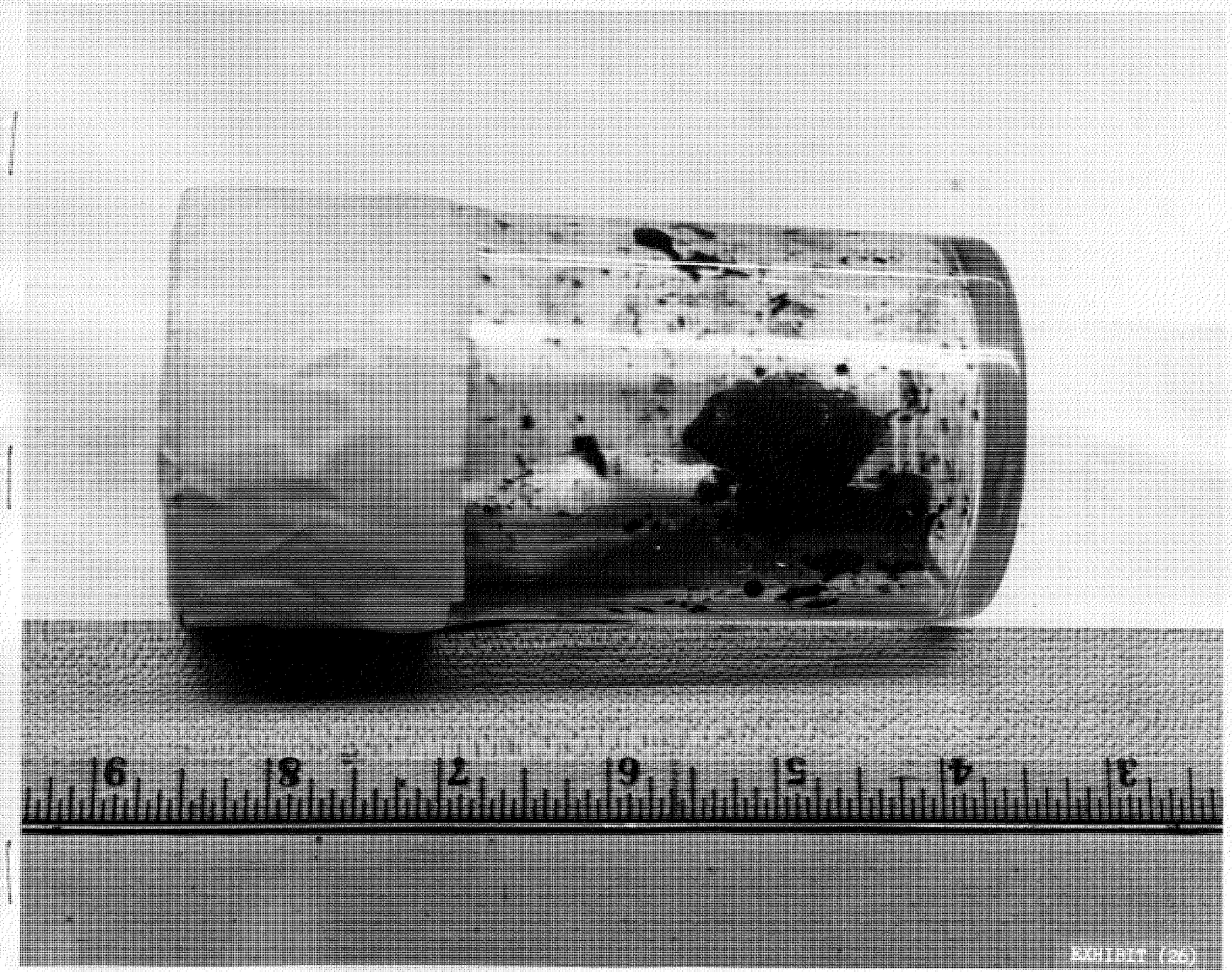
12 2 2 — 63

NO. [illegible] DATE [illegible]

UNIT ASB

[illegible]



NO. 1248-63

USS ASB

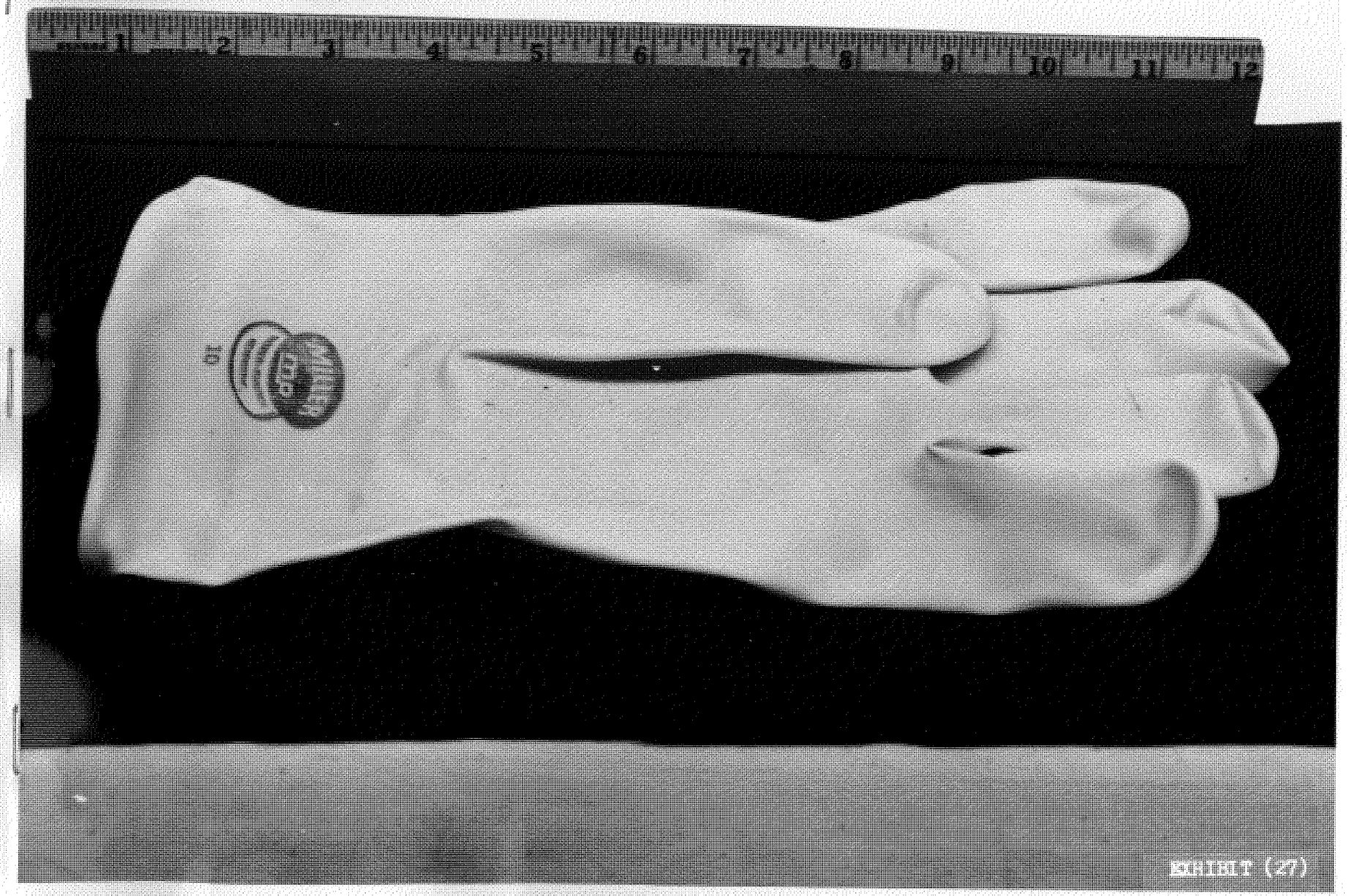


Exhibit (27)

