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**BUREAU OF SHIPS GROUP**  
**TECHNICAL INSPECTION REPORT**

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By John H. Deyette Date 22 SEP 1953

367489

**OPERATION CROSSROADS,**  
**U.S.S. GASCONADE (APA 85).**

TEST BAKER.

VOLUME 1 ~~CONFIDENTIAL~~ **U.S.**

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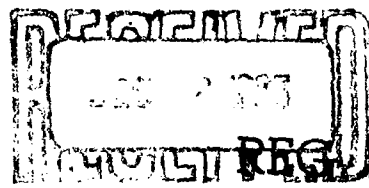
OPERATION CROSSROADS

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TECHNICAL INSPECTION REPORT

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Director  
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Washington, D. C. 20301

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USS GASCONADE (APA85)

Page 1 of 77 Pages

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TABLE OF CONTENTS

PAGE NO.

VOLUME I

Ship Characteristics Sheet - - - - -	3
Midship Section - - - - -	4
Overall Summary of Damage - - - - -	5
Hull Technical Inspection Report (Section I) - - - - -	16
Machinery Technical Inspection Report (Section II) - - - - -	31
Electrical Technical Inspection Report (Section III) - - - - -	45
Ship Damage Diagram (Appendix) - - - - -	63
Ship Measurement Diagram (Appendix) - - - - -	65
Commanding Officers Report (Appendix) - - - - -	69

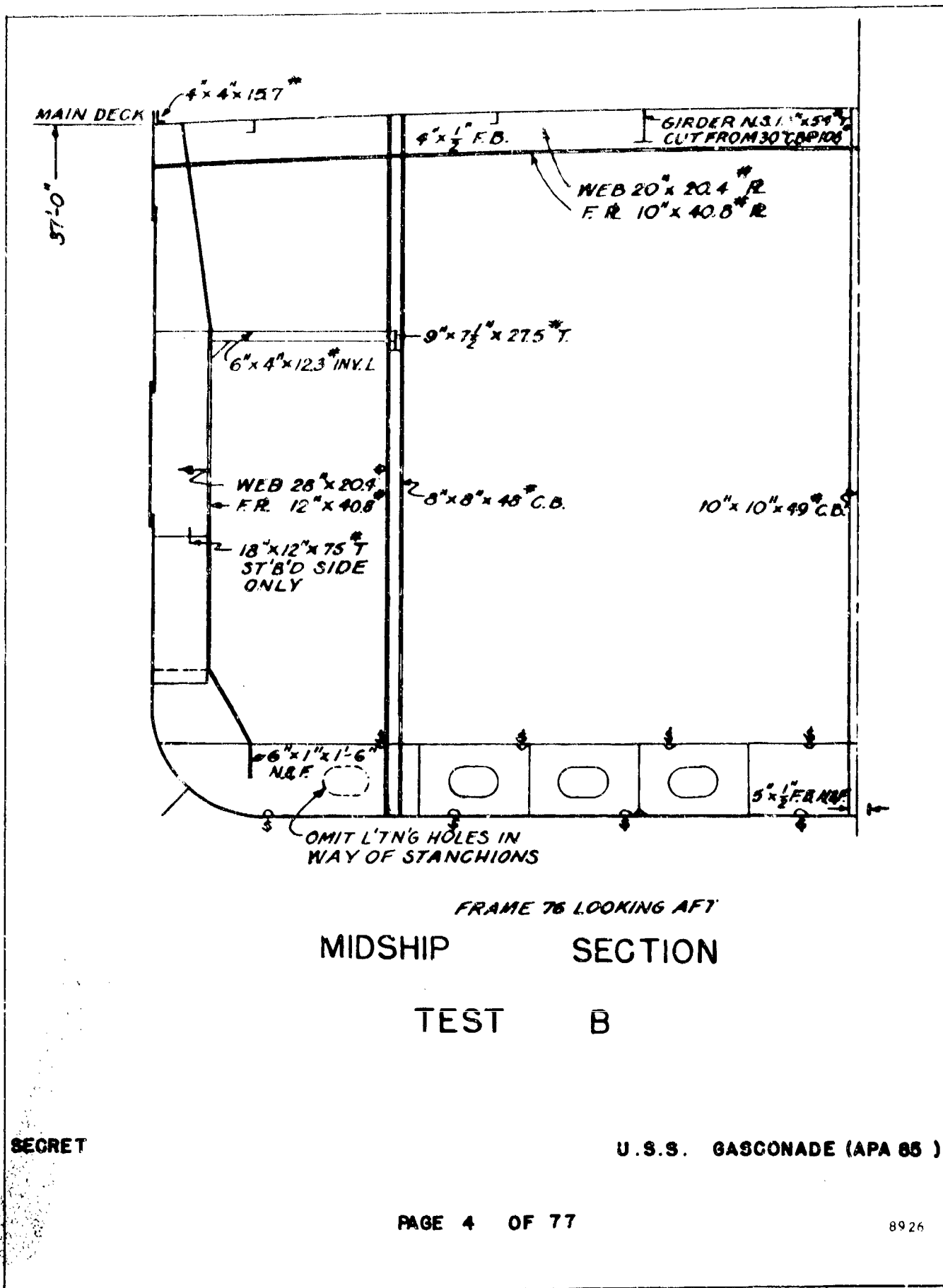
VOLUME II

Photographic Section - - - - -	2
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SECRET

USS GASCONADE (APA85)





SECRET

U.S.S. GASCONADE (APA 85)

TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

	HULL		
	Forward	Aft	List
Before test	8' 9"	18' 4"	0°
After test	9' 0"	19' 9"	2° Port

Flooding was confined to the port and starboard shaft alleys and the after machinery space. Flooding in the shaft alleys probably came through the stern tubes and from the after machinery space through the shaft glands. The after machinery space and both shaft alleys flooded to a depth of about 8 feet from a broken salt water cooling line to a spring bearing. The overboard valve for this line had been inadvertently left open. It is considered that the ship's force could have controlled all flooding.

(b) Structural damage.

HULL

The most significant damage is a wrinkle in the shell at frame 95. It runs downward from just below the port sheer strake, under the bottom, and up, almost to the starboard sheer strake. The bottom is further wrinkled between frames 80 and 81 and frames 111 and 113. There is also panel dishing of the bottom from frames 75 to 115. Part of the port and starboard bilge keels are missing. The starboard shaft fairwater is separated from the hull. There is considerable dishing of topside doors and light metal structures and distortion of below decks metal joiner bulkheads. Ladder pins are sheared and handrails are broken. Platforms in the after machinery space in way of frames 94-95, port and starboard, are badly wrinkled. Centerline stanchions at frames 78 and 101 in the machinery spaces, show compression stress patterns. Several bulkheads are wrinkled and watertight doors are sprung.

SECRET

USS GASCONADE (APA85)

## MACHINERY

The outer casings of both stacks were moderately dished in.

## ELECTRICAL

There was no structural damage noted which affected electrical equipment.

(c) Other damage.

## HULL

The structural damage to the shell could have affected the operability of the main machinery if misalignment of the shafts or movement of the machinery have resulted.

## MACHINERY

Machinery on the lower level of the after engine-room was damaged by flooding. There is a large amount of other damage. Boiler brickwork was moderately damaged. Foundation bolts were loosened on a number of units, including #1 main turbine, forward ship's service generator, all main and auxiliary condensers. Cracked paint around foundations indicates momentary displacement of a number of units. The foundation of the motors for the refrigerating compressor and the starboard jacking gear failed so that the motors are no longer connected to these units. The cast iron foundations of the machine shop lathes and milling machine broke; these units fell and were severely damaged. The steam connection to the forward auxiliary condenser broke. The hot water storage tank, hung from the overhead of the after engine room, broke away and fell, bending or rupturing all connected piping. There was other damage of a minor nature throughout the engineering plant.

It is believed that a great deal of damage, such as condenser leaks, rotating machinery out of alignment, etc., exists that could not be found by visual inspection.

SECRET

USS GASCONADE (APA85)

It is considered certain that if the machinery of this vessel had been in operation at the time of the test, very heavy damage would have occurred.

## ELECTRICAL

Principle electrical damage consisted of the following:

1. Holding down bolts for propulsion motors and generators were loosened.
2. All equipment located in the flooded areas was damaged by submersion in water and fuel oil.
3. The frame of the exciter for the #3 AC ship's service generator set was cracked. Holding down bolts for the DC ship's service generator sets were loosened.
4. Portable batteries were damaged by being thrown out of their racks.
5. Refrigeration motors and one jacking gear motor were torn from their mountings. Some galley equipment and machine tool motors and controllers were damaged. One cargo winch controller was damaged by water.
6. Approximately 20 percent of the lamps on the vessel were broken. Both 24 inch searchlights were damaged.
7. The master gyro compass, the standard magnetic compass at secondary control, and two gyro repeaters were damaged.
8. One rudder angle indicator and the wind intensity system were damaged.

## II. Forces Evidenced and Effects Noted.

(a) Heat.

HULL

None.

SECRET

USS GASCONADE (APA85)

MACHINERY

There was no evidence of heat.

ELECTRICAL

There was no evidence of heat.

(b) Fires and explosions.

HULL

None.

MACHINERY

There was no evidence of fires or explosions.

ELECTRICAL

There was no evidence of any fires or explosions.

(c) Shock.

HULL

There is considerable evidence of shock, such as, equipment thrown out of socket stowages, breakage of light bulbs, distortion of machinery foundations, and failure of piping.

MACHINERY

This vessel received a severe underwater shock. There are innumerable evidences of this shock; including cracked paint and loosened holding down bolts at foundations of machinery; broken piping; broken foundations of motors and machine shop equipment, disarranged boiler brickwork, loose gear thrown around, etc.. Whipping motion of the vessel, or the mass of water thrown on her, or both, are believed to have caused the dishing in of the outer casings of both stacks.

SECRET

USS GASCONADE (APA85)

## ELECTRICAL

There was evidence of underwater shock on this vessel. This shock is evidenced by the loosening of foundation bolts, the cracking and breaking of cast iron parts, broken lamps, battery disarrangement, and by the damage to the master gyro compass. It is also considered that the underwater shock contributed to the damage to the topside equipment.

(d) Pressure.

## HULL

Blast or water pressure is evidenced by displacement of hatch and pontoon covers from both cargo hatches, dished superstructure doors and access trunks, and slight displacement of the upper deck. The upper deck displacement caused buckling of light bulkheads below.

## MACHINERY

There was no evidence of pressure.

## ELECTRICAL

There was evidence of both air blast and water pressure on this vessel. It is considered that the combination of these two forces were the cause of most of the damage to electrical equipment located topside in exposed locations.

(e) Effects apparently peculiar to the atom bomb.

## HULL

Only effects noted peculiar to the atom bomb are radioactivity and wave phenomena.

## MACHINERY

An underwater shock of this magnitude is apparently peculiar to the atom bomb.

SECRET

USS GASCONADE (APA85)

## ELECTRICAL

Radioactivity was the only effect noted that is considered peculiar to the atom bomb.

### III. Effects of Damage.

#### (a) Effect on machinery, electrical, and ship control.

##### HULL

Flooding seriously affected propulsion.

##### MACHINERY

The effects of the damage on machinery are difficult to assess because of the limited nature of the inspection. It was not practicable to test any machinery except the anchor windlass, as no power was available on the ship. Machinery could not be opened for interior inspection, and a few units could not be inspected at all as time for inspection was limited by radiological hazard. Leads left in bearings of one main turbine and one ship's service generator were not removed for this reason.

Effects of visible damage are as follows:

The after engine room is inoperable because of flooding but this could have been controlled if the crew had been aboard. Otherwise, both boilers could be steamed at full power for some time, but minor repairs (requiring 4 to 8 hours) to brickwork would be required for extended operations. The forward ship's service generator (for deck equipment), refrigeration plant, and a few unimportant auxiliaries are inoperable but could be made operable within 8 hours. Machine shop equipment is believed to be beyond repair.

The above estimate should be received with great caution. The magnitude of the shock received by the vessel, and the damage done to machinery on other vessels (FALLON, HUGHES, LST-133), only slightly closer to the explosion, are believed to warrant the

SECRET

USS GASCONADE (APA85)

conclusions that a great deal of damage exists that could not be discovered by the limited inspection made. It is considered certain that, if the machinery had been in operation at the time of the test, severe damage would have been done to rotating machinery and the vessel would have been completely immobilized.

