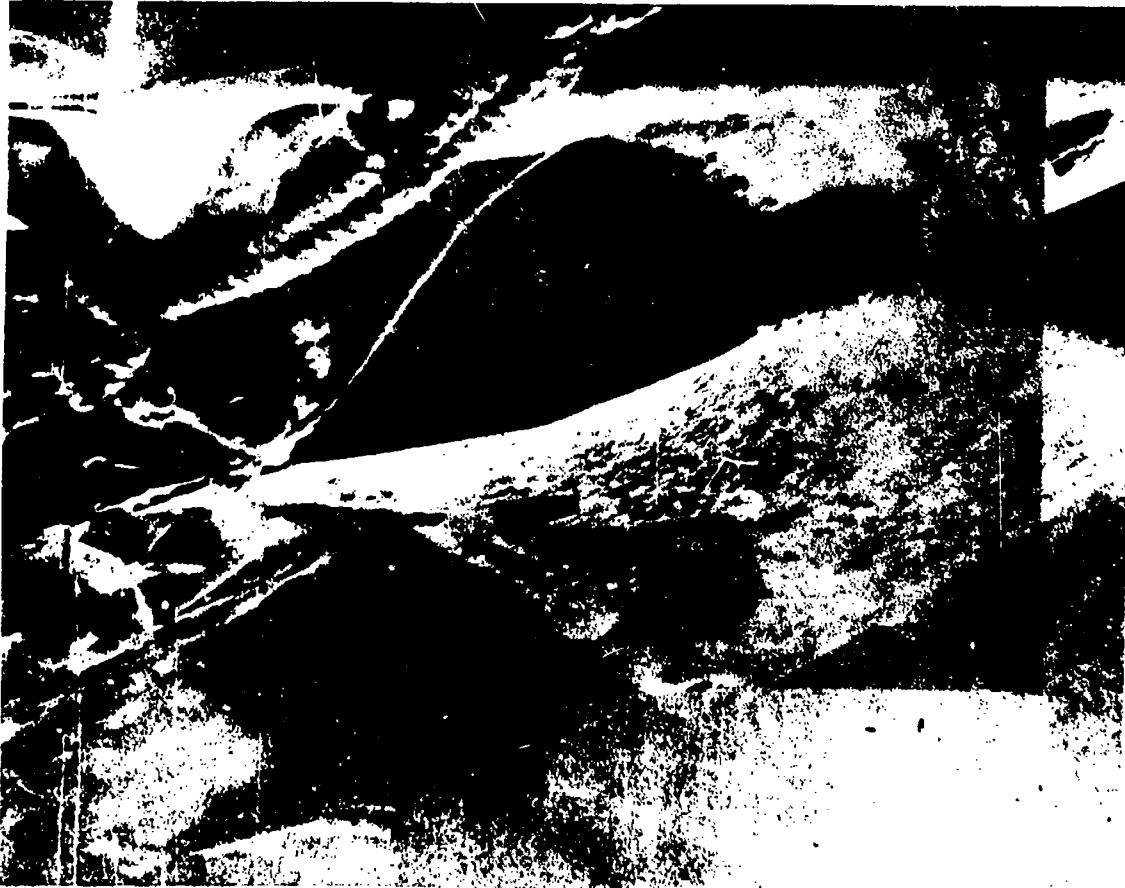
CR5-SI7-14 (Underwater). View of GILLIAM dam showing twisted plating. Portion of ship unknown.