NO. 1254-63 DATE

UNIT ASB

EXHIBIT (28)

12555

63

453

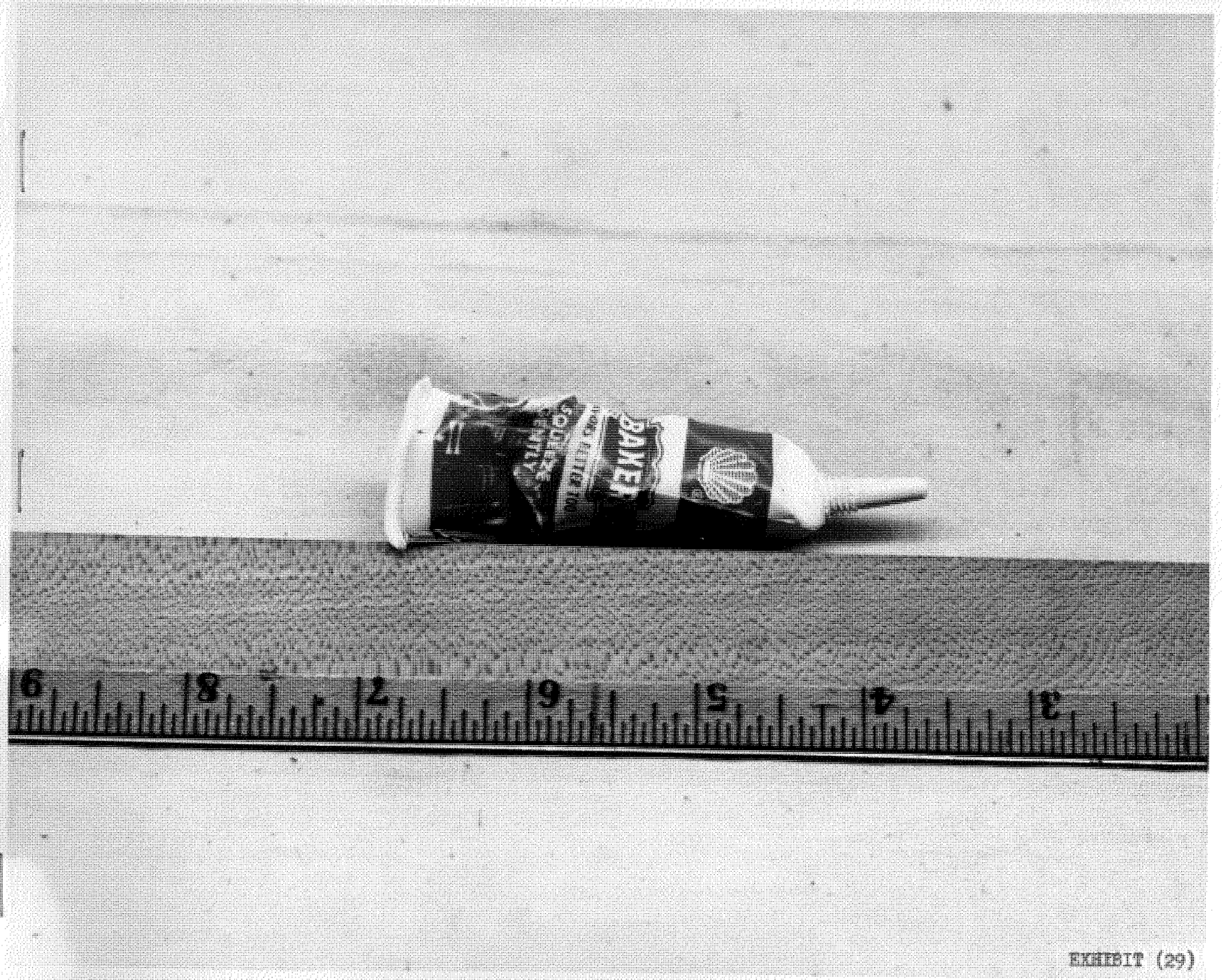


EXHIBIT (29)

1261-63

ASB

PORTSMOTH NAVAL SHIPYARD
PORTSMOUTH, N. H.

RMB

IN REPLY REFER TO
303C-1/303C-5

12 Apr 1963

MEMORANDUM

From: Materials Testing Laboratory
To: President, Court of Inquiry

Subj: USS THRESHER (SS(N)593); debris removed from area of casualty, report on

Encl: (1) Examination and Tests Upon Debris Retrieved from Area of USS THRESHER (SS(N)593) Casualty (2 copies)

1. The subject debris, brought to the Materials Testing Laboratory in custody of Lieutenant Sousae was inventoried as follows:

a. One (1) rubber glove (right hand), large, paint smeared, bearing label "QM(CTM)-11705-E-62"

b. One (1) rubber glove (left hand) bearing label "MILLER MP Rubber & Plastic NEOPRENE 10"

c. One (1) bottle of clear liquid (full), now labeled "#1"

d. One (1) bottle of clear liquid (about 1/3 full), now labeled "#1A"

e. One (1) small bottle, now labeled "#2" containing:

Small pieces of cork
One (1) small piece of polyester microballoon material
One (1) small piece foamed plastic material (white)
Several small pieces white and off-color gelatinous material

f. One (1) large glass now labeled "#3" containing:

Two (2) pieces foamed plastic (white with oily black discolorations)
Small pieces of cork
A quantity of dark oily substance

g. One (1) small glass, now labeled "#4" containing:

One (1) piece of pale yellow solid plastic
Two (2) pieces of cork
One (1) piece of plastic, off-white in color with partially visible marking

h. One (1) small plastic squeeze tube with following marking, "BAKER'S, Flavors Better Too, Squeeze Gently"

Exhibit (30) 5 pages
1

2. These exhibits were photographed as a complete group and then as individual items before opening containers or conducting examinations or tests as appropriate. A detailed account of the test and/or examination methods used and the findings item by item are submitted herewith as enclosure (1).