#### ELECTRICAL

The bomb explosion and subsequent flooding seriously damaged the ship's control and electrical equipment. It is believed that the flooding could have been controlled and much flooding damage eliminated if there had been a crew aboard the vessel or if the vessel could have been reboarded within a few hours after the explosion. The electric propulsion and ship's service plants would probably have been temporarily put out of service if the ship had been steaming at the time of the explosion. It is considered that the electric plant could have been put into operation within a few minutes so that the ship could have steamed and electric power would be available provided there were not too many serious casualties to key engineering personnel.

(b) Effect on gunnery and fire control.

#### HULL

No comment.

#### MACHINERY

No comment.

#### ELECTRICAL

Fire control circuits used in conjunction with the gyro compass were put out of commission due to the damage to the gyro. A major overhaul of the gyro compass would be required to make it operable.

SECRET

USS GASCONADE (APA85)

(c) Effect on water-tight integrity and stability.

HULL

The effect, in general, on water-tight integrity was negligible since both sources of flooding could have been corrected by ship's force. The effect on stability of the flooding of the after machinery space and shaft alleys is considered to be negligible.

MACHINERY

No comment.

ELECTRICAL

Water-tight integrity and stability were not affected by failure of electric equipment. No progressive flooding occurred along cables and no electric equipment shifted on its foundation sufficiently to affect stability.

(d) Effect on personnel and habitability.

HULL

Aside from the effects of radioactivity, it is considered that personnel and habitability would have been affected as the result of shock, roll, high waves, possible blast effect, and displacement of gear.

MACHINERY

It is believed that all personnel below deck would have been dazed by the shock and that a considerable number of them would have been killed or injured. Personnel topside would probably have had a high percentage of casualties. Habitability was destroyed by high radioactivity, and was otherwise reduced by loss of power, damage to galley equipment, and general disarrangement of the ship.

SECRET

USS GASCONADE (APA85)

## ELECTRICAL

The personnel on this vessel would have been affected by the radioactivity. The extent of the casualties and the time elapsed before these casualties would have rendered personnel incapable of performing their duties should be ascertained from the medical reports of the test. It is considered that exposed personnel would have suffered serious casualties due to the wave action and air blast. It is also considered that personnel inside the vessel would have suffered casualties due to displacement of gear and due to the underwater shock. Habitability was affected due to radioactivity and from the electrical standpoint, by the damage to galley equipment and refrigeration plant.

(e) Total effect on fighting efficiency.

## HULL

Although the buoyancy, stability, and watertight integrity of this ship were not appreciably affected, the seaworthiness of the ship was greatly affected by a reduction of longitudinal strength. The change in hull alignment might have caused some loss in usability of machinery. The total effect would be a considerable loss in fighting efficiency approaching total loss.

## MACHINERY

It is estimated that if the vessel had been underway at the time of the test, damage to machinery would have completely immobilized her and required a major overhaul at a shipyard.

## ELECTRICAL

Electrically the fighting efficiency of the vessel would have been seriously affected temporarily since it is almost certain that power for both ship's service and propulsion equipment would have been interrupted. With the exception of the master gyro compass and searchlights, it is considered that the ship's force in a short time could have made sufficient repairs to operate the ship at only slightly reduced efficiency. This statement is based on the assumption that sufficient uninjured personnel of the ship's engineering crew would remain for repair and operation of the ship's electrical equipment.

SECRET

USS GASCONADE (APA85)

Page 13 of 77 Pages

IV. General Summary of Observers' Impressions and Conclusions.

HULL

Aside from radiological effects, this ship suffered severe, but not crippling, damage. Several days would have been required to clear up the interior sufficiently to permit satisfactory use. The hull strength was seriously reduced but was such that the ship could probably have been sailed to a repair base, providing no severe weather was encountered.

MACHINERY

The GASCONADE was at a range at which the most severe damage to vessels of her type began to diminish slightly.

ELECTRICAL

The ship received considerable damage as a result of the underwater atomic bomb explosion. It is believed, however, that with the exception of the searchlights and the master gyro compass, that electrical equipment of the latest navy shockproof design, properly mounted, would have received very minor if any damage as a result of this test.

V. Preliminary General or Specific Recommendations of Inspection Group.

HULL

More satisfactory means of closing cargo hatches should be developed. Light structures topside should be built in for protection. Furniture and equipment should be more firmly secured in place and shock mounted where necessary.

MACHINERY

A detailed study of the machinery of this vessel under favorable conditions would be very instructive. Such a study

SECRET

USS GASCONADE (APA85)

should include particularly alignment of rotating machinery and shafting, interiors of turbines and condensers, and tests of piping.

#### ELECTRICAL

It is recommended that consideration be given to the redesign of the 24-inch searchlights and the master gyro compass to give them resistance to shock and air blast comparable with that of other electrical equipment on the vessel.

It is recommended that consideration be given to more adequate stowage or securing of loose gear such as storage batteries, spare parts and floor plates.

SECRET

USS GASCONADE (APA85)

Page 15 of 71 Pages

# TECHNICAL INSPECTION REPORT

## SECTION I - HULL

### GENERAL SUMMARY OF HULL DAMAGE

#### I. Target Condition After Test.

##### (a) Flooding; drafts; list.

	Forward	Aft.	List.
Before Test	8' 9"	18' 4"	0°
After Test	9' 0"	19' 9"	2° Port

Flooding was confined to the port and starboard shaft alleys and the after machinery space. Flooding in the shaft alleys probably came through the stern tubes and from the after machinery space through the shaft glands. The after machinery space flooded to a depth of about 8 feet from a broken salt water cooling line to a spring bearing. It is considered that the ship's force could have controlled all flooding.

##### (b) Structural Damage.

The most significant damage is a wrinkle in the shell at frame 95. It runs downward from just below the port sheer strake under the bottom and up, almost to the starboard sheer strake. The bottom is further wrinkled between frames 80 and 81 and frames 111 and 113. There is also panel dishing of the bottom from frames 75 to 115. Part of the port and starboard bilge keels are missing. The starboard shaft fairwater is separated from the hull. There is considerable dishing of topside doors and light metal structures and distortion of below decks metal joiner bulkheads. Ladder pins are sheared and handrails are broken. Platforms in the after machinery space in way of frames 94-95, port and starboard, are badly wrinkled. Centerline stanchions at frames 76 and 101 in the machinery spaces show compression stress patterns. Several bulkheads are wrinkled and water-tight doors are sprung.

SECRET

USS GASCONADE (APA85)

- (c) Damage; machinery; electrical, ship control; fire control; gunnery; electronics.

The structural damage to the shell could have affected the operability of the main machinery if misalignment of the shafts or movement of the machinery had resulted.

II. Forces Evidenced and Effects Noted.

- (a) Heat.

None.

- (b) Fires and Explosions.

None.

- (c) Shock.

There is considerable evidence of shock, such as, equipment thrown out of socket stowages, breakage of light bulbs, distortion of machinery foundations and failure of piping.

- (d) Pressure.

Blast or water pressure is evidenced by displacement of hatch and pontoon covers from both cargo hatches, dished superstructure doors and access trunks and slight displacement of the upper deck. The upper deck displacement caused buckling of light bulkheads below.

- (e) Effects Apparently Peculiar to the Atomic Bomb.

Only effects noted peculiar to the Atomic Bomb are radioactivity and wave phenomena.

III. Effects of Damage.

- (a) Effect on machinery, electrical and ship control.

Flooding seriously affected propulsion.

SECRET

USS GASCONADE (APA85)

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on watertight integrity and stability.

The effect in general on watertight integrity was negligible since both sources of flooding could have been corrected by ship's force. The effect on stability of the flooding of the after machinery space and shaft alleys is considered to be negligible.

(d) Effect on personnel and habitability.

Aside from the effects of radioactivity, it is considered that personnel and habitability would have been affected as the result of shock, roll, high waves, possible blast effect and displacement of gear.

(e) Total effect on fighting efficiency.

Although the buoyancy, stability and watertight integrity of this ship was not appreciably affected, the seaworthiness of the ship was greatly affected by reduction of longitudinal strength. The change in hull alignment might have caused some loss in usability of machinery. The total effect would be considerable loss in fighting efficiency approaching total loss.

#### IV. General Summary of Observers Impressions and Conclusions.

Aside from radiological effects, this ship suffered severe, but not crippling damage. Several days would have been required to clear up the interior sufficiently to permit satisfactory use. The hull strength was seriously reduced but was such that the ship could probably have been sailed to a repair base, providing no severe weather was encountered.

#### V. Any Preliminary, General or Specific Recommendations.

More satisfactory means of closing cargo hatches should be developed. Light structures topside should be built in for protection. Furniture and equipment should be more firmly secured.

SECRET

USS GASCONADE (APA85)

in place and shock mounted where necessary.

VI. Instructions for Loading the Vessel Specified the Following:

ITEM	LOADING
Fuel Oil	95%
Diesel Oil	95%
Ammunition	100%
Potable and reserve feed water	100%
Salt water ballast	None

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 Director of Ships Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

SECRET

USS GASCONADE (APA85)

## DETAILED DESCRIPTION OF HULL DAMAGE

### A. General Description of Hull Damage.

#### (a) Overall condition of vessel.

The overall condition of the vessel is fair. The hull has suffered a major compression failure in the lower flange at frame 96. The exterior of the superstructure is dished and distorted on the port side. Equipment within the hull has been thrown about and most of the equipment is inoperable. General views of exterior damage are shown on pages 2 to 31 inclusive. See diagram, page 64.

#### (b) General areas of hull damage.

The major damage to the hull proper is concentrated at the shell plating buckle at frame 96. Superstructure dishing is general along the port side. Flooding damage has occurred in the after machinery space. Damage to equipment, furniture and joiner work is general throughout the ship.

#### (c) Apparent causes of damage in each area.

Damage to the hull proper indicates that an extreme hogging condition occurred during the test, probably due to the wave generated by the detonation. The topside damage is the result of the impact of water, air blast, or both. Extensive damage to furniture and equipment resulted from the violent motion of the vessel and underwater shock.

#### (d) Principal areas of flooding with sources.

Flooding is confined to the after machinery space and the shaft alleys. The after machinery space flooded slowly to a height of eight feet through a broken 1/2" salt water cooling line to a spring bearing. The shaft alleys flooded to a depth of four to five feet through the bulkhead shaft glands and the stern tubes.

SECRET

USS GASCONADE (APA85)

- (e) Residual strength, buoyancy and effect of general condition of hull on operability.

The longitudinal strength of the vessel is considerably reduced as the result of compression failure of the hull. Buoyancy is not seriously reduced. The reduction in strength and flooding of a machinery space and both shaft alleys would result in serious reduction in operability.

B. Superstructure.

- (a) Description of damage.

Masts, booms and rigging appear to be undamaged. Radio antennae have been blown down. Radar arrays are missing or damaged seriously. The port, forward cargo boom and the starboard, after cargo boom broke out of their retaining straps. (Photo 2175-1, page 32).

On the signal bridge level, a starboard deck locker is severely dished. The starboard flag bag is badly dished and torn from its connections. It is now hanging on the fire and aft railing of the signal bridge, inboard and aft of its original position. (Photo 1787-2, page 34). The forward stack is moderately distorted on the starboard after side and slightly distorted on the port side. A searchlight on the forward stack is damaged. (Photos 140-2 and 3, page 35 and 36). The after stack is severely distorted on the starboard side. (Photos 2184-11 and 140-4, pages 37 and 38). The ready service lockers at frame 84 are broken loose and moved to port. The compass at frame 90 is knocked down. On the navigating bridge, one gyro repeater is missing and the other is knocked out of the gimbals.

Ladder securing pins are sheared on a majority of exposed ladders. Hand rails are bent and broken. All doors on the starboard side of the superstructure between frames 60 and 108 are dished, some very slightly and others as much as an inch. The double doors to the wardroom on the upper deck at frame 75 are severely dished. The deckhouse plating on the starboard side above the superstructure deck

SECRET

USS GASCONADE (APA85)

is dished slightly in the vicinity of frame 95.

On the after deckhouse top, the whale boat secured to the starboard gage tower at about frame 145 has been demolished and has damaged the emergency steering station on the centerline. (Photo 4207-10, page 39 ). Light ventilation and sheet metal lockers are distorted. The sheathing under the starboard 20 MM gun tub is demolished. (Photo 4207-11, page 40). The ladder at the after end of the deckhouse, frame 147, is loose and the hand rail is bent. (Photo 4207-12, page 41). Damage to the port 20 MM gun tub at frame 135, occurred between tests A and B (Photo 501-49, page 8 ).