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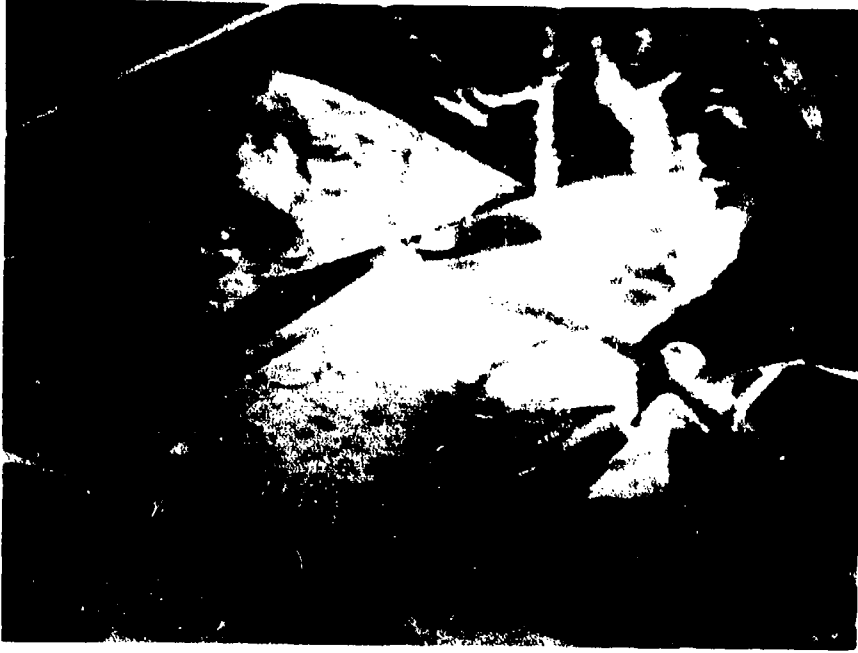
CR5-SI7-16 (Underwater). View of same vicinity as shown in the photo on page 17. Plating appears heavy. Sheared rivet holes are shown in foreground.

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CR5-S-17-19 (Underwater). Another view of damage to GILLIAM plating. Same view as in the photo on page 17. Location unknown.

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CR5-S22-7 (Underwater). Bitt torn from upper deck of GILLIAM seen on Bikini lagoon bottom. Compare with the photo on page 22.

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CR5-S22-8 (Underwater). Air blast gage and tower formerly located on upper deck, frame 12 of GILLIAM now resting on Bikini lagoon bottom. 40 mm gun in background was located prior to test at frame 24, upper deck. Note bitt in foreground and compare with the photo on page 21.

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CR5-S32-11 (Underwater). Haws pipe and chain pipe found near bow of GILLIAM.

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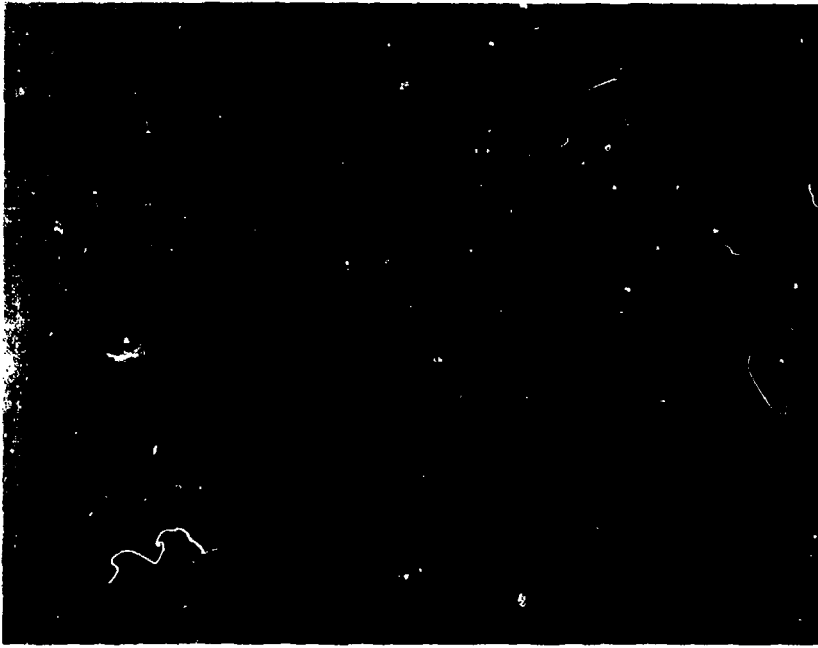
CR5-S33-12 (Underwater). Base of 40 MM gun mount seen lying on lagoon bottom. 40 MM gun itself seen in the photo on page 22.