(b) (6)

Head, Polymers Research Section

(b) (6)

Head, Chemistry Section

Copy to:
COMSUBLANT NORVA (1)
DEPCOMSUBLANT (1)
PTSMH NAVSHIPYD (Code 100) (1)
PTSMH NAVSHIPYD (Code 240) (1)
PTSMH NAVSHIPYD (Code 303C) (2)

Exhibit (30)
2

Examination and Tests Upon Debris Retrieved
from Area of USS THRESHER (SS(N)593) Casualty

Examination of the subject materials item by item in the order appearing in the inventory on the forwarding document was accomplished in the following manner.

Item a. Large right hand glove--visual examination only--no tests--recognized by Military personnel as type usually issued.

Item b. Left hand rubber glove--visual examination only--no tests. Visible label identifies material as Neoprene rubber--inspection indicates Neoprene latex dipped glove.

Item c. (Bottle #1) and Item d. (Bottle #1A)

One-half the liquid in each bottle was combined to make a single sample of 120 ml volume. The combined sample was extracted with ether and the ether extract evaporated to dryness in a tared platinum dish. The residue was examined in ultra-violet light and it displayed fluorescence. The dish and residue were weighed, ignited and reweighed. Upon re-examination in ultra-violet light, no fluorescence was observed.

Oil content of the specimen, calculated from the weight loss was 43 PPM. The actual amount of oil extracted was too small to permit type identification.

Item e. (Bottle #2)

Samples of cork could be visually identified as bits of cork board such as used aboard submarines. Specific gravity determination verified material was cork.

The small polyester-microballoon particle was cut in half and one half was sectioned and compared microscopically, 10X, with a blank sample of material known to have been used aboard THRESHER and found to be identical in structure and appearance.

The white foamed plastic material was sampled and subjected to pyrolysis test (simple burning). This gave the distinctive odor characteristic of polyurethane. Compared under the microscope at 10X magnification with a blank sample of 6 lb/cu ft polyurethane foam, the material was identical in appearance and structure.

One of the small pieces of white and off-color gelatinous material was examined microscopically and found to be fluidly plastic in character. This was shaken in various solvents but found highly insoluble. The material exhibited a distinctly putrescent odor and was, therefore, returned unidentified to Lieutenant Sousae for possible study by a biologist or biochemist.

Item f. (Large Glass #3)

One of the pieces of white foamed plastic material was examined and compared with a blank sample exactly as was the material described in the third paragraph under Item e., above, with identical results. Material is low-density (6 lbs/cu ft) polyurethane foam. In addition, the specimens were shaken in ether to determine solubility of the dark deposits thereon. This material was found to be extractible oily material and the same as the black oily material in this container.

The cork particles were again identified by specific gravity and visual examination.

A weighed sample of the dark oily substance was extracted with benzene. The extracted portion, comprising 98.4% of the sample, was a very dark, tacky oil. Based on the fact that it was soluble in benzene, ether and gasoline and was inert to concentrated sulfuric acid as well as fluorescent under ultra-violet light, the material was judged to be a straight petroleum product.

The insoluble portion of this sample was examined spectrographically and found to be mostly compounds of iron. Calculated as oxides, this portion of the sample was made up of:

Iron Oxide	86%
Calcium Oxide	4%
Magnesium Oxide	2%
Silica	2%
Sodium Oxide	2%
Vanadium Oxide	1%
Copper Oxide	2%
Aluminum Oxide	1%

Traces of Titanium, Boron, Manganese, Chromium and Nickel

Item g. (Small Glass #4)

Pale yellow plastic was identified by pyrolysis as polyethylene plastic by characteristic paraffin odor. Since the material was yellow in color, a test for borates was made by spectrograph. This was negative but presence of Titanium was noted. This was judged to be a color base material used to brighten the yellow of the plastic.

The cork specimens, being identical in appearance with specimens previously identified, were not tested.

The piece of off-white plastic material was found by observation under a magnifying glass to be embossed with the marking:

"POL--
PRIN-"

Exhibit (30)
4

By comparing this with a capsule of Polaroid photographic material similarly embossed:

"POLAROID
PRINT --
etc."

it was established that it had been part of a similar capsule.

Item h. (Squeeze Tube)

This is identified by its markings and no tests or comments were required.

Exhibit (30)
5

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, N. H.

IN REPLY REFER TO

CHF

303C-1/303C-5

13 April 1963

MEMORANDUM

From: Materials Testing Laboratory
To: President, Court of Inquiry

Subj: USS THRESHER (SS(N)593); second group of flotsam recovered from area of casualty; report on

1. The subject flotsam was delivered to the Materials Testing Laboratory in custody of CDR R. C. Peniston, USN, at approximately 11:50 AM, Saturday, April 13, 1963. This material comprised three items as follows:

Item 1 - Two amber colored, translucent rubber gloves, both right hand, size 8, similar to surgeons' gloves. One glove had stained fingers and both bore a diamond shaped "Pioneer" label. No identification of this material was necessary and no tests were conducted.

Item 2 - One doughnut-like, cylindrical, tan colored, foam float similar to a rope float. This was about 3 inches in diameter by 2 inches in height. A chip was cut from an edge of this object and the specimen was subjected to a flame test with these results:

a. Material did not support combustion.

b. Material in flame gave characteristic odor of rubber.

c. No melting was observed.

A Beilstein test for chlorine was run with positive results. The material is, therefore, identified as neoprene rigid foam.

Item 3 - One large yellow plastic sheet about 1 inch thick X 12 inches X 10 inches with two reasonably square edges and two irregularly shaped edges one showing evidence of a pipe having penetrated it. This sheet bore a dimly discernable marking

"BORATED
GRADE II"

Its appearance and marking indicated it to be borated polyethylene such as that used in Nuclear Shielding. The marking refers to Specification MIL-P-19336C, Grade II which requires this label at a mimimum of six places on each full sheet.

Further verification was made by pyrolysis (simple exposure to flame) with these observations:

(a) Material burned readily and dripped

(b) Had strong paraffinic odor. The material is, therefore, identified as polyethylene plastic. Specific gravity of the material determined by Jolly balance method was 0.97 as compared to 0.96 for standard reference sample of borated polyethylene.

Spectrographic analysis to determine presence of borates gave positive results, showing boron content of 1.28% as against specified requirement of

b(3) 10 USC 130

(b) (6)

Head, Chemistry Section

(b) (6)

Head, Polymers Research Section

Copy to:
COMSUBLANT NORVA (1)
DEPCOMSUBLANT (1)
PTSMH NAVSHIPYD (Code 100) (1)
PTSMH NAVSHIPYD (Code 240) (1)
PTSMH NAVSHIPYD (Code 303C) (2)

Exhibit (31)
2

NAVAL MESSAGE
OPNAV FORM 2110-28 (10-58)

RELEASED BY	DRAFTED BY	PHONE EXT. NR.