(b) Causes of damage in each area .

Damage to the superstructure may have been the result of air blast, solid water impact, or both.

(c) Evidences of fire in the superstructure.

There is no evidence of fire.

(d) Estimate of relative effectiveness against heat and blast.

It is not considered that there is sufficient evidence to make any estimates.

(e) Constructive criticism of superstructure design or construction.

No comment.

C. Guns and directors.

No comment.

D. Torpedo mounts and depth charge gear.

Not applicable.

SECRET

USS GASCONADE (APA85)

E. Weather Deck.

(a) General condition of deck and causes of damage.

In general, the weather deck is undamaged. Pages 67 and 68 contain data recorded by deflection scratch gages installed under the upper deck.

(b) Usability of deck in damaged condition.

The usability of the deck is unimpaired.

(c) Condition of equipment and fittings.

The anchor winch has moved slightly as a result of shock. This is evidenced by the cracking of paint around the base of the winch. The same evidence of slight movement is apparent on all four cargo winches at frame 40 and on the two winches at frame 57. Expanded metal screens in the locker at frame 53 are torn and distorted. Hand rails on the weather deck passageways, port and starboard, are bent. The accommodation ladder is out of its cradle and is hanging from the davit. (Photo 2184-7, page 42).

The airplane stowed for the test on the starboard side of the upper deck abreast of the after cargo hatch, has been demolished by the impact of water and violent wave action. (Photo 2184-9, page 43 ). Aft of the after deckhouse at frame 150, port and starboard, two ready service lockers facing aft have their doors badly dished. The lockers are bodily moved forward. (Photos 1787-3 and 2185-1, pages 44 and 45 ).

F. Exterior Hull.

(a) Condition of exterior hull plating and causes of damage.

Exterior hull damage appears to be confined to the vicinity of frame 96. In this area, a sharp buckle in the shell plating begins somewhat below the sheer strake on both the port and starboard sides

SECRET

USS GASCONADE (APA85)

and extends below the waterline. (Photos 1712-7, 2182-12, 2184-2,4 and 8, pages 46 to 50 ). The inspection of the interior below the waterline indicated that the buckle extends entirely around the bottom of the vessel. The damage is a compressive failure as the result of extreme hogging under wave action.

(b) Condition of exterior hull fittings and causes of damage.

Hull fittings are generally intact. The port boat boom at frame 60 has been unshipped from its cradle and swung aft along the hull. (Photo 1709-3, page 51 ).

(c) Details of any impairment of sheer strakes.

No apparent damage.

(d) Condition of side armor belt.

Not applicable.

G and I. Interior Compartments.

(a) Damage to structure and causes.

Structural damage on the interior is confined to the midships portion of the ship in the engineering spaces. In the forward machinery space, there are evidences of shock and movement of the bottom of the vessel which resulted in damage to machinery foundations (Photos 2183-5 and 2977-3, pages 52 and 53 ), and caused stress lines in the paint on the main deck pillars at frame 76. (Photo 2813-6, page 54 ). The starboard side and the first platform plating, port and starboard, are buckled in way of the shell failure. (Photo 2183-8, page 57 ). The starboard pillar at frame 101 shows stress patterns in web and flanges. Bulkhead 56 is slightly buckled at the main deck level, starboard. (Photo 143-11, page 58). Six scratch gages were installed in the after machinery space to record the movement between the port and starboard shells and between the main deck and inner bottom. The data recorded is in Appendix.

SECRET

USS GASCONADE (APA85)

(b) Damage to joiner bulkheads and causes.

There is no apparent damage forward of No. 1 hold. In the hold area, upper deck hatch pontoons are dislodged and bent. Some are lying on the port side of the main deck. (Photo 140-1, page 59 ). Some have fallen to the first platform and several are lying in the hold. Two main deck pontoons in the after cargo space have been displaced. One pontoon at the first platform has fallen into the hold. A longitudinal restraining I-beam installed over the first platform pontoons has failed in way of the missing pontoon. (Photo 140-1, page 59). On the main deck, the outboard bulkhead of the port passageway, abreast the cargo hatch, is badly buckled inboard. (Photo 140-7, page 60). Many of the upper deck hatch pontoons in No. 2 hold are dislodged, bent, and lying on the main deck. (Photos 4207-6 and 7, pages 62 and 61 ). Joiner bulkheads in this area are demolished. ( Photo 4207-8, page 63). Expanded metal bulkheads on the main deck, port and starboard, between the two cargo hatches are lightly buckled. Aft of No. 2 hold, a joiner bulkhead at frame 133 on the second platform is buckled aft. (Photo 2184-1, page 64 ).

(c) Details of damage to access closures and fittings.

Most doors and hatches below the weather deck are intact. The watertight door at the forward end of the starboard main deck weather passageway, frame 59, is pushed forward, distorting the door frame. (Photo 143-12, page 65 ). The door is not operable. The quick acting door at frame 73, starboard, leading to the forward machinery space, is torn from the lower hinge. (Photo 2183-7, page 66).

(d) Condition of equipment within compartments.

The equipment and furniture in all compartments is badly displaced. Bunks and lockers in living spaces are dislodged, blocking passageways and access openings. Heavy machinery on machinery spaces platforms is broken loose, displaced, or has damaged foundations. A milling machine in the after machinery space on the workshop level is moved about five feet. (Photos 2183-4 and 2183-10, pages 67 and 68). The support frames of a lathe bed are collapsed. In the storerooms, stores have been thrown on deck. A large amount of the equipment in galleys and bakery is damaged by shock. (Photo 142-12, page 69 ). The airplane stowed in the after hold is severely damaged. (Photos 2174-8 and 9, pages

SECRET

USS GASCONADE (APA85)

70 and 71 ).

(e) Fire and flooding.

There were no fires. The only flooding is in the after machinery space and shaft alleys. The sources of this flooding are a broken salt water cooling line to the shaft spring bearing and the stern tubes.

(f) Damage in way of piping, cables, ventilation ducts, etc.

A salt water cooling line in the after machinery space fractured and caused the flooding in this space.

(g) Estimate of reduction of watertight subdivision, habitability and utility of compartments.

There is no apparent reduction of watertight subdivision. The utility and habitability of most spaces is impaired only by the disarrangement of equipment and fittings. Several days would be required to restore complete services. Flooding damage has rendered electrical equipment on the lower levels of the after machinery space inoperable.

H. Armor Decks.

Not applicable.

J. Underwater Hull.

(a) Interior inspection of underwater hull.

An interior inspection of the hull indicates that the only damage is in way of frame 96. It is described in Items F and G. An underwater inspection indicates that the bottom is dished between frames 111 and 113.

(b) Effect of damage on buoyancy, operability and maneuverability.

There is no effect on buoyancy and maneuverability. Oper-

SECRET

USS GASCONADE (APA85)

ability is limited by the reduction in strength. It is considered that the vessel is able to reach port under ordinary sea conditions but continued operation is not advisable until hull repairs are effected.

(c) Any known or suspected damage to:

1. Shafts and propellers.

An underwater inspection indicates that the starboard fairwater is separated from the hull.

2. Struts.

None.

3. Rudders.

None.

4. External keels.

An underwater inspection indicates that parts of the port and starboard bilge keels are missing.

(d) Details of impairment of keel structure.

Inspection was not possible but it is believed that the keel structure has suffered a compression failure between frames 95 and 96.

K. Tanks.

(a) Condition of tanks in areas of damage.

Tanks were not inspected but some damage is probable in the vicinity of frame 96.

SECRET

USS GASCONADE (APA85)

(b) Contamination of liquids.

Unknown.

(c) Damage to torpedo defense systems.

Not applicable.

L. Flooding.

(a) Description of major flooding areas.

The after machinery space is flooded to an estimated depth of eight or nine feet. Both port and starboard shaft alleys are flooded to a depth of about five feet. The auxiliary machinery space and the forward machinery space have six and four inches of water on the b'ges respectively, which is normal seepage.

(b) Sources of flooding.

The after machinery space flooded principally through a broken 1/2" shaft bearing salt water cooling line. (photo 2978-8, page 72 ), and slightly through leaky inner bottom tanks. The shaft alleys flooded gradually over a two week period through the stern tubes and through shaft bulkhead glands from the after machinery space.

(c) List of compartments believed to have flooded slowly so as to be susceptible to damage control.

All flooded compartments are believed to have flooded slowly. It is believed that all flooding could have been controlled.

M. Ventilation.

No noteworthy change.

SECRET

USS GASCONADE (APA85)

N. Ship Control.

(a) Damage to ship control stations and causes.

Damage is very minor and consists of damage to the standard compass, two gyro repeaters and the emergency steering station. (Photo 4207-10, Page 39 ).

(b) Constructive criticism of ship control systems.

No comment.

O. Fire Control.

No comment.

P. Ammunition Behavior.

No comment.

Q. Ammunition Handling.

No damage.

R. Strength.

(a) Permanent hog or sag.

The ship has suffered a major compression failure in the lower flange of the hull girder. This indicates that the vessel underwent a severe hogging condition during Test B. There is some evidence that the vessel is slightly hogged at present. It appears that the hogging condition was due to the action of a very large wave generated by the bomb detonation. The buckling of the hull does not extend above the main deck. The longitudinal strength of the vessel has been reduced to approximately 75 per cent of intact value at frame 96.

(b) Shear strains in hull plating.

There is no evidence of shear strains in the hull plating.

SECRET

USS GASCONADE (APA85)

- (c) Evidence of transverse or racking strains.

There is no evidence of transverse or racking strains.

- (d) Details of any local failures in way of structural discontinuities.

None observed.

- (e) Evidence of panel deflection under blast.

There is no observable deflections in the hull plating. Stress lines in machinery space pillars indicate that the bottom of the vessel has moved up somewhat. Some of the strains in the pillars may be due to longitudinal bending. Buckled joiner bulkheads under the upper deck indicate a deflection in this member but no permanent deformation can be observed.

- (f) Turret, machinery and gun foundations.

Machinery foundations show effects of underwater shock. Paint is cracked on deck winch foundations. Main and auxiliary machinery foundations show strains and failures. (Photos 2183-5 and 2977-3, pages 52 and 53 ). Gun foundations are apparently intact.

- S. Miscellaneous.

No comment.

SECRET

USS GASCONADE (APA85)

# TECHNICAL INSPECTION REPORT

## SECTION II - MACHINERY

### GENERAL SUMMARY OF MACHINERY DAMAGE

#### I. Target Condition After Test.

##### (a) Drafts after test; list; general areas of flooding, sources.

The after engine room was flooded to an average depth of about 6 feet. Water entered through a broken salt water cooling line to a spring bearing. The overboard valve for this line had been inadvertently left open. This flooding could have been controlled if the crew had been aboard. There is no evidence of leakage through shaft glands.

##### (b) Structural damage.

The outer casings of both stacks were moderately dished in.

##### (c) Other damage.

Machinery on the lower level of the after engineroom was damaged by flooding. There is a large amount of other damage. Boiler brickwork was moderately damaged. Foundation bolts were loosened on a number of units, including #1 main turbine, forward ship's service generator, all main and auxiliary condensers. Cracked paint around foundations indicates momentary displacement of a number of units. The foundation of the motors for the refrigerating compressor and the starboard jacking gear failed so that the motors are no longer connected to these units. The cast iron foundations of the machine shop lathes and milling machine broke; these units fell and were severely damaged. The steam connection to the forward auxiliary condenser broke. The hot water storage tank, hung from the overhead of the after engineroom, broke away and fell, bending or rupturing all connected piping. There was other damage of a minor nature throughout the engineering plant.

SECRET

U.S.S. GASCONADE (APA85)

It is believed that a great deal of damage, such as condenser leaks, rotating machinery out of alignment, etc., exists that could not be found by visual inspection.

It is considered certain that if the machinery of this vessel had been in operation at the time of the test, very heavy damage would have occurred.

## II. Forces Evidenced and Effects Noted.

### (a) Heat.

There was no evidence of heat.

### (b) Fires and explosions.

There was no evidence of fires or explosions.

### (c) Shock.

This vessel received an underwater shock of high magnitude. There are innumerable evidences of this shock; including cracked paint and loosened holding down bolts at foundations of machinery; broken piping; broken foundations of motors and machine shop equipment, disarranged boiler brickwork, loose gear thrown around, etc. Whipping motion of the vessel, or the mass of water thrown on her, or both, are believed to have caused the dishing in of the outer casings of both stacks.