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CR5-32-10 (Underwater). Chain pipe of GILLIAM. See the photograph on page 24.

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CR5-S17-11 (Underwater). Deck which resting on lagoon bottom.

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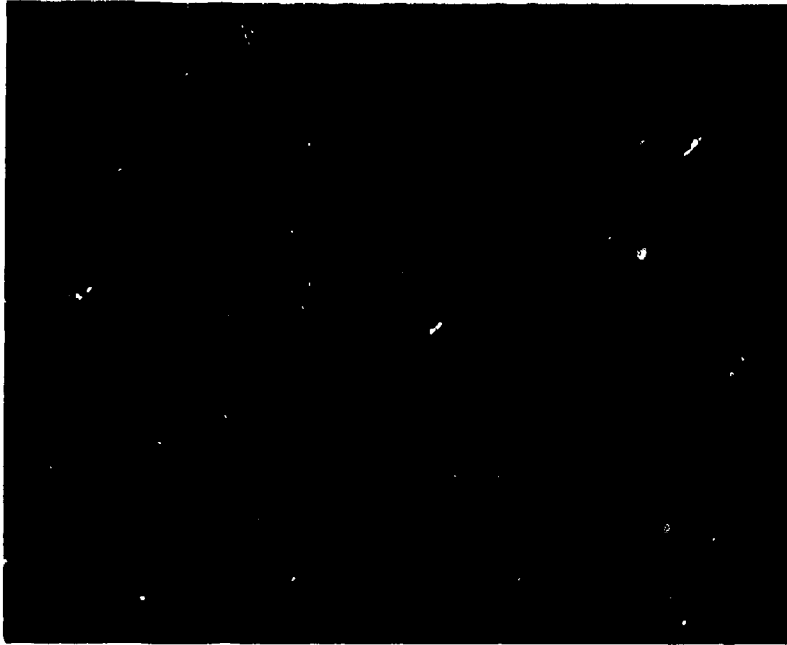
CR5-S18-4 (Underwater). Unidentified wreckage, presumed to be wreckage of army searchlight equipment placed on board GILLIAM, frame 129 to 134 port, upper deck outboard of carpenter shop.

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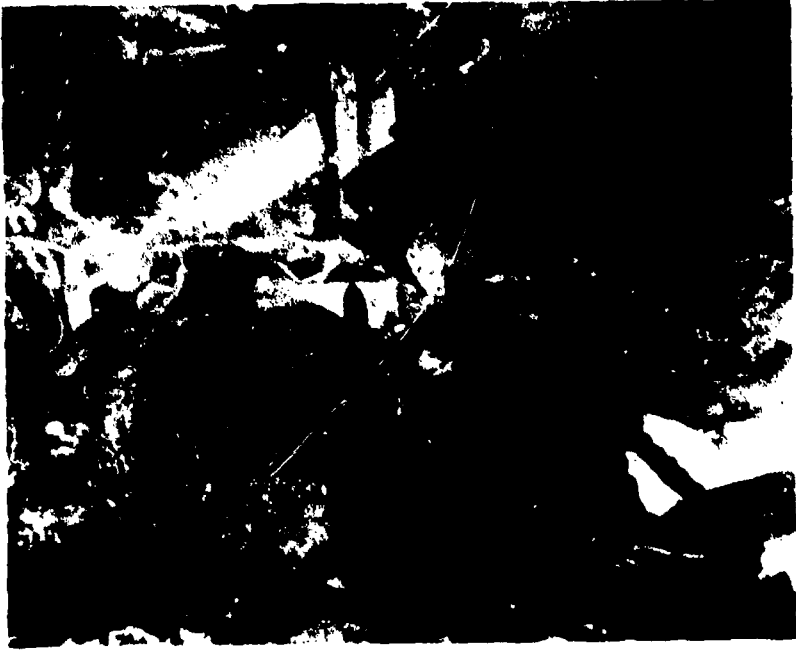
CR5-S18-7 (Underwater). Another view of damage in same vicinity as in the photo on page 27.