DATE	TOR/TOD	ROUTED BY	CHECKED BY
Ø6 APRIL 1963	Ø3ØØZ VIA: GMPO	WU/FJW//WH//	

MESSAGE NR.	DATE/TIME GROUP (GCT)	PRECE-DENCE	FLASH	EMERGENCY	OPERA-TIONAL IMMEDIATE	PRIORITY	ROUTINE	DEFERRED
	Ø 5 1 9 4 Ø Z	ACTION					XXXXX	
		~~INFO~~						

FROM:
COMSUBFLOT TWO

TO:
USS SKYLARK

INFO:
COMSUBLANT
DEPCOMSUBLANT
COMSUBLANT ADMIN PTSMH
USS THRESHER
COMSUBDEVGRU TWO
COMSUBRON TEN

UNCLAS

SKYLARK WEEKLY EMPLOYMENT

A. MY OPSKED 14-63

1. CHANGE REF A TO READ AS FOL:

WHEN RFS 8 APR SKYLARK PROCEED BSN OPAREA 1 BRAVO TO RNVU WITH THRESHER IN POSIT 42-55N 7Ø-26W AT Ø916ØØZ. UPON COMPL OPS IN BSN OPAREAS AND WHEN DIRECTED BY OTC PROCEED TO POSIT 41-47N 65-27W ATOARR AT 1Ø12ØØZ FOR OPS AS DIR BY OTC. WHEN RELEASED BY OTC PROCEED DIR TO NLON TO ARR 11 APR.

2. OTC IS THRESHER. COMM G15B PRI, C25BL SEC. MAKE OWN UNCLAS MOVREP.

BT

C O P Y C O P Y C O P Y C O P Y

DISTRIBUTION:

Exhibit (32)

UNCLASSIFIED

DATE/TIME GROUP

Reorder from FPSO Cog. "I" Stock Points

SUBMARINE FLOTILLA TWO
Fleet Post Office
New York, New York

FDSS2/3120
(11/d1)
2 Apr 1963

COMSUBFLOT TWO OPSKED 14-63

From: Commander Submarine Flotilla TWO
To: Distribution List

Subj: Detailed Schedule of Employment for Ships in SUBFLOT TWO Areas 8-14 April 1963

Ref: (a) COMSUBLANT OPORD 1-61 (ch 2)
(b) COMSUBFLOT TWO OPORD 1-62 (ch 2)
(c) COMSUBFLOT TWO INST 3140.2
(d) COMSUBFLOT TWO INST 3120.1D

Encl: (1) Subject schedule

1. Enclosure (1) effective 0000R 8 April 1963 furnishes information as to area assignment, employment, rendezvous, communications and details of services provided units operating in areas assigned COMSUBFLOT TWO.

2. This schedule is approved and issued in compliance with reference (a) for ships operating in the New London area; and it shall be executed accordingly weather and other circumstances permitting. Attention is directed to references (a), (b) and (c). Particular attention is drawn to reference (d) which sets forth an explanation of OPSKED symbols and abbreviations.

3. Area assignments commence 0000R and terminate 2400R on the effective day, unless otherwise directed.

4. This operating schedule will have served its purpose and will be canceled at 2400R, 14 April 1963.

(b) (6)

By direction

Distribution:
(In accordance with enclosure (3) to reference (d))

Copy to:
CO USS SIRAGO (SS485)
CO USS SENNET (SS408)
CO USS WACCAMAW (AO109)
CO USS NORFOLK (DL1)
CO USS HARTLEY (DE1029)

Exhibit (33) 4 pages
1

1. In accordance with reference (c), USS HALFBEAK (SS352) is designated Weather Duty Ship.

2. Ready ASR -- USS SUNBIRD (ASR15).

3. Operations New London area:

DATE / SHIP	MON 8 APR	TUE 9 APR	WED 10 APR	THU 11 APR	FRI 12 APR	SAT 13 APR	SUN 14 APR
USS CORPORAL (SS346)	SUBSS/ENL					M.A.	M.A.
	Area P	Area HW	Area HE	Area L	Area HW		
USS DIABLO (AGSS479)	SUBSS/ENL					M.A.	M.A.
	Area HW	Area HE	Area L	Area HW	Area HE		
USS JALLAO (SS368)	TYT				M.A.	M.A.	M.A.
	Areas 31A, 32A	EV 201 Areas 31,32	Areas 31,32	EV 401 Area 33			
USS TIGRONE (SS419)	ENR MED						
	COND OPS IAW COMSUBLANT OPORD 11-63			- ETR 8 AUG			
USS SUNBIRD (ASR15)	SVCS				M.A.	M.A.	M.A.
	ENR & ARR NLON	M.A.	SVCS TO CSF 6	ENR & ARR ARR NLON			
USS SEA OWL (SS405)	SUBLANT				M.A.	M.A.	M.A.
	M.A. UNDERWAY 1800R	EV 202 Area 23	Area 23	Area 23			
USS ENTEMEDOR (SS340)	SUBASWEX 1-63				M.A.	M.A.	M.A.
	Areas 33A, 34A, 35A	Areas 33, 34,35	Areas 33, 34,35	Areas 34, 35			
USS SAILFISH (SS572)	SUBASWEX 1-63				M.A.	M.A.	M.A.
	Areas 33A, 34A, 35A	Areas 33, 34,35	Areas 33, 34,35	Areas 34, 35			
USS SEA WOLF (SS575)	TESTS				M.A.	M.A.	M.A.
	Lane ALFA Areas L,23 NOTE 7	EV 202 Lane ALFA Area 23	Lane ALFA Area 23	Lane ALFA Area 23			
USS SKIPJACK (SSN585)	SEA TRIALS				M.A.	M.A.	M.A.
	Lane XRAY	Area P Lane YANKEE	Areas 33, 34, 35	Areas 34,35 Lane YANKEE			
USS SIRAGO (SS485)	SUBSS/ENL					M.A.	M.A.
	Area HE	Area L	Area HW	Area HE	Area L		
USS SENNET (SS408)	RFT SCOL						
	M.A.	M.A.	M.A. UNDERWAY 1800R	EV 401 Area 33	M.A.	M.A.	M.A.

EXHIBIT (33)

DATE / SHIP	MON 8 APR	TUE 9 APR	WED 10 APR	THU 11 APR	FRI 12 APR	SAT 13 APR	SUN 14 APR
USS FAIRVIEW (EPCER850)	OTF					M.A.	M.A.
USS BRATTLEBORO (EPCER852)	Areas R,N	Areas R,N	Areas P,R, N,Y	Areas P,R, N	Areas P,R, N,Y		
USS WACCAMAW (AO109)		EV 201					
USS NORFOLK (DL1)		Areas 31,32					
USS HARTLEY (DE1029)							

EV. NO.	SHIP	SUB INITIAL POINT	TIME	TARGET GROUP	TARGET INITIAL POINT	TYPE OF EXERCISE	AREA
201	JALLAO	AS DIR BY OTC	0700R	WACCAMAW NORFOLK HARTLEY	AS DIR BY OTC	TYPE DELTA SERVICES	31,32

OTC: CO USS WACCAMAW (AO109) OCE: CO USS WACCAMAW (AO109)
Communications: G15D Primary, C25BL Secondary.
JALLAO rendezvous with WACCAMAW/NORFOLK/HARTLEY in vicinity center area 31 at 090700R. WACCAMAW/NORFOLK/HARTLEY provide type DELTA services as requested by JALLAO and as directed by OTC until about 091500R.