### (d) Pressure.

There was no evidence of pressure.

### (e) Any effects apparently peculiar to the atom bomb.

An underwater shock of this magnitude is apparently peculiar to the atom bomb.

SECRET

U.S.S. GASCONADE (APA85)

### III. Effects of Damage.

#### (a) Effect on machinery and ship control.

The effects of the damage on machinery are difficult to assess because of the limited nature of the inspection. It was not practicable to test any machinery except the anchor windlass, as no power was available on the ship. Machinery could not be opened for interior inspection, and a few units could not be inspected at all as time for inspection was limited by radiological hazard. Leads left in bearings of one main turbine and one ship's service generator were not removed for this reason.

Effects of visible damage are as follows:

The after engine room is inoperable because of flooding but this could have been controlled if the crew had been aboard. Otherwise, both boilers could be steamed at full power for some time but minor repairs (requiring 4 to 8 hours) to brickwork would be required for extended operations. The forward ship's service generator, forward 180 kw. D.C. generator (for deck equipment), refrigeration plant, and a few unimportant auxiliaries are inoperable but could be made operable within 8 hours. Machine shop equipment is believed to be beyond repair.

The above estimate should be received with great caution. The magnitude of the shock received by the vessel, and the damage done to machinery on other vessels (Fallon, Hughes, LST-133), only slightly closer to the explosion, are believed to warrant the conclusion that a great deal of damage exists that could not be discovered by the limited inspection made. It is considered certain that, if the machinery had been in operation at the time of the test, severe damage would have been done to rotating machinery and the vessel would have been completely immobilized.

SECRET

USS GASCONADE (APA85)

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on watertight integrity and stability.

No comment.

(d) Effect on personnel and habitability.

It is believed that all personnel below deck would have been dazed by the shock and that a considerable number of them would have been killed or injured. Personnel topside would probably have had a high percentage of casualties. Habitability was destroyed by high radioactivity, and was otherwise reduced by loss of power, damage to galley equipment, and general disarrangement of the ship.

(e) Total effect on fighting efficiency.

It is estimated that if the vessel had been underway at the time of the test, damage to machinery would have completely immobilized her and required a major overhaul at a shipyard.

IV. General Summary of Observers' Impressions and Conclusions.

The Gasconade was at a range at which the most severe damage to vessels of her type began to diminish slightly.

V. Preliminary Recommendations.

A detailed study of the machinery of this vessel under favorable conditions would be very instructive. Such a study should include particularly alignment of rotating machinery and shafting, interiors of turbines and condensers, and tests of piping.

SECRET

U.S.S. GASCONADE (APA85)

## DETAILED DESCRIPTION OF MACHINERY DAMAGE

### A. General Description of Machinery Damage.

#### (a) Overall condition.

The after engine room was flooded to an average depth of about 6 feet. This could have been controlled if the crew had been aboard. Boiler brickwork was moderately damaged. Foundation bolts of a number of units were loosened and cracked paint around foundations indicates considerable momentary displacement of machinery. The refrigeration compressors and starboard jacking gear motor foundations failed, so that the motors are no longer connected to these components. Machine shop equipment was heavily damaged because of foundation failures. There is moderate damage to piping. Otherwise, the machinery does not appear to be damaged from visual inspection. There are sufficient evidences of shock to warrant the belief that there is additional damage that could not be discovered by the limited inspection possible under the circumstances.

#### (b) Areas of major damage.

The after engine room received major damage from flooding, which could have been controlled if the crew had been aboard. No other major damage could be found by visual inspection except to the machine shop lathes. Minor visible damage exists throughout the machinery plant. It is believed that a considerable amount of major damage exists that could not be found by this type of inspection.

#### (c) Primary causes of damage.

Shock caused all damage except that caused by flooding. The flooding was caused primarily by shock which broke a salt water line from which the after engine room was flooded.

#### (d) Effect of target test on overall operation of machinery plant.

The effect of the visible damage on the machinery is relatively slight. The boilers could continue steaming for some time

SECRET

U.S.S. GASCONADE (APA85)

but minor repairs (requiring 4 to 8 hours) to brickwork would be required for extended steaming. The forward ship's service generator and forward auxiliary (100 kw DC) generator (which furnishes power for deck equipment) are inoperable because of a broken steam connection to the air ejector of the forward auxiliary condenser. The refrigeration plant and starboard jacking gear are inoperable because of failures of motor foundations. Both machine shop lathes are probably beyond repair. The fresh water distribution system is largely out of commission. The after engine room is inoperable because of flooding which could have been controlled if the crew had been aboard.

If no damage other than that found by visual inspection occurred, and assuming that the flooding were controlled, (it could be stopped by merely closing one valve) the ship would have been temporarily immobilized but could have been gotten underway again at nearly full speed within a few hours. However, it is believed that much additional damage exists. It is considered certain that a shock of this magnitude would have caused severe damage to rotating machinery in operation and that the ship would have been immobilized if she had been underway during the test.

#### B. Boilers.

The after boiler and its appurtenances were not closely inspected as they were covered with fuel oil. No damage was discernable upon superficial visual inspection. The forward boiler was not damaged sufficiently to prevent continued operation for a limited period. Minor repairs to brickwork would have been required for extended operations.

(a) Air casings.

No damage apparent.

(b) External fittings.

No damage apparent.

SECRET

U.S.S. GASCONADE (APA85)

(c) Fuel oil burner assemblies.

No damage apparent.

(d) Brickwork and furnaces.

No. 1 boiler: The underwater shock caused the spalled faces of bricks and slag on the front and rear walls to fall to the furnace floor. These walls had apparently seen considerable service and the material which fell had been loosened by natural spalling of the brickwork and would have eventually fallen under ordinary conditions. The front and rear walls were slightly cracked. The plastic firebrick had been knocked out from around the peep hole in the rear wall. The top course of brick in the furnace floor was disarranged and the bricks scattered. (Photograph 2977-1, page 73 and 2977-2, page 74).

The condition of the brickwork would not have impaired operation of the boilers immediately but replacement of the plastic around the peep hole and relaying the top course of brick on the furnace floor would be required for extended operations. This would require about 4 hours work by the ship's force.

No. 2 boiler: Conditions in the after machinery space did not permit examination of the brickwork in #2 boiler. It is believed that damage to the brickwork was similar to that in #1 boiler and that ~~steaming~~ steaming could have continued for some time but eventually the boiler would have had to be secured for repairs to the brickwork.

(e) Steam and water drums and headers.

No apparent damage.

(f) Tubes.

No apparent damage.

(g) Foundations.

The foundations showed no evidence of damage.

SECRET

U.S.S. GASCONADE (APA85)

(h) Stacks and uptakes.

The outer casing of both stacks were moderately dented, but not enough to affect operation. (Photographs 140-2, page 35 and 140-4, page 38).

Note: It was not possible to make any hydrostatic tests of these boilers after test B.

C. Blowers.

The blowers were examined and found to be apparently undamaged. They were turned freely by hand.

D. Fuel Oil Equipment.

This equipment was apparently undamaged insofar as could be determined by visual inspection.

E. Boiler Feedwater Equipment.

Both deaerating feed tanks showed evidence of shock, their holding down bolts being stretched loose. There was no indication of damage from external inspection.

There was no other damage to boiler feedwater equipment that could be discovered by visual inspection.

F. Main Engines.

Two foundation bolts on #1 main turbine were loose. (Photograph 141-10, page 75).

On the starboard jacking gear, the gear housing, which is a spacer between the main jacking gear and the motor and is bolted to their casings, broke. This allowed the motor to fall down, carrying with it the pinion which is on the motor shaft, (photographs 141-6, page 76 and 141-7, page 77). The jacking gear is attached to the main shaft in the auxiliary machinery room.

SECRET

U.S.S. GASCONADE (APA85)

No other damage to the main engines could be found by visual inspection. However, in view of the shock the vessel received and damage to other vessels only slightly closer to the explosion (Fallon, Hughes, LST-133), the main turbines are believed to be out of alignment. It is considered certain that they would have been severely damaged if they had been in operation at the time of the test.

G. Reduction Gears.

Not applicable.

H. Shafting and Bearings.

The salt water cooling line to the forward spring bearing broke. (Photograph 2978-8, page 72). Water entering through this line flooded the after engine room. This flooding could have been controlled if the crew had been aboard.

No other damage to shafting or bearings was found by visual inspection. However, in view of the shock received by the vessel, it is considered probable that they are out of alignment.

I. Lubrication System.

The lubrication system was apparently undamaged insofar as could be determined from visual inspection. No test of the system could be made.

J. Condensers and Air Ejectors.

The forward auxiliary condenser had all its holding down bolts stretched but not torn loose. The structural foundations had buckled (photograph 2977-3, page 53). No sagging of the condenser was discernable by visual inspection. The holding down bolts of both main and auxiliary air ejectors were stretched.

Insofar as could be determined by visual inspection, operability of none of these condensers was affected, but there are probably internal leaks, especially in tubes.

SECRET

U.S.S. GASCONADE (APA85)

The steam connection to the forward auxiliary air ejector was broken off. (Photograph 2978-7, page 78). This made the forward ship's service generator and forward 100kw D.C. generator (which furnishes power for operating deck equipment) inoperable. It is estimated that repairs could have been made by the ship's force in about 3 hours.

#### K. Pumps.

All pumps in the after engine room were made inoperable by flooding of their electric motors. This flooding could have been controlled if the crew had been aboard.

No other damage to pumps could be found by visual inspection. However, none of them were operated or turned by hand. It is considered highly probable that some of them are out of alignment, especially in the forward end of the after engine room. There was a fairly deep wrinkle in the hull plating at this point indicating a heavy jar to machinery in this vicinity at the time the shock occurred.

#### L. Auxiliary Generators.

The cast iron saddles of the lube oil coolers on all ship's service generators were broken (photograph 2978-6, page 79). All ships service generators showed evidence of momentary displacement (cracked paint around foundations). Holding down bolts were stretched on all these generators. These deformations did not appear to be sufficient to impair operation. However, the momentary displacement might have been sufficient to cause damage if the generators had been in operation.

Leads left in one bearing of #2 ship's service generator could not be removed, thus there is no definite measure of the movement of the rotors.

The forward ship's service generator and forward 100kw D.C. generator are inoperable because of a broken steam connection to the air ejector of the auxiliary condenser serving these generators. (See "J" above).

SECRET

U.S.S. GASCONADE (APA85)

M. Propellers.

Not inspected.

N. Distilling Plant.

A tubular sight glass on the water measuring tank was broken. The pointers of all gages were disarranged.

There is no other damage to the distilling plant apparent from visual inspection. However, no test could be made and internal damage (particularly tube leaks) may exist.

O. Refrigerating Plant.

The plant is inoperable because of failure of motor foundations. The motors were mounted on adjustable plates which can be moved along the bedplates in order to adjust tension of the V-belts. These plates sheared, allowing the motors to fall away from the bedplates and the V-belts to slip off. (Photographs 141-8, page 80, 141-9, page 81, and 2978-1, page 82).

No other damage to the refrigeration plant could be found by visual inspection.

P. Winches, Windlasses, and Capstans.

All deck machinery appears to be undamaged. There are signs of strain (cracked paint) at the foundation bolts of the anchor windlass but all bolts are tight. The anchor windlass was operated after test B by power from a tub alongside. It functioned normally.

Q. Steering Engine.

The steering engine appears to be undamaged, insofar as can be determined by visual inspection.

SECRET

U.S.S. GASCONADE (APA85)

R. Elevators, Ammunition Hoists, Etc.

Not inspected.

S. Ventilation (Machinery).

The ventilation machinery appears to be undamaged insofar as can be determined by visual inspection.

T. Air Compressors.

The air compressor was inspected and appears to be undamaged.

U. Diesels.

The emergency diesel generator is apparently undamaged. The engine was turned over by its starter after test B and functioned normally. It was not tested on fuel.

The diesel fire pump appears to be undamaged.

No boats were aboard during test B.

V. Piping.

All piping systems were inspected and appear to be undamaged except as noted below. None of them were tested.

(a) Main steam.

One spring hanger rod failed in tension above the spring assembly as a result of shock. This hanger was of the common spring (not gene spring) type. (Photographs 2978-3, page 83).

(b) Salt water.