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CR5-S-18-8 (Underwater). Another view of the same damage as shown in the photo on page 27.

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CR5-S13-9 (Underwater). View of same damage as shown in photo on page 27. Note diver.

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CR5-S18-11 (Underwater). Same damage as shown in the photo on page 27 but from a different angle.

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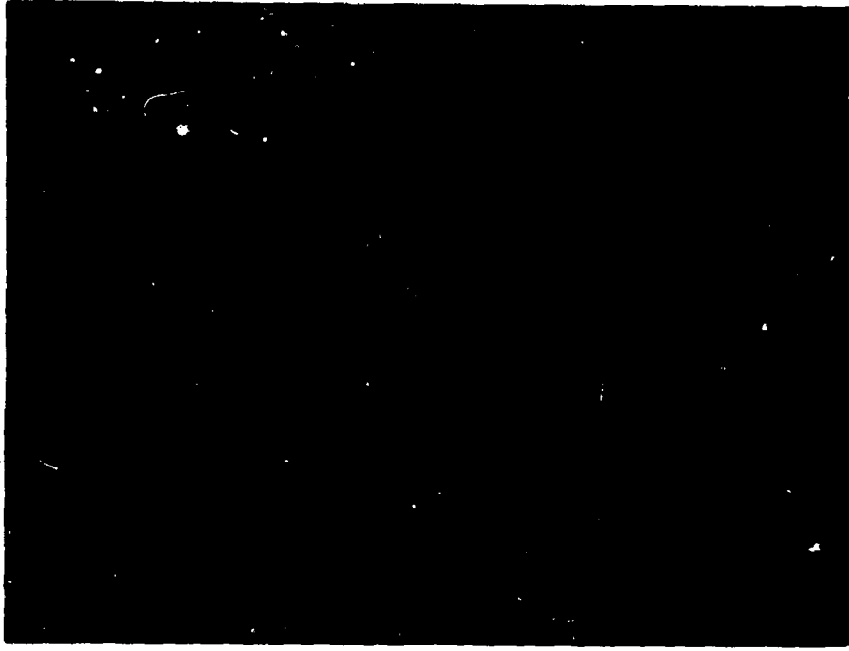
CR5-S19-7 (Underwater). Another view of unidentified wreckage. See the photo on page 27.

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CR5-S17-22 (Underwater). Unidentified wreckage of GILLIAM. Neither frame number nor portion of ship photographed is known. This photograph was taken in same vicinity as the photo on page 33.

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CR5-S17-1 (Underwater). Unidentified wreckage of GILLIAM. Neither frame number nor portion of the ship photographed is known. This photograph was taken in same vicinity as the photo on page 34.

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CR5-S17-4 (Underwater). Unidentified wreckage of GILLIAM. Neither frame number nor portion of ship photographed is known.

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CR5-S19-3 (Underwater). Unidentified wreckage of GILLIAM. Neither frame number nor portion of ship photographed is known.

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CR5-S19-16 (Underwater). Unidentified wreckage of GILLIAM. Neither frame number nor portion of ship photographed is known.