202	SEAWOLF	AS DIR BY OTC	0600R	SEA OWL	AS DIR BY OTC	SERVICES	23

OTC: CO USS SEAWOLF (SSN575) OCE: CO USS SEA OWL (SS405)
Communications: G15E Primary, C25AC Secondary.
SEAWOLF/SEA OWL rendezvous vicinity center area 23 about 090600R. SEA OWL provide services as directed by OTC.

401	JALLAO	AS DIR BY OTC	0600R	SENNET	AS DIR BY OTC	S-4-T S-6-T	33

OTC: CO USS JALLAO (SS368) OCE: CO TARGET SHIP
Communications: G15D Primary, C25BL Secondary.
JALLAO/SENNET rendezvous vicinity center area 33 about 110600R. JALLAO make initial target run for SENNET, then make alternate runs as requested by SubScol instructors until about 111400R.

OTC: OCE:
Communications:

SHIPS IN UPKEEP IN NEW LONDON

Submarine Base
USS PIPER (SS409)
USS TENCH (SS417)
USS CONGER (AGSS477)
USS ANGLER (SS240)
USS CROAKER (SS246)
USS SKATE (SSN578)
USS CAVALLA (SS244)
USS TULLIBEE (SSN597)
USS HARDHEAD (SS365)
USS BLENNY (SS324)
USS IREX (SS482)
USS SABLEFISH (SS303)
USS BECUNA (SS319)
USS HALFBEAK (SS352)
USS SEAWOLF (SSN575)

State Pier
USS TUSK (SS426)
USS SKYLARK (ASR20)

SHIPS IN OVERHAUL

Philadelphia
USS GROUPER (AGSS214) RFS 24 MAY
USS FULTON (AS11) RFS 8 MAY

E. B. Company
USS SKIPJACK (SSN585) RAV
USS TRITON (SSN586) RFS 8 JUL

Portsmouth
USS DOGFISH (SS350) RFS 26 JUL
USS ALBACORE (AGSS569) RFS 6 SEP
USS THRESHER (SSN593) PSA

Boston
USS TRINGA (ASR16) RFS 13 JUL

SHIPS ON DETACHED DUTY

USS COBBLER (SS344), USS SARDA (AGSS488), USS SEA ROBIN (SS407), MED, ETR 29 MAY
USS BANG (SS385), SUBWINTEX
USS NAUTILUS (SSN571), SUBSPRINGEX

N-O-T-E-S

NOTE 1: OTC ensure safety of retrievers and provide escort for retrievers when out of sight of land.

NOTE 2: Circuit C25CT Primary assigned for non-scheduled air operations.

NOTE 3: The below listed submarines are designated visiting submarines in accordance with COMSUBFLOT TWO INST 1510.2 (Submarine School Training).

DATE	DAY	SUBMARINE
8 APR	MON	USS PIPER (SS409)
9 APR	TUE	USS BLENNY (SS324)
10 APR	WED	USS CONGER (AGSS477)
11 APR	THU	USS TULLIBEE (SSN597)

NOTE 4: The degaussing station facilities are under evaluation. When the second substitute pennant is flying at the degaussing station, ships entering/leaving the SUBASE will run the degaussing range (markers on piers 14 and 15) at a speed of 6-8 knots. Upon completion of the run report draft readings to New London Control or the degaussing office, telephone number 3132.

NOTE 5: Blowing of Sanitary Tanks. Submarines are encouraged to blow sanitary tanks at the spoil area (App 28G) or further out to sea when entering or leaving port.

NOTE 6: ALSUBLANT 81 applies.

NOTE 7: SEAWOLF assigned Lane ALFA only for the following times:

081800R-090800R and 101200R-112400R.

ITE Skylark (AGR-20) ZONE DESCRIPTION +5 DATE TUESDAY 9 APRIL Monday (Day) 8 (Date) April (Month), 1963

MESSAGE FROM NEW LONDON CONN. TO

TIME	RECORD OF ALL EVENTS OF THE DAY
	0000-0400
	000 - LTJG (b) (6) OMOW: (b) (6) QMSA
	UNDERWAY AS BEFORE IN ROUTE FROM STATE PIER
	NEW LONDON CONN. TO BASTOW OPA AREA NO. 1 B. IN ACCORDANCE
N.C	WITH COMSUBFLOT TWO MESSAGE 170432Z APR. 63 OPR-3 SER 844 APRIL 1963 DATED 2 APRIL
	1963.
0005	C/C 074°T
0016	C/C 070°T (085° PSTGC)
0022	C/C 068°T (083° PSTGC)
0031	C/C 064°T (080° PSTGC)
0032	RADAR CONTACT "G" 055°T 14000. 100 YDS.
0043	C/C 070°T (086° PSTGC)
0048	RADAR CONTACT "D" 040°T 7000 YDS.
0101	A/A 1/3
0107	A/A 2/3
0110	RADAR CONTACT "E" 072°T 14500
0111	A/A STAND
0115	A/STOP ANSWERING BELLS & MAIN ENGINES
0140	C/C 071°T (086° PSTGC)
0209	C/C 065°T (080° PSTGC)
0226	4/10°/R COMMING TO 058°T (073° PSTGC)
0228	PASSED BUZZARDS BAY LIGHT ABEAM STBD 2060 YDS.
0233	A/A 1/3
0235	4/15°/R
0238	A/A 2/3 STEADY ON 035°T
0239	C/C 034T C/C 015T (029° PSTGC)
0246	4/10°/R C/C 034°T (048° PSTGC)
0256	4/20°/R C/C 086°T
0258	A/STOP A/A 2/3 ANSWERING BELLS FOUR MAIN ENGINES
0300	STEADY ON 086°T (101° PSTGC)
0300	C/C 083°T (100° PSTGC)
0304	A/A STAND.
0310	C/C 066°T (083° PSTGC)
0311	C/C 060°T (075° PSTGC)
0313	C/C 058°T (073° PSTGC)
0317	C/C 064T (081° PSTGC)
0322	RADAR CONTACT "INDIA" 041°T, 11800 YDS
0328	4/5°/R C/C 060°T C/C 055°T
0329	C/C 051°T (066° PSTGC)
0336	RADAR CONTACT "J" 031°T 18500 YDS.
0343	4/5°/R C/C 031°T (042° PSTGC)
0345	C/C 028°T (043° PSTGC) (b) (6)
0350	A/A 2/3
0355	4(jg) (b) (6) has the deck and conn
0359 0401	~~4/5°/R STAND C/C 035°~~
	000 LTJG (b) (6) 04-08 OMOW (b) (6) QMSA
	UNDERWAY AS BEFORE

EXHIBIT 34 - 29 pages

USS USS Skylark (AM-63) DESCRIPTION ex DAY Tuesday 2 April 1963
MESSAGE FROM New London, Connecticut TO Buzzards Bay, Mass.