The 1/2 inch cooling water line to the after main shaft spring bearing broke off as a result of shock. Failure of this line

SECRET

U.S.S. GASCONADE (APA85)

caused flooding of the after engine room to a level of about 7 feet. This was possible since the cut-out valve at the main injection line in the forward engine room was inadvertently left open during test B. Photograph 1978-8, page 72, shows this damage.

(c) Fresh water piping.

The fresh water compression tank in the forward engine room was torn from its foundation and attached piping was crushed and bent. This tank was suspended from a bracket foundation and was fastened with ten 1/2 inch bolts, all of which failed in single shear. The following photographs show this damage: 2977-5, page 84, forward end of hot water heater showing bent piping; 2977-7, page 85, aft mounting bracket failure; 2977-8, page 86, underbody of heater, pipe and pump damage; 2977-9, page 87, forward end of heater broken lines to steam coil; 2977-11, page 88, general view taken from forward.

The hot water heater and storage tank was hung from the overhead in the after engine room. As a result of shock, all of the supporting bolts holding the heater to its mounting hangers were sheared and the tank fell, bending or rupturing the water connections to and from the tank and the steam connecting piping to the steam coil. This damage is shown on photographs 2977-5, page 84, 2977-9, page 87, and 2977-11, page 88.

(d) Auxiliary steam.

Two screwed joints were pulled apart as a result of shock in the steam connection to the auxiliary air ejector in the after engine room. (Photograph 2977-7, page 85, shows this damage). This made the forward auxiliary condenser and two generators served by it inoperable. (See J and L above).

(e) Fire main

The brass valve stem of a 1/2 inch drain valve in the forward machinery space just below the overhead was broken off directly below the attached operating rod. It is believed that the

SECRET

U.S.S. GASCONADE (APA85)

comparatively heavy operating gear for such a light valve vibrated excessively as a result of shock and caused the failure. This did not affect the operability of the fire main in any way.

W. Miscellaneous.

(a) Messing machinery.

Galley range tops were thrown around and broken. (Photographs 2978-9, page 89, 141-1, page 90, 142-11, page 91, and 142-12, page 69).

(b) Laundry equipment.

Apparently undamaged.

(c) CO2 stowage.

A number of securing brackets were loosened allowing several of the bottles to come adrift. (Photograph 2978-2, page 92).

(d) Machine shop equipment.

The cast iron lathe and milling machines were heavily damaged, probably beyond repair, as a result of shock. They were torn from their foundations and broke in several places. (Photographs 2978-4, page 93, 2978-5, page 94, 2992-9, page 95, 2992-10, page 96, 2992-11, page 97, 2992-12, page 98, and 2182-9, page 99.)

SECRET

U.S.S. CASCONADE (APA85)

Page 44 of 77 Pages

TECHNICAL INSPECTION REPORT

SECTION III - ELECTRICAL

GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

The drafts and list were not observed. The after machinery space and both shaft alleys were flooded to a depth of approximately 10 feet. The flooding was not the result of any electrical failures.

(b) Structural damage.

There was no structural damage noted which affected electrical equipment.

(c) Other damage.

Principle electrical damage consisted of the following:

1. Holding down bolts for propulsion motors and generators were loosened.
2. All equipment located in the flooded areas was damaged by submersion in water and fuel oil.
3. The frame of the exciter for the #3 AC ship's service generator set was cracked. Holding down bolts for the DC ship's service generator sets were loosened.
4. Portable batteries were damaged by being thrown out of their racks.

SECRET

USS GASCONADE (APA85)

Page 45 of 77 Pages

5. Refrigeration motors and one jacking gear motor were torn from their mountings. Some galley equipment and machine tool motors and controllers were damaged. One cargo winch controller was damaged by water.

6. Approximately 20% of the lamps on the vessel were broken. Both 24" searchlights were damaged.

7. The master gyro compass, the standard magnetic compass at secondary control, and two gyro repeaters were damaged.

8. One rudder angle indicator and the wind intensity system were damaged.

## II. Forces Evidenced and Effects Noted.

### (a) Heat.

There was no evidence of heat.

### (b) Fire and Explosions.

There was no evidence of any fires or explosions.

### (c) Shock.

There was evidence of underwater shock on this vessel. This shock is evidenced by the loosening of foundation bolts, the cracking and breaking of cast iron parts, broken lamps, battery disarrangement, and by the damage to the master gyro compass. It is also considered that the underwater shock contributed to the damage to the topside equipment.

### (d) Pressure.

There was evidence of both air blast and water pressure on this vessel. It is considered that the combination of these two forces were the cause of most of the damage to electrical equipment located topside in exposed locations.

SECRET

USS GASCONADE (APA85)

- (e) Any effects apparently peculiar to the atom bomb.

Radioactivity was the only effect noted that is considered peculiar to the atom bomb.

### III. Effects of Damage.

- (a) Effect on propulsion and ship control.

The bomb explosion and subsequent flooding seriously damaged the ship's control and electrical equipment. It is believed that the flooding could have been controlled and much flooding damage eliminated if there had been a crew aboard the vessel or if the vessel could have been reboarded within a few hours after the explosion. The electric propulsion and ship's service plants would probably have been temporarily put out of service if the ship had been steaming at the time of the explosion. It is considered that the electric plant could have been put into operation within a few minutes so that the ship could have steamed and electric power would be available provided there were not too many serious casualties to key engineering personnel.

- (b) Effect on gunnery and fire control.

Fire control circuits used in conjunction with the gyro compass were put out of commission due to the damage to the gyro. A major overhaul of the gyro compass would be required to make it operable.

- (c) Effect on water-tight integrity and stability.

Water-tight integrity and stability were not affected by failure of electric equipment. No progressive flooding occurred along cables and no electric equipment shifted on its foundation sufficiently to affect stability.

- (d) Effect on personnel and habitability.

The personnel on this vessel would have been affected by the radioactivity. The extent of the casualties and the time elapsed before these casualties would have rendered personnel incapable

SECRET

USS GASCONADE (APA85)

of performing their duties should be ascertained from the medical reports of the test. It is considered that exposed personnel would have suffered serious casualties due to the wave action and air blast. It is also considered that personnel inside the vessel would have suffered casualties due to displacement of gear and due to the underwater shock. Habitability was affected due to radioactivity and from the electrical standpoint, by the damage to galley equipment and refrigeration plant.

(e) Total effect on fighting efficiency.

Electrically the fighting efficiency of the vessel would have been seriously affected temporarily since it is almost certain that power for both ship's service and propulsion equipment would have been interrupted. With the exception of the master gyro compass and searchlights, it is considered that the ship's force in a short time could have made sufficient repairs to operate the ship at only slightly reduced efficiency. This statement is based on the assumption that sufficient uninjured personnel of the ship's engineering crew would remain for repair and operation of the ship's electrical equipment.

IV. General Summary of Observers' Impressions and Conclusions.

The ship received considerable damage as a result of the underwater atomic bomb explosion. It is believed, however, that with the exception of the searchlights and the master gyro compass, that electrical equipment of the latest navy shockproof design, properly mounted, would have received very minor if any damage as a result of this test.

V. Any Preliminary General or Specific Recommendations of the Inspecting Group.

(a) It is recommended that consideration be given to the redesign of the 24" searchlights and the master gyro compass to give them resistance to shock and air blast comparable with that of other electrical equipment on the vessel.

SECRET

USS GASCONADE (APA85)

(b) It is recommended that consideration be given to more adequate stowage or securing of loose gear such as storage batteries, spare parts and floor plates.

SECRET

USS GASCONADE (APA85)

Page 49 of 77 Pages

## DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

### A. General Description of Electrical Damage.

#### (a) Overall condition.

1. Ship's propulsion equipment was initially unaffected except for loosening of foundation bolts and dislodgment of arc chutes, both of which could be readily repaired by the ship's force. Subsequent flooding rendered all equipment in the after engine room, lower level, inoperative.

2. D.C. ship's service generators were unaffected except for loosening of foundation bolts from a vertical whip. These bolts could easily be tightened by the ship's force. The A.C. ship's service generator in the auxiliary machinery space should not be operated since its exciter frame is cracked.

3. Refrigeration plant was inoperable since both refrigeration motors were knocked from their bases. It is considered that emergency repairs could be made by ship's force before spoilage of food occurred.

4. Gyro compass was rendered inoperative due to shock, thereby reducing the ship's efficiency. This unit requires general overhaul not possible by ship's force.

5. Both 24 inch searchlights are inoperable and require considerable repair to be made operable.

6. Numerous lamps were broken throughout the ship.

#### (b) Areas of major damage.

The engine rooms, the I.C. room and exposed locations suffered the most damage.

SECRET

USS GASCONADE (APA85)

(c) Primary causes of damage in each area of major damage.

Underwater shock in all areas except exposed locations was the major cause of damage. In exposed areas, the cause of damage is considered to be a combination of underwater shock, air pressure, and wave action.

(d) Effect of target test on overall operation of electric plant.

1. The ship's service electric plant, with the exception of the turbo-generator in the auxiliary machinery space, is operable with minor repairs.

2. All auxiliary electrical equipment is operable except refrigeration motors, one jacking gear motor and all motors and controllers in the after engine room, lower level, which were submerged. Had ship's company been aboard, the flooding could have been controlled and the flooding damage prevented.

3. All electric propulsion equipment appeared operable with minor repairs except the port propulsion motor which had been submerged.

4. Communications were unaffected.

5. Fire control circuits were unaffected except those used in connection with the gyro compass.

6. Ventilation appeared to be unaffected electrically.

7. Numerous lamps were broken throughout the ship.

(e) Types of equipment most affected.

Rotating machinery was most affected.

SECRET

USS GASCONADE (APA85)

## B. Electric Propulsion Rotating Equipment.

The two propulsion generators, one located in each engine room on the upper level, displayed almost identical evidence of having been jarred by vertical shock transmitted through the foundations. Paint was cracked around the generator frame holding-down bolts and at joints between the cooler and generator frame. The vent ducts between the generator and cooler appeared to have flexed or vibrated for paint had cracked at joints. However, all holding-down bolts and those securing the cooler and ducts in place were tight and were not visibly distorted. There was evidence of appreciable rust at the lower inboard side of each generator cooler, between the cooler head and cooler section. The cooler heads probably loosened sufficiently to allow water remaining in the coolers to seep through the gasketed joints although there was no visible evidence that the securing bolts had stretched. Despite the above evidence of shock, the sight glasses and thermometers were not damaged and all brushes were in place. Based on visual external inspection it is believed that both propulsion generators could be operated immediately although some water leakage would occur from the coolers. The propulsion motor in the after engine room was not accessible for close inspection because of the presence of water and oil in the bilges to a level above the floor gratings on the lower level. This motor was originally almost completely submerged and was partially submerged at the time of inspection. There was evidence of rust around the cooler heads and a coating of oil film on external surfaces of the motor. The motor is inoperable and requires a complete yard or base overhaul because of submergence.

The propulsion motor in the forward engine room displayed evidence of having been jarred by vertical shock transmitted through the foundations. The bolts securing the after bearing cap had loosened and the nuts had backed off about 1/8", indicating that the after end of the rotor had moved upward due to shock. The forward bearing showed no evidence of shock, however. Refer to photograph 141-11; page 103, for damage to the after bearing. Metal chocks between the motor feet and the foundation were displaced horizontally. These chocks were fitted between the motor and foundation but were not secured by holding-down bolts. The motor frame holding-down bolts had loosened and the nuts had backed away. Paint around the bolt heads

SECRET

USS GASCONADE (APA85)

had cracked. Refer to photograph 141-10; page 7 for evidence of loosened bolts. There was rust around the heads of the cooler, indicating water leakage through the gaskets as shown in photograph 141-12; page 102. Several brush springs on the starboard side had been displaced and one brush holder spring was missing. See photograph 143-1, page 104. Cracked paint at joints and seams in the blower motor housings and ducts indicated that these had flexed or vibrated. Based on visual external inspection it is believed that this motor would be operable after the loosened bolts are tightened, unless rotor shaft is sprung. The booster motor-generator sets in both engine rooms showed no visual evidence of damage and could be turned freely by hand.

The three 90 KW propulsion exciters showed no evidence of damage other than that paint around the bolts in the end bells was cracked, indicating that the end bells had jarred but had not been displaced. All end bell bolts were tight. Refer to Item D for comments in regard to effects of shock on the foundations of the ship's service turbine-generator and propulsion exciter sets.

It is recommended that some means be provided for securing the chocks used under the motor feet to prevent them from falling out even though there is slight movement of the entire motor.