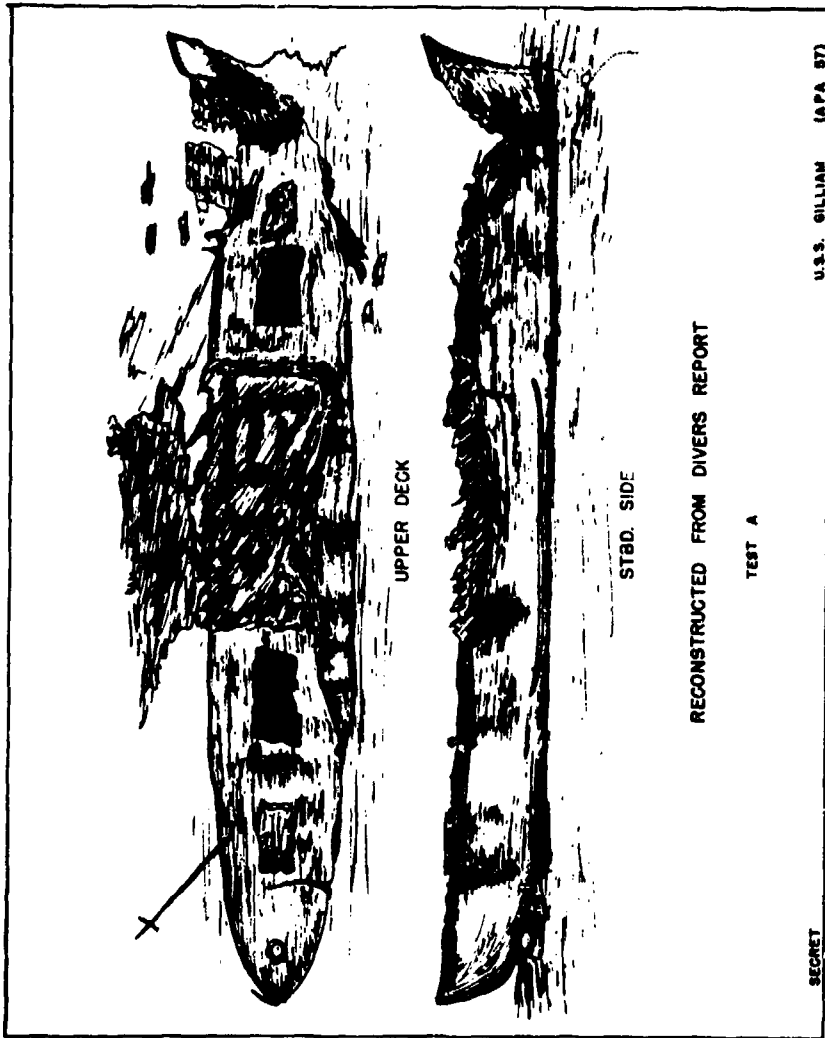
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Defense Special Weapons Agency
6801 Telegraph Road
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TRC

9 April 1997

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ATTENTION: OMI/Mr. William Bush

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency (formerly Defense Nuclear Agency) Security Office has reviewed and declassified the following reports:

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| AD-366748 - | XRD-65 |
| AD-366747 ~ | XRD-64 |
| AD-366746 ^ | XRD-63 |
| AD-376826 ~ | XRD-60 |
| AD-376824 ~ | XRD-58 |
| AD-376825 ~ | XRD-59 |
| AD-376823 ~ | XRD-57 |
| AD-376822 ~ | XRD-56 |
| AD-376821 ~ | XRD-55 |
| AD-366743 ~ | XRD-54 |
| AD-376820 ~ | XRD-53 |
| AD-366742 ~ | XRD-52 |
| AD-366741 ~ | XRD-51 |
| AD-366740 ~ | XRD-50-Volume-2 |
| AD-366739 - | XRD-49-Volume-1 |
| AD-366738 - | XRD-48 |
| AD-366737 ^ | XRD-47 |

TRC

9 April 1997

SUBJECT: Declassification of Reports

| | |
|-------------|-----------------|
| AD-366736 - | XRD-46 |
| AD-366735 - | XRD-45 |
| AD-366723 - | XRD-37 |
| AD-366721 - | XRD-35 |
| AD-366717 - | XRD-31-Volume-2 |
| AD-366716 - | XRD-30-Volume-1 |
| AD-366751 - | XRD-68-Volume-2 |
| AD-366750 - | XRD-67-Volume-1 |
| AD-366752 - | XRD-69 |
| AD-366744 - | XRD-61. |

All of the cited reports are now **approved for public release**. **Distribution statement "A"** now applies.

Arndith Jarrett
ARDITH JARRETT
Chief, Technical Resource Center

*Completed
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B.W.*