TIME	RECORD OF ALL EVENTS OF THE DAY
0600	STEAMING AS UNDERWAY
0605	Shifted signal bag & bucket detail making all preparations for entering Cape Cod Canal
0612	P/C 025° T
0615	R/L 5°
	Passed buoy 1 in all respects for Special Sea and Anchor Detail
	R/Hand R/L 5° R/Hand
	Passing Cleveland Point Ledge light abeam to stbd 100 yards Entering Cape Cod Canal Channel
0616	Steady on 041° T
0617	P/C 013° T
	R/W Standard
0619	P/C 012° T (Brgs 046°)
0621	P/C 014° T
0622	P/C 013° T (Brgs 025°)
0623	P/C 012° T
0625	P/C 013° T
0626	P/C 012° T
0628	P/C 013° T
0629	P/C 16° R/R 15° P/C 20° R/Hand meet her P/C 15°
	R/Hand P/C 033° T
0630	P/C 034° T P/C 033° T P/C 032° T
0631	P/C 031° T R/W Std
0632	R/W Standard
	P/C 030° T
0636	P/C 031° T P/C 032° T
0638	P/C 031° T
0640	P/C 032° T
0642	P/C 033° T P/C 034° T P/C 035° T P/C 036° T
	R/R 5° R/Hand
0643	Steady on 041.2° T
0644	R/W Std P/C 043° T P/C 044° T P/C 045° T
0645	P/C 046° T
0646	R/R 5° R/Hand Steady on 057° T
0647	R/R 5° R/Hand P/C 067° T
	900 Shifting signal to flying bridge
0648	R/W Standard
0650	Follow 20 yards left of center channel by Navigator
	P/C 066° T
0651	R/L 5° R/W Johnson P/C 055° T P/C 053° T
0654	R/L 5° R/W Hand
	Following center of channel by Navigator
	P/C 032° T
0655	R/W 2/3 R/L 5° R/Hand P/C 033° T R/L 5° R/Hand
	P/C 036° T

Skylark (ASR-20) ZONE DESCRIPTION Y DATE Tuesday (Day) 9 (Date) April (Month) 19 63

FROM New London, Connecticut TO Caribou Op. Area

TIME	RECORD OF ALL EVENTS OF THE DAY
	0800 - 0200 next
0457	C/C 065° T
0458	R/R 5° R/A mid
	bearing readout of channel by Navigator
0500	C/C 060° T
0501	R/R 5° R/A mid R/R 5° R/A mid steady on 080° T
0502	R/R 5° R/A mid steady on 085° T
0506	C/C 096° T C/C 092° T C/C 078° T
0507	C/C 092° T C/C 094° T
0509	R/L 5° R/A mid steady on 090° T
0511	R/L 5° R/A mid steady on 062° T
0512	R/A standard
	Observed Sunrise Turned off running lights
0515	Secured special sea and anchor detail set regular
	underway watch, exhaust section one (1)
	C/C 065°
	passed buoy #1 Thimble Shoal at entrance Cape
	Cod Canal
	005 Skylark will be pilot house
0525	R/L 10° C/C 800° T
	Cape Cod Canal Buoy Bearing 311° T at
	with Cape Cod Canal Buoy bearing 311° T at
	a distance of 3200 yards at course of 800° T
0526	(illegible) Watson has the helm and Brown
0702	C/C 005° T
0709	C/C 010° T
0715	C/C 005° T
0240	C WO (b) (6) has the deck and Brown (b) (6) QMOW
	0800 - 1200
	000 - 0400 (b) (6) QMOW (b) (6) C.E. GATE
	"STANDING AT ANCHOR"
0858	C/C TO 357°
0745	MUSTERED THE CREW ON STATIONS. ABSENTEES - NONE (b) (6)
0930	A/10° RUD C/C TO 015° T TO AVOID LOBSTER POTS
0934	C/C TO 005° C/C TO 000° C/C TO 355° T
0940	C/C TO 320° T
0941	C/STB A/A 2/3
0945	ANSWERING BELLS ON TWO MAIN ENGINES A/E STOP A/E AHEAD 1/3
0949	A/E AHEAD 1/2 MADE RENDEZVOUS WITH U.S.S THRESHER (SSN593)
0950	4/15° RUD
0953	A/A 2/3
0954	C/C TO 180 A/15° RUD C/C TO 135° T
0958	A/ASTD C/C TO 320° T C/C TO 325° T
1008	A/A 1/3 MADE ROUTINE INSPECTION OF MACHINE DEPARTMENT; CONDITIONS NORMAL
1014	A/A STD 4/15° RUD STA RUD CHANGE ME

USS Skylark (ASR-20) DUTY DESCRIPTION TS DATE Tuesday 9 April 19 62
(Day) (Date) (Month)

AT/PASSAGE FROM Boston OP-AREA TO

TIME	RECORD OF ALL EVENTS OF THE DAY
1015	P/15°PORT MANEUVERING TO TAKE STATION 400 YDS ON THE PORT SIDE OF THE U.S.S. THRESHER (SSN 593)
1016	C/200' PUB. ANNOUNCE
1018	P/20° PORT C/TO 070°T
1020	A/E STOP ANSWERING BELLS ON FOUR (4) MAIN ENGINES A/A STD
1022	A/E STOP
1036	A/E AHEAD ½ 4/10° PORT
1043	4/15° PORT P/20° PORT
1045	4/C TO 100°T (119° PSTBD)
1047	4/C TO 110°T A/E AHEAD ½
1048	4/FULL PORT
1049	4/C TO 330°T
1050	4/5° PORT MAKING 10 KTS SPD
1051	PUB. ANNOUNCE
1052	4/C TO 310°T (328° PSTBD)
1053	4/C TO 330°T (349° PSTBD)
1058	4/C TO 310°T
1059	4/C TO 290°T
1100	4/C TO 270°T CHRONOMETERS WOUND AND COMPARED
1101	4/C TO 250°T 4/5° PORT
1103	4/C TO 220°T (241° PSTBD)
1104	4/C TO 240°T (262° PSTBD)
1108	4/5° PORT
1110	4/10° PORT
1111	4/C TO 130°
1124	A/E AHEAD ½
1130	4/C TO 120°
1133	A/A STD P/25° PORT A/A ½
1134	A/A STD & COMMENCED MANEUVERING TO INVESTIGATE DISCOLORATION IN WATER ASTERN OF THIS SHIP
1135	C/C TO 310°
1136	P/5° PORT A/A ½ 4/C TO 324°
1137	4/C TO 323°
1138	A/A STD ½ A/E BACK ½ DISCOLORED AREA ALONGSIDE TO STBD
1140	A/E STOP P/FULL PORT A/E AHEAD ½
1141	4/C TO (b) (6) ASSUMED THE CON 4/FULL PORT
1142	A/E AHEAD ½
1145	A/E AHEAD ½
1146	A/E STOP
1147	P/20° PORT WATER PREVIOUSLY REVIEWED BY (b) (6) USNA
	4/ STRAIGHT AHEAD (b) (6)
1158	4/FULL A/A ½
1253	A/A ½ A/E AHEAD
	A/A ½ STEADY ON COURSE 215° (PSEUDO)
1452	A/E AHEAD A/A ½
1457	COMMENCED ON 3 LEG EXHIBIT 3