It is considered that the possibility of providing some means of locking the holding-down bolts or using more holding-down bolts to prevent loosening under shock be investigated. Since only the inboard bearing holding-down bolts of the propulsion motor loosened, it is considered that the distribution of weight between the various bolts should also be studied.

#### C. Electric Propulsion Control Equipment.

The propulsion control cubicle in the after engine room had deposits of dirt and loose paint flakes over external surfaces and internal parts. Floor plates located beneath the cubicle had been dislodged and had fallen on incoming cables. Since the plates were on the insulated portion of the cable, no damage would have resulted even if the system had been energized. The plates were not

SECRET

USS GASCONADE (APA85)

secured in place prior to the test. Three of the seven arc chutes located at the rear of the cubicle had become dislodged and had fallen to the floor behind the cubicle. These chutes were not damaged and could be readily put back in place. There was no other indication of damage to this cubicle and it is believed that this unit could be made completely operable by restoring the dislodged arc chutes.

The propulsion control cubicle in the forward engine room was relatively clean. Unsecured floor plates beneath the cubicle had dislodged and had fallen on incoming cables. Since plates were on insulated portion of cables, no electrical damage would have resulted. None of the arc chutes had dislodged completely, but three arc chutes had displaced from their lower supports, being held in place only by the top supports. There was no other indication of damage to this cubicle and it is believed that this unit could be made completely operable by readjusting the displaced arc chutes.

The standby exciter transfer panel in the auxiliary machinery room did not appear to be damaged.

It is recommended that floor gratings be secured to prevent them from becoming missiles thereby damaging other equipment and causing personnel casualties. Not only is there the possibility of loose floor plates causing casualties by acting as missiles but there is also the possibility of these plates causing short circuits in electric equipment.

The contactors used in these control cubicles are of the commercial type. It is considered that with modern shock-proof navy design contactors, no trouble would be experienced with arc chutes being knocked off since they are more adequately secured.

D. Generators - Ships Service.

(a) Alternating current sets.

The combination ship's service - propulsion exciter - turbo-generator set located in the auxiliary machinery space, upper

SECRET

USS GASCONADE (APA85)

lever was the only unit showing damage. The electrical end of this unit consists of a Westinghouse Electric Corporation 250 KW, 450 V. 3 phase, 60 cycle AC generator; a 90 KW, 120-450 V. DC propulsion exciter, and a 5.5 KW, 120 V. DC exciter for the AC ship's service generator. The exciter for the AC ship's service generator had a small crack approximately 3 inches long in the top of its support bracket. This exciter is of the overhung type and it evidently whipped due to the shock of the blast transmitted to the machine through its foundation. The whipping action is believed to have caused the cracking of the exciter cast iron support frame. The unit was not operated however, from visual inspection, it did not appear to be out of line.

A check of the Bureau of Ships records indicates that an identical machine was subjected to shock tests at the Engineering Experiment Station at Annapolis, Maryland in November 1945. A practically identical casualty to that experienced on this vessel occurred when the set was subjected to a bottom blow. It is considered that the use of cast iron in the construction of motors and generators should not be permitted.

(b) Direct current sets.

Holding down bolts for both Westinghouse Electric Corporation 100 KW, 120/240 V. DC, S.O. 4B4182, turbo-generator sets were loose. The sets did not appear to be out of line. It is believed that both units could be operated if the holding-down bolts were tightened.

It is considered that the possibility of using larger or more holding bolts should be investigated in the future design of turbo-generator sets.

E. Generators - Emergency.

There was no apparent damage to the emergency diesel generator. Diesel engine starting batteries jumped out of their rack (See Section J) but appeared to still be capable of starting the unit.

SECRET

USS GASCONADE (APA85)

The emergency generator was operating on this vessel prior to the test. The recorder on the NMC Fathometer ceased to operate some time between zero time and plus 30 seconds. This could have been due to failure of emergency diesel which was supplying power to the Fathometer, however, this is not definitely known.

F. Switchboards, Distribution and Transfer Panels.

No damage was observed to any switchboards or distribution panels.

G. Wiring, Wiring Equipment and Wireways.

The only damage to cable and wiring was from related equipment carrying away and from submersion in flooded compartments.

H. Transformers.

No damage was observed to power or lighting transformers.

I. Submarine Propelling Batteries.

Not Applicable.

J. Portable Batteries.

(a) Portable batteries in the battery charging room on the upper deck, port side aft, were thrown on the deck resulting in considerable acid spillage but no visual signs of material damage. These batteries were not secured in the racks.

(b) Master gyro batteries were dislodged from their racks. Electric cables prevented batteries from falling when dislodged, therefore no serious damage resulted. There were no signs of acid spillage or material damage other than one broken cable. Refer to photograph 141-3, page 100.

SECRET

USS GASCONADE (APA85)

(c) The anemometer battery located on the port wing of the navigation bridge turned over in its rack allowing acid spillage. The battery was not secured in the rack.

(d) The radio batteries located on the port wing of the navigation bridge were generally disarranged resulting in considerable acid spillage. Three cell covers were cracked and one terminal was broken off. These batteries were not restricted from vertical movement. Refer to photograph 143-2, page 101.

(e) Emergency diesel batteries were generally disarranged but were prevented from damage in falling by the connecting straps and cables. There were no signs of acid spillage or material damage.

(f) None of the above portable batteries were secured in such a manner as to prevent vertical movement. Had they been locked in position by strong-backs, it is believed no damage would have resulted.

K. Motors, Motor Generator Sets and Motor Controllers.

(a) All motors and motor controllers located on the lower level in the after engine room were flooded by water and oil. No damage other than that due to flooding was apparent although a close inspection could not be made since the space was still flooded slightly above the floor plates when the inspection was made.

(b) A 3/0.9 HP, 440 V. AC, Westinghouse Electric Corporation class 11950 ventilating fan controller located on the upper level of the after engine room, port side, frame 105, had the overload reset rod for the Westinghouse Type MG overload relay displaced due to shock. This relay and reset mechanism was designed to withstand Navy class 150 foot pound shock, therefore, it is considered that it received a shock of greater magnitude than 150 foot pounds.

(c) A commercial type Allen Bradley Bulletin 301-R controller mounted on the drill press in the machine shop located in the after engine room was smashed when the drill press was knocked from its base. The cable was broken where it came from the line into the controller.

SECRET

USS GASCONADE (APA85)

(d) Both ice machine motors were knocked off of their mounting bases. The motors are located in the forward engine on slotted base plates, the slots being used for tightening the belt. There were no washers on the bolts and the heads of the bolts were only slightly wider than the slots. The slots evidently expanded sufficiently to free the holding down bolts for the bolts, appeared to be in act. See photographs 141-8, page 80, and 141-9, page 81.

(e) In the auxiliary machinery space the turning motor for the port shaft was broken from its mounting. This motor was mounted on the jacking gear housing. This cast iron housing cracked completely around the motor and allowed the motor to fall to the deck. See photographs 141-6, page 76, and 141-7, page 77.

(f) The cast iron base of the pedestal type dough mixing machine was broken by the shock. See photograph 142-12, page 69.

(g) The cast iron flour sifter motor shelf pulled out at the bolt holes where the shelf is fastened to its support. See photograph 141-1, page 90.

(h) The burner control switch for the bake oven was displaced when the two 1/8" bolts holding the enclosure were sheared off. See photograph 141-1, page 90. Also the hinges for the blower motor were broken.

(i) The after port cargo winch controller had its cover knocked off. Since this controller was on the weather deck, it had been thoroughly soaked, during the hosing down operations and due to rain. The initial damage was evidently due to air blast or wave action. There were no indications of damage to this controller due to underwater shock.

(j) No damage was observed to HI shockproof controllers or to motors with steel frames.

(k) No damage to motor generator sets was observed.

SECRET

USS GASCONADE (APA85)

It is considered that very minor damage would have occurred to motors and control equipment if the latest Navy HI shock-proof design equipment had been used. It should be pointed out however, that some of the failures that occurred to motors on this vessel were a result of the failure of cast iron parts used in the mounting supports for the motors. It therefore appears that the cast iron parts used in mounting brackets and supports for motors should be eliminated.

The pulling of the bolts through the slotted base plate of the ice machine is considered to be due to faulty installation since bolts with larger heads or washers should have been used.

L. Lighting Equipment.

(a) Numerous rough service lamps distributed throughout the ship were broken from the shock, machinery spaces receiving the most lighting damage.

(b) No broken RSHI lamps were observed. Shock mounted lighting fixtures are not in use on this vessel.

M. Searchlights.

(a) The following damage was noted to the port 24" searchlight:

1. The dome door glass and retaining ring was broken.
2. The signal shutter was badly twisted and bent.
3. The lamp mechanism was dislodged from the drum and the negative feed rod was broken. The positive feed rod and the positive rotating shaft were bent.
4. The bottom of the lamp housing was dished and the whole unit appeared to be slightly inclined to the starboard.

This searchlight would require major overhaul or perhaps replacement to be placed in service again. Such overhaul or

SECRET

USS GASCONADE (APA85)

replacement is considered to be beyond the capacity of the ship's force. See photographs 143-6, 7; pages 113, and 114.

(b) The following damage was noted to the starboard 24" searchlight:

1. The dome door glass was broken.
2. The drum is distorted making closing of the rear door difficult.

It is considered that this unit could be repaired by ship's force.

(c) Photograph 140-2, page 35, shows general damage to both searchlights.

#### N. Degaussing Equipment.

The only damage to the degaussing equipment observed was that the cable to compass compensating coils parted when the compass binnacle at the secondary control station was knocked over. There was no apparent damage to the compensating coils or to the control box. See photograph 143-5, page 116.

#### O. Gyro Compass Equipment.

(a) The Sperry Mk 14 Mod 0 master gyro compass located in the I.C. room, main deck, amidship, sustained the following damage:

1. Suspension springs were considerably elongated as shown in photograph 141-4, page 109.
2. Binnacle ring guide studs were jarred from slots. Refer to photograph 141-5, page 110.
3. Binnacle housing top and cover were thrown on deck causing the glass to break.

SECRET

USS GASCONADE (APA85)

4. Visual inspection revealed no damage to the gyro motor-generator, control amplifier and repeater panel, or the voltage adjusting rheostat. Gyro batteries are covered under Item J and are shown in photograph 141-3, page 100.

(b) The repeater and the gimbal ring were jarred free of the binnacle on starboard pelorus. See photograph 143-8, page 107. The port pelorus repeater and gimbal ring were missing. The exact cause of this damage is not definitely known. It is considered, however, that this damage was possibly a result of air blast since numerous similar casualties resulted in Test A. There is also the possibility that the damage was a result of the water striking the vessel after being lifted from the lagoon by the explosion.

(c) The steering repeater located in the steering engine room was jarred from its socket, breaking the dial window in falling.

(d) The Arma Mk VI Mod 3 class II Dead Reckoning Tracer located in C.I.C. had its cover jarred off and glass broken. The mechanism appears undamaged and it is believed that the unit is operable. Refer to photograph 143-9, page 108.

(e) The magnetic compass located at the secondary control station had its mounting screws sheared. See photograph 143-5, page 106. The lighting and compensating coil cables were severed.

#### Recommendation

It is recommended that the gimbal pins on the pelorus repeaters be lengthened and that threaded binnacle pins with locking nuts so that the repeater will not be freed from the gimbal ring in the event of distortion of the ring.

#### P. Sound Powered Telephones.

Approximately six sound powered handsets distributed throughout the ship were found jarred from their brackets. None, however, were rendered inoperative. It is doubted if these handsets were properly locked in position in their brackets prior to the test.

SECRET

USS GASCONADE (APA85)

Q. Ship's Service Telephones .

Not applicable.

R. Announcing Systems.

(a) The Stromberg Carlson general announcing system located in the I.C. room appears operable and undamaged except for a slight distortion of the amplifier rack cabinet.

(b) The P.A.B. reproducer located on the signal bridge was slightly bent by a missile and its spare part box was thrown from its foundation. See photograph 143-3, page 105.

S. Telegraphs.

No damage was observed to any telegraph system.

T. Indicating Systems.

(a) Rudder angle indicator exposed at the aft steering station was struck by a missile breaking the dial window and bending the pointer shaft, thereby rendering the unit inoperable. The after steering station is shown in Hull photograph 4207-10, page 39.

(b) The anemometer cups were carried away by the blast.

U. I.C. and A.C.O. Switchboards.

No damage was observed.

V. F.C. Switchboards.

No damage was observed.