FROM SKYLARK (ASR 20) TIME DESIGNATION +5 DATE TUESDAY (Day) 9 APRIL (Date) (Month) 63

WITNESSED FROM BOSTON OP-AREA TO

TIME	RECORD OF ALL EVENTS OF THE DAY
	ASR's DEPARTURE
	AA 12
	ASR ETA (b) (6) PASS (b) (6) ASR'A
	ENGAGEMENT AS BEFORE
1120	SPEAK ASTERN 70 MILES STEAM AT 20 KTS HEADING 045
1121	N/A N3
1201	OK ASTERN 30 (OUTBOUND)
1203	ASTERN
1204	ASTERN 2 MILES 2 MILES EASTWARD AND 1 MILE OFF THE LAND
1205	N/A N3
1210	N/A N3 4 FULL AWD OK 30 (OUTBOUND)
1212	N/A N3
1214	OK FULL
1215	OK 350° ASTERN STEAM N/A N3
1216	LEFT TO 340° (BACK ASTERN)
1220	ASTERN
1223	N/A N3 STEAM
1224	N/A N3
1225	OK 040° N/A N3 (INBOUND)
1232	N/A N3
1232	MARKS 30 APART
1237	20 MILES
1245	30 APART N/A N3
1246	N3 OK 114° (WAS 135°) CLOSE
1249	NOW N/A N3
1323	30 MILES
1329	20 MILES
1340	N/A N3 OK 020°
1341	N/A STEAM OK 060°
1343	OK 040° (BASE COURSE)
1347	OK 060°
1348	N/A N3 ASTERN N/A N3
1350	SPEED 110° (OUTBOUND)
1351	STEAM IN N/A STEAM N3
1355	SPEED 30 KNOTS
1356	CLOSE CLOSE
1402	120° (130° OUT) 30 MILES
1410	20 MILES
1412	OK 114° (BASE)
1417	ASR RELEASE STEAM CLOSE N/A STEAM
1423	OK 180° (140° OUT)
1429	(b) (6) ASR HAS BEEN RELEASED
1537	STEAM N3 TO ASR 120°

(b) (6)

EXHIBIT 34

USS [redacted] (ASR-20) PORT VISITED [redacted] DATE [redacted] (Day) [redacted] (Month) [redacted] (Year)

DEPARTED FROM [redacted] TO [redacted]

TIME	RECORD OF ALL EVENTS OF THE DAY
	[redacted]
	[redacted] (b) (6) [redacted] [redacted] (b) (6) [redacted]
	[redacted]
	[redacted]
	[redacted] (b) (6) [redacted]
	[redacted] (b) (6) [redacted]
	[redacted]
	2000-2400
	000-2400 (b) (6) [redacted] (b) (6) [redacted]
	"STEAMING AS BEFORE"
2000	PT LOG READING 63138 POSITION 42°15.2'N 68°18.3'W
2117	HELO STEERING CASUALTY DRILL) SWITCH STEERING CONTROL TO AFTER STEERING STEERING AT POINTER
2120	COMMENCED STEERING BY GYRO
2124	AFTER STEERING SWITCH STEERING CONTROL TO PILOTHOUSE
2233	SIGHTED UNIDENTIFIED CONTACT BEARING 090° DISTANCE 8.5 MILES
2347	WATCH PERSONNEL RELIEVED BY (b) (6) [redacted] (b) (6) [redacted]
2347	CONTACT "ALFA" LOST
2359	CONTACT ALFA LOST
2359	CONTACT "2" LOST

EXHIBIT 32
6

Sunset (ASP 20) ... (Day) ... (Date) ... (Month) ... 19

Central AOR AREA

TIME — RECORD OF ALL EVENTS OF THE DAY

0000 - 0400

0400 Crew (b) (6) ... Patrol (b) (6) ... 2016

Steamed independently to localized water [illegible]

to exercise areas, test fired guns and small arms [illegible]

(PRACTICE) AT CENTRAL AREA from Assn. Exercises

[illegible] Local op. "A" AREA ASC [illegible]

[illegible] Comm contact "Echo" and his Helicopter

[illegible] Comm contact Patrol Bkt and Patrol

[illegible] Ye ASC (Underway)

[illegible] Ye ASC (Anchored)

[illegible] Ye ASC (Underway)

[illegible] Ye ASC

[illegible] Ye WAT (Anchored)

[illegible] WAT (Underway)

[illegible] Comm contact "A" ASC Inspectors

[illegible] Comm contact "E" ASC Inspectors

[illegible] Comm contact "I" ASC Inspectors

[illegible] Comm contact "L" ASC Inspectors

[illegible] Comm contact "L" ASC Inspectors

[illegible] Ye ASC (Anchored)

[illegible] Ye ASC (Underway)

[illegible] Ye ASC

[illegible] Ye WAT (Underway)

[illegible] Radar contact "N" ASC MST Approx 10S

[illegible] MAN STEERING CAPACITY INSTRUCTION (SEW)

[illegible] Secure from Steering Capacity (SEW)

[illegible] Ye ASC on Course "N" MAST Approx

[illegible] Ye ASC (Anchored)

[illegible] Anchor "A" ASC AREA and Inspectors

[illegible] Radar contact "E" ASC Inspectors

[illegible] Comm contact "D" ASC Inspectors

[illegible] Comm contact "D" ASC MST Inspectors

[illegible] Comm contact "L" ASC Inspectors

[illegible] Comm contact "L" "D" Anchor ASC and Inspectors

[illegible] Comm contact "L" ASC Inspectors

[illegible] Comm contact "L" Patrol ASC ASC Inspectors

[illegible] Contact "L" Patrol ASC and Inspectors

(b) (6)

Subm - Piers

Underway to Patrol

0715 Sighted (b) (6) ... Ordered ... Sunrise ... Secured ... Anchor ... Patrol

0800 Pilot

0812 Pilot 35° Ye 330° T

0813 Secure Anch

0815 Ye 181 Rig 20° Exhibit 3A

Skylark (ASR-20) ZONE DESCRIPTION +5 DATE Wednesday 10 April 19 63
(DAY) (DATE) (MONTH)