W. Miscellaneous.

The electric grill located in the crews galley was generally disarranged and the elements thrown to the deck by the shock as shown in the photograph. 142-11, page 91.

SECRET

USS GASCONADE (APA85)

APPENDIX

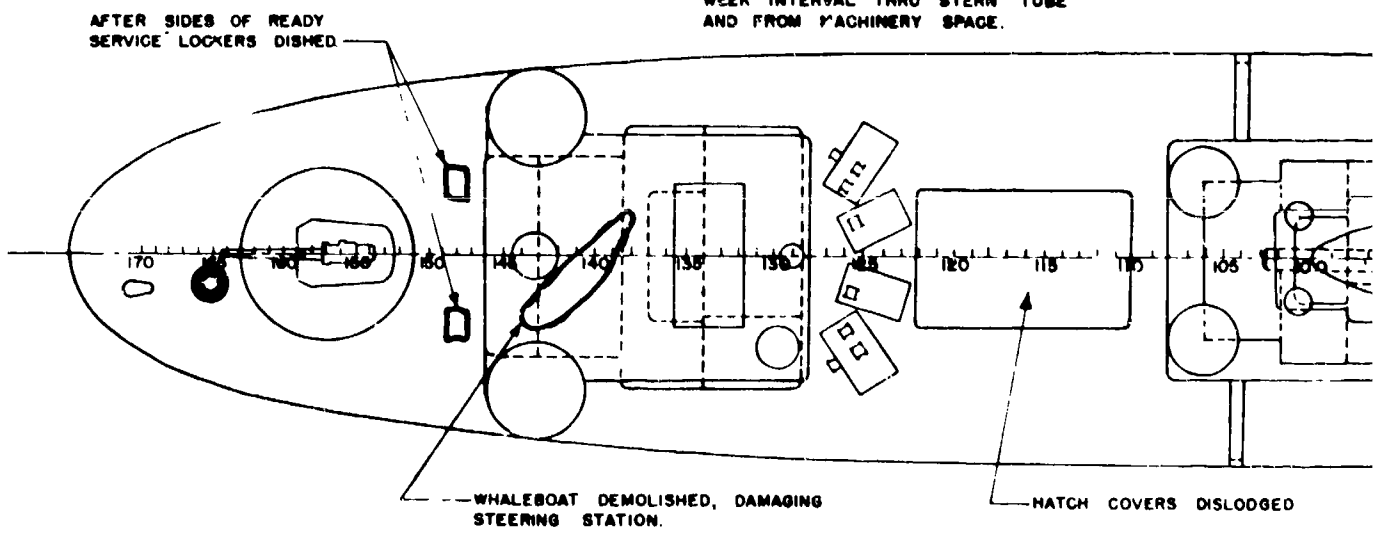
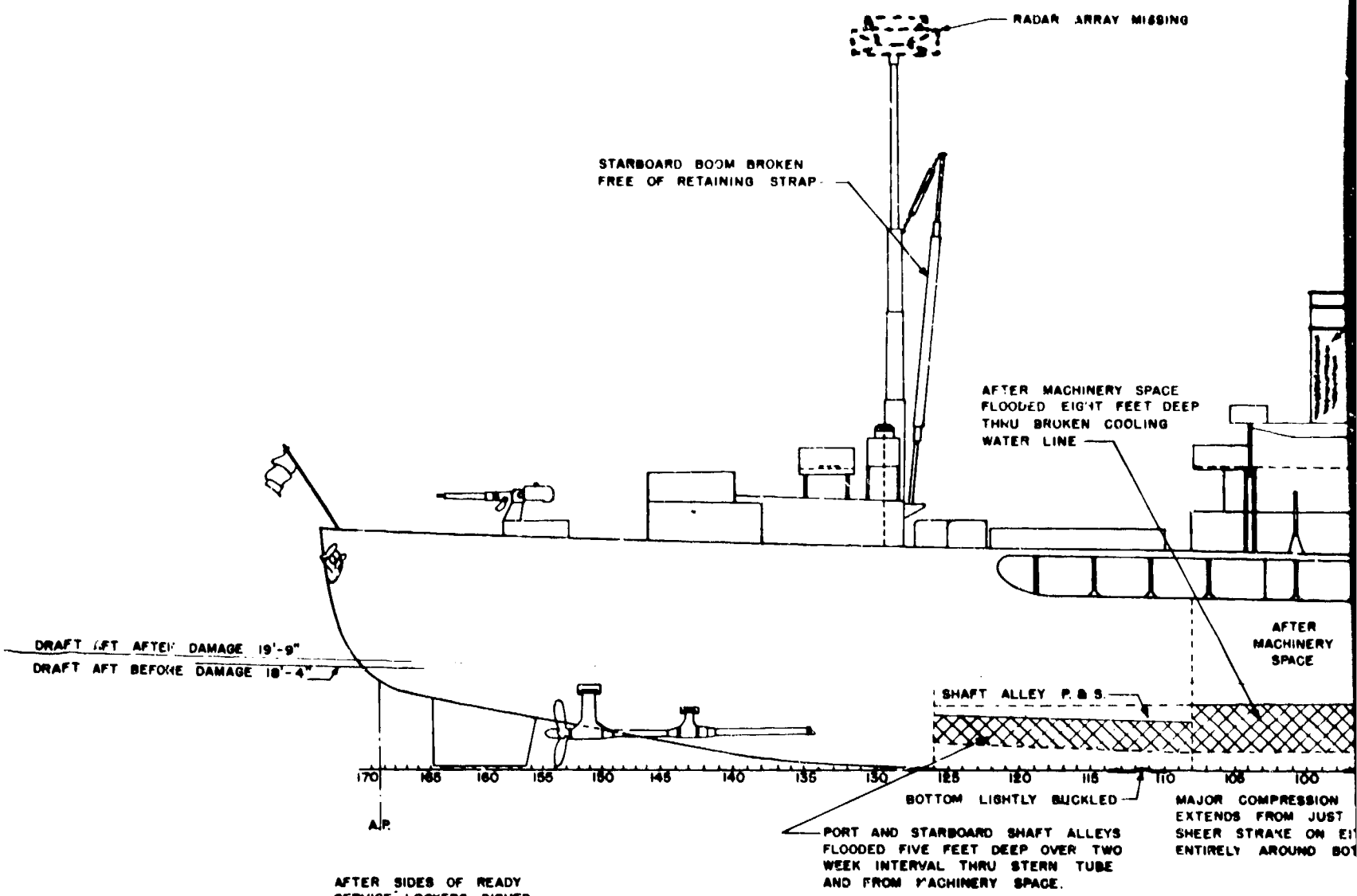
SHIP DAMAGE DIAGRAM

TEST BAKER

SECRET

USS GASCONADE (APA85)

Page 63 of 77 Pages



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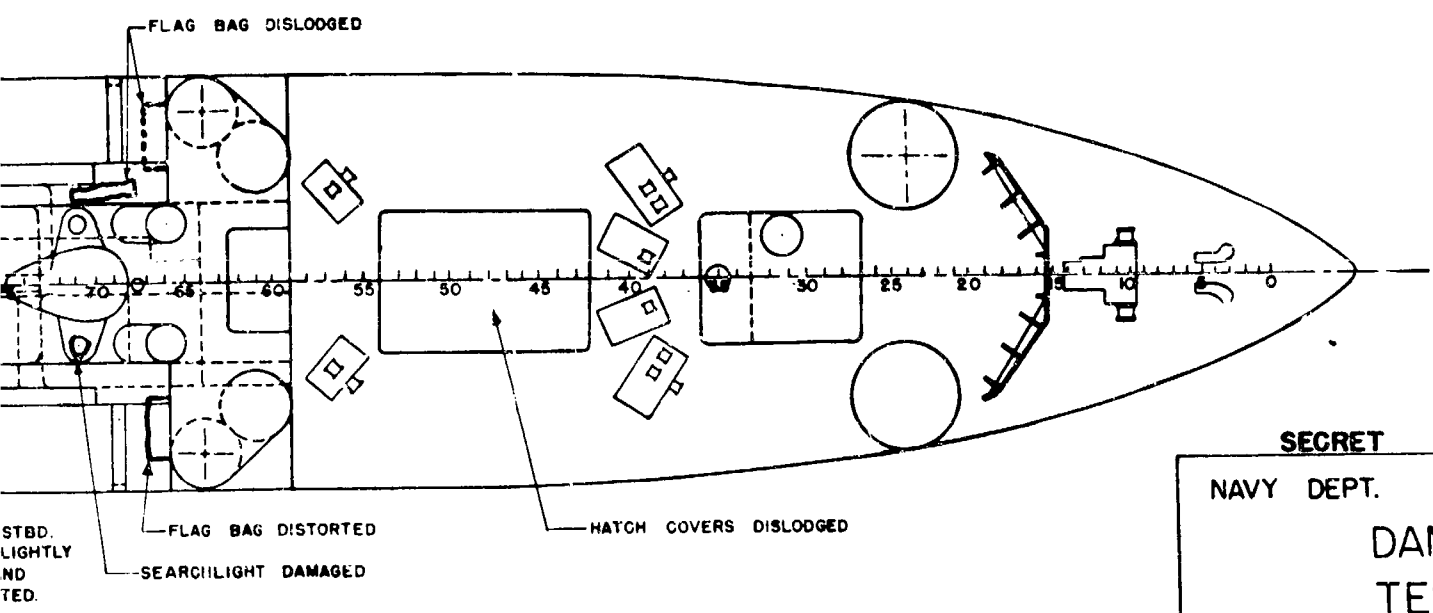
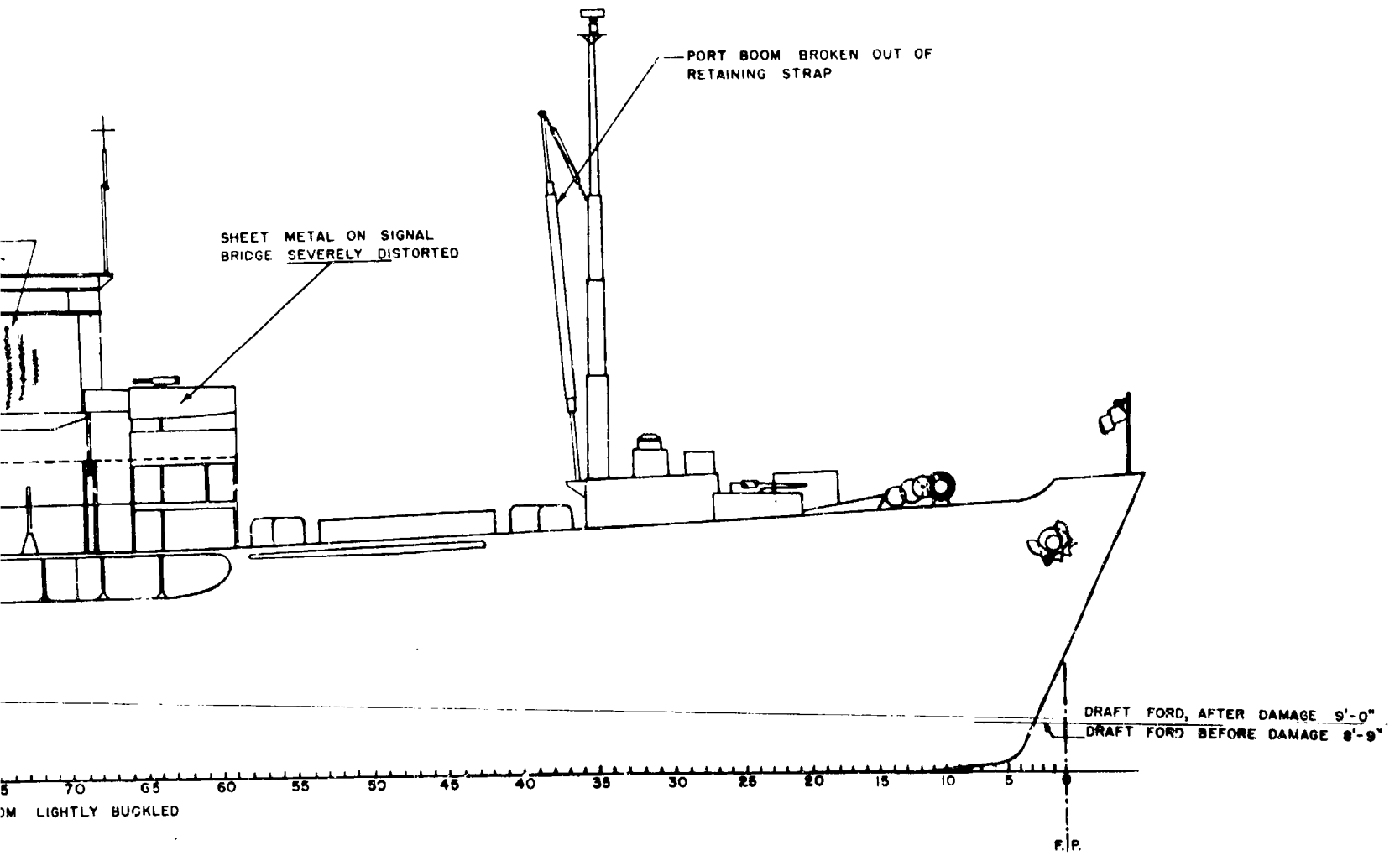
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LEGEND

 SLOW FLOODING

**SECRET**

NAVY DEPT. BUREAU OF SHIPS

**DAMAGE TEST B**

U.S.S. GASCONADE APA 85

2

3

APPENDIX

SHIP MEASUREMENT DIAGRAM

TEST BAKER

SECRET

USS GASCONADE (APA85)

Page 65 of 77 Pages

## Appendix

### Ship Measurement Data

Deck deflection scratch gages were installed under the upper deck and in the after machinery space to record relative movement of structural members. Gage locations and readings are tabulated on pages 67 and 68.

SECRET

USS GASCONADE (APA85)

Page 66 of 77 Pages

# DECK DEFLECTION GAGES

TEST B

SHIP U.S.S. GASCONADE APA 85

FR. NO.	LOCATION		MAXIMUM COMP.	MAXIMUM EXP.	PERMANENT		SET EXP. / COMP.	REMARKS
	DECK	DIST. OFF &			DISTANCE			
53	MAIN	PORT 9'-6"	NONE	NONE	NONE	NONE		NONE
53	"	STBD 9'-6"	"	"	"	"		"
116	"	PORT 9'-6"	"	"	"	"		"
116	"	STBD 9'-6"	"	"	"	"		GAUGE BENT BY MATCH COVERS
129 1/2	"	PORT 9'-0"	1/16"	"	"	"		NONE
129 1/2	"	STBD 9'-0"	1/16"	"	"	"		"

NOT

# DECK DEFLECTION GAGES

TEST B

SHIP U.S.S. GASCONADE APA 85

FR. NO.	LOCATION		DIST. OFF &	MAXIMUM		MAXIMUM EXP.	PERMANENT		SET	REMARKS
	DECK	AFTER		COMP.	EXP.		DISTANCE	EXP. / COMP.		
98		ENGINE ROOM	STBD 12'0"	0-2-8	NONE	0-0-2	0-1-2	COMP.		NONE
99	"	"	PORT 14'-0"	0-0-20	0-0-2	0-0-16		COMP.		"
102	"	"	STBD 12'-0"	0-1-0	NONE	0-0-16		COMP.		"
102	"	"	PORT 16'-0"	0-0-8	0-0-6	0-0-2		COMP.		"
102	"	"	PORT 12'0"	0-1-16	NONE	0-0-10		COMP.		"
101	"	"	ATHWAIRSHIP	0-0-8	0-0-6	NONE		COMP.		GAUGE WAS BROKEN OFF OF STBD. BULKHEAD.

NOTE: READING ARE IN FEET, INCHES AND THIRTY - SECONDS OF AN INCH.

APPENDIX

COMMANDING OFFICERS REPORT

TEST BAKER

SECRET

USS GASCONADE (APA85)

Page 69 of 77 Pages

# TECHNICAL INSPECTION REPORT

## PART A - GENERAL SUMMARY

### I. Target Condition After Test.

- (a) There was considerable damage from test B. The after engineering space and shaft alleys were flooded. Rigging was severed or loosened. Equipment and fittings had been torn off bulkheads and strewn about. The ship had buckled between frames 95 and 96 on both port and starboard sides. It is believed that all personnel would have been killed or seriously injured had they been on board. The ship was highly radioactive on first reboarding.

### II. Forces Evidenced And Effects Noted.

- (a) Severe shock was evidenced by shifting of machinery on foundations and displacement of objects suspended in cantilever fashion.
- (b) The only evidence of heat was that the paint on the part of the anchor chain that was on the bottom was burned off and the chain appeared to be charred.

### III. Results Of Test On Target.

- (a) Due to flooding, damage, and radioactivity, the main plant and ship control equipment were not tested. While gunnery and fire-control equipment was not tested with power, the visual inspection showed slight damage to 5/38 only.
- (b) The effect on personnel and habitability was considered disastrous. It is very doubtful if there would have been any survivors. Without consideration of radiological hazards, living on the ship would be very difficult. No power, water, or ventilation could be provided and the living quarters are torn up.

SECRET

U.S.S. GASCONADE (APA85)

- (c) Fighting efficiency and the ability of the ship to function as an attack transport was totally impaired.

IV. General Summary of Impressions and Conclusions.

- (a) It is the opinion of the Commanding Officer that the effects of the atomic bomb on this vessel were considerable in that power, water, and ship control were rendered inoperable while the interior fixtures of the ship were thrown about in confusion.

SECRET

U.S.S. GASCONADE (APA85)

Page 71 of 77 Pages

INSPECTION REPORT

PART C

SECTION I - HULL

A. Hull Damage.

The hull is buckled both port and starboard at frame 95.

B. Superstructure (exclusive of guns and mounts).

(a) Bridge Area.

1. Both stacks dished.
2. Ready service boxes frame 90 torn from deck.
3. Smoke generator, frame 100, completely demolished.
4. Port and starboard 24" searchlights severely damaged.
5. Starboard flag bag crushed; port flag bag knocked free of mounting.
6. Standard compass binnacle torn from mounting.
7. Gyro repeater, 04 deck, knocked out of gimbals.
8. Gyro repeater, port wing of bridge, missing; repeater on starboard wing of bridge knocked out of gimbals.
9. Dead reckoning tracer completely demolished.
10. Superstructure plating between 02 and 04 decks, starboard side at frame 95, dished.

(b) Forward deck-house and spud locker.

1. Spud locker screening blown out.
2. No apparent damage to forward deck-house.

(c) Amidships superstructure.

1. Watertight door along starboard side dished.
2. Majority of ladders have sheared securing pins and broken rails.

SECRET

U.S.S. GASCONADE (APA85)

- (d) After deck-house.
  - 1. Double doors to C and R shop dished.
  - 2. After bulkhead of deck-house dished.
  - 3. Door to access trunk of 5'' magazine jammed.
  
- C. Guns and Directors.
  - (a) Unprotected mounts - one 5''/38, two twin 40mm, and four 20mm mounts.
    - 1. All gun covers radioactive and jettisoned.
    - 2. Power drive shield on 5''/38 dished about two inches.
    - 3. Parallax Zero Reader mounting bolts sheared.
    - 4. 5''/38 gun frozen in elevation.
    - 5. No other apparent damage to rest of guns from bomb.
    - 6. No power available to test drive or sights.
  
  - (b) Director, Rangefinders, and Mk 14 Sight.
    - 1. Director and Mk 14 sights not tested with power but appear to be intact.
    - 2. Rangefinder not closely inspected due to high Geiger reading in tub.
  
- D. Not applicable.
  
- E. Weather Decks.
  - (a) General condition poor, most equipment damaged.
    - 1. Rigging severed or loosened.
    - 2. Hatch covers on O1 deck knocked down into holds. Metal covers are bent in the middle in most cases and canvas cover shredded.
    - 3. Two pontoon hatch covers on main deck, and one on first platform of of number one hold are knocked down into hold.
    - 4. Army radar gear severely damaged.
    - 5. Wardroom doors dished.

SECRET

U.S.S. GASCONADE (APA85)

6. Plane on 01 deck completely demolished.
7. Flag staff and life lines on fantail knocked inboard on deck.
8. Ready service locker doors for 5"/38 ammunition dished about ten inches.
9. Plywood movie house on 03 deck completely flattened.
10. Sheet metal deck lockers on after deck-house demolished.
11. Fire hose and other canvas stowed topside highly radioactive and jettisoned.
12. One ten-ton boom forward, port side number one hatch, and one ten-ton boom aft at number two hatch starboard side knocked from cradles.
13. All fenders highly radioactive and jettisoned.

F. Exterior Hull (above waterline).

- (a) Hull buckled at frame 95 on port and starboard sides.

G. Interior of Compartments.

- (a) In general lockers, bunks, desks, scuttlebutts, fans, and other items were adrift.
  1. Joiner bulkhead along passageway beside forward hold bulged about 30''.
  2. All tables in mess hall knocked flat.
  3. Range in galley damaged.
  4. Dough mixer in galley adrift.

SECRET

U.S.S. GASCONADE (APA85)

PART C

SECTION II - MACHINERY

A. Main propulsion.

1. Forward main motor shifted approximately 1/8" on base; no other apparent damage; visual inspection only.
2. After main motor not inspected. Motor was completely submerged when after machinery space flooded.
3. Numbers 1 and 2 main alternators and turbines - visual inspection only; no apparent damage.

B. Boilers.

1. Forward boiler brickwork very slightly damaged, deck raised about 6" for length of about 2 feet. No other damage noted.
2. After boiler not inspected; partially submerged when after machinery space flooded.

C. Auxiliaries in forward machinery spaces.

1. No. 1 DC heater hold-down bolts stretched and loosened.
2. No. 1 DC generator moved on base; sheared alignment pin.
3. No. 1 auxiliary condenser hold-down bolts stretched and loosened.
4. No. 1 main condenser hold-down bolts stretched and loosened; mounting frame slightly bent.
5. Two ice machines motors torn loose and off mountings.

D. Auxiliaries in after machinery spaces.

1. Auxiliary condenser air ejector hold-down bolts loosened; 1" steam line torn loose.
2. Main condenser air ejector hold-down bolts loosened.
3. Lathe and milling machine torn loose from deck and overturned; drill press base cracked and broken, remained upright.

SECRET

U.S.S. GASCONADE (APA85)

PART C

SECTION III - ELECTRICAL

A. No power available for testing.

SECRET

U.S.S. GASCONADE (APA85)

Page 76 of 77 Pages

**CONFIDENTIAL**

PART C

SECTION IV - ELECTRONICS

A. Radio I and Wheelhouse.

1. RBS-1 power supply torn from mounts. Receiver proper not damaged.
2. RAK-7 receiver chassis bulged slightly, otherwise in good condition.
3. RAL-7 capacitor gear train locked.
4. TBS-6 all 808 tubes jarred from sockets; heavy structural damage visible.
5. SCR-508, all units thrown from rack to deck. Batteries cracked and dry.

B. Forward Radar.

1. BN-IFF transponder unit chassis torn from cabinet.
2. ABK interrogator upper unit thrown to deck.

C. Radio II.

1. TCF r. .lotelephone unit thrown over backwards severing power cables and antenna connections.
2. TCS 12(1) transmitter unit torn from cabinet.

D. Radio III.

All units inoperable due to immersion

E. After Radar.

SC rotary units thrown about compartment.  
SC antenna knocked from mast into number 2 hold carrying away other antennae.

**SECRET**

U.S.S. GASCONADE (APA85)

Page 77 of 77 Pages

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TRC

18 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER  
ATTENTION: OMI/Mr. William Bush (Security)

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency has reviewed and declassified the following reports:

*AD-367489*

XRD-133-Volume 1  
U.S.S. Gasconade (APA 85), Test Baker, Volume 1, Operation Crossroads, Bureau of Ships Group, Technical Inspection Report, Director of Ship Material, Joint Task Force Once. Approved by F. X. Forest, Captain, U.S.N., 77 pages.

*AD-367486*

XRD-130-Volume 1  
U.S.S. Fallon (APA81), Test Baker, Volume 1, Operation Crossroads, Bureau of Ships AGroup, Technical Inspection Report, Director of Ship Material, Joint Task Force One. Approved by F. X. Forest, Captain, U.S.N., 78 pages.

*AD-377466*

XRD-213  
Director of Ship Material, Joint Task Force One, Operation Crossroads, Gross Damage Report, Test Able, dated 6 July 1946.

The DTIC accession number was not available. This office is not sure if DTIC was on distribution for the cited reports.

However, the reports are now **approved for public release; distribution statement "A"** now applies.

*Arndith Jarrett*

ARDITH JARRETT  
Chief, Technical Resource Center