AT/ENROUTE FROM Boston Op Area TO

TIME	RECORD OF ALL EVENTS OF THE DAY
	0000 - 0400 [illegible]
[illegible]	C/c 121° T (PSTGC 145°)
[illegible]	C/c 330° T
[illegible]	A/E 2/3 C/c 5° commenced circling on station, exercising
	with USS Thresher SS(N) 593
0120	A/stop [illegible]
[illegible]	answering bells on one (1) main engine
[illegible]	A/E full
[illegible]	A/E 1/3 A/stop
[illegible]	A/E 2/3 C/c 310° T
[illegible]	A/stop
[illegible]	A/E 1/3 A/E full C/c 250° T
[illegible]	A/stop
	(b) (6) [illegible]
0747	U.S.S. THRESHER (SS(N) 593) COMMENCED DEEP DIVE
0750	HELD GERTRUDE CHECK WITH U.S.S. THRESHER
0745	MUSTERED THE CREW ON STATIONS, ABSENTEES: NONE
[illegible]	B/FULL AHD A/A 1/3
	(b) (6) [illegible]
	0800-1200
	OOD - LT(JG) (b) (6) JOOD - (b) (6) [illegible]
	STEAMING AS BEFORE
0800	POSITION 41°-46'N 65°-03.2W
0805	C/c TO 180° T
0835	B/FULL AHD A/FULL AHD A/E STOP A/A 1/3
0836	C/c TO 130° T
0837	C/c TO 110° T MAKING 10 RPM
[illegible]	A/FULL AHD C/c TO 130° C/c TO 180° C/c TO 180°
0840	C/c TO 120° T (143° PSTGC)
0844	C/c TO 140° B/FULL AHD
0845	C/c TO 150°
[illegible]	B/FULL AHD C/c TO 210°
[illegible]	B/FULL AHD
[illegible]	C/c TO 310° T (333° PSTGC)
[illegible]	B/FULL AHD - RECEIVED WORD FROM THRESHER OF DIFFICULTIES IN CONNECTION
	WITH DEEP DIVE
0911	A/E STOP
0915	A/E AHEAD 1/3 C/c TO 220° C/c TO 270°
0917	A/E STOP ANSWERING BELLS ON FOUR (4) MAIN ENGINES HAD LOST COMMUNICATION
	WITH U.S.S. THRESHER SS(N) 593
[illegible]	B/FULL AHD THIS SHIP TRYING TO ESTABLISH COMMUNICATIONS EVERY MINUTE WITH [illegible]
[illegible]	C/c TO 045°
[illegible]	B/FULL AHD C/c TO 090° T
[illegible]	A/FULL AHD C/c TO 090° T ([illegible] PSTGC)
[illegible]	A/FULL AHD A/A 1/3 C/c TO 290° T (312° PSTGC)
[illegible]	MADE DAILY INSPECTION OF MAGAZINES TEMPERATURES; CONDITIONS NORMAL
[illegible]	A/A 1/3 [illegible]

RECORD OF ALL EVENTS OF THE DAY
Ship Log Continued

(b) (6)

(b) (6)

(b) (6)

Skyfall (Act 2a) [illegible] 15th [illegible]

Bell, Q, Moneypenny

TIME	RECORD OF ALL EVENTS OF THE DAY
1325	3 [illegible] [illegible] [illegible]
1327	R/L 190° T (range 1920)
	[illegible] (b) (6) [illegible]
	[illegible]
	[illegible] (b) (6) [illegible] (b) (6) [illegible]
1605	[illegible] [illegible] [illegible] [illegible] [illegible]
	[illegible]
1624	R/L 090° T (range 11 M)
1632	R/Base [illegible] [illegible] 24 [illegible] 2000 [illegible]
1646	R/L 010° T R/A Skyfall [illegible]
1648	(range 9.2 M)
1655	[illegible] "C" [illegible] 230 9500 [illegible]
	R/A ½
1206	R/A Skyfall
1208	R/L 015° T
1212	Radio [illegible] [illegible] [illegible] Recovery (ARS.43)
1212	[illegible] Recovery [illegible] Radio [illegible] [illegible]
	Skyfall will be [illegible] with [illegible] Recovery
1219	R/A ½ R/L 135° T
1222	R/L 130° T (range 194 M)
1224	R/L 225° T R/A Skyfall R/L 290° T R/A Gun
1226	(range 310 M) R/L 10° R/A Skyfall [illegible] R/L 330° T
	R/L 10° R/L 235° T
1232	[illegible] Recovery has [illegible] Skyfall [illegible]
1238	R/L 298° T (Range 318 M)
1244	R/A ½
1245	R/L 5° R/A Lobo
1248	R/L 5° Skyfall R/L 285° T
1249	R/Lobo
1250	R/L 10° R/A ½
1252	R/A Skyfall R/L 10° R/L 5° R/L Gun R/A Lobo
1253	R/Lobo Skyfall [illegible] [illegible] Skyfall
1254	Observed Survivor [illegible] on [illegible]
1603	R/L Gun R/A ½ [illegible] [illegible] R/L [illegible] R/L [illegible]
1264	R/A ½ R/A 15° R/A [illegible] R/L 10° R/L [illegible] R/L 10° R/L
1605	R/L 20° R/L [illegible] R/A 10° R/A Gun R/A [illegible]
1606	R/L 10° R/L Gun R/A ½ R/Lobo R/A [illegible]
1802	R/A ½ R/A ½ R/Lobo R/L 10°
1803	R/A ½
1812	R/A ½ R/L [illegible] R/L 130° T
1814	R/Lobo R/L 5° R/L 135° T R/A ½
1815	R/L 5°
1816	R/A [illegible] [illegible] [illegible] 150° T
1819	R/A 10 R/A [illegible] [illegible] 150° T
1826	R/A 10° R/A 165° [illegible]

TIME	RECORD OF ALL EVENTS OF THE DAY
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(b) (6)

(b) (6)

EXHIBIT 38

ON Skylab (SL-2) DAY NUMBER 28 OF MISSION 28 (Total) 28 (Skylab) 0 (ASTP)

ATTENDING Sole Occ. M

TIME	RECORD OF ALL EVENTS OF THE DAY
	At Ref Conf
0741	Lockout depressurized outside
0742	Crew at Lock (Complete)
0751	Access Ax Airlock Ax is Closed
0801	Lockout Depressurized Outside
0802	Crew Secure for Extravehicular Activity
0830	Crewmen Begin Donning Suits Airlock Depress
0840	EVA Visual Signal Exchange with Ground Station
0841	Lockout Depressurized Outside
0845	EVA Crew (Complete)
0848	Crew at Lock (Complete)
0851	EVA Crew
0853	Crewmen Exit (Complete)
0904	MDA Display Console EVA Crew
0905	Crewmen in Lock
0905	Crew at Lock (Complete)
0909	Crewmen in Lock
0910	Crew out Lock (Complete)
0911	Lockout Depressurized
0915	EVA Crew
0917	Crewmen Exit (Complete)
0918	Hand Control Ax EVA Crewman Control
0925	Hand Control Ax Viewing Center
0929	Crew
0930	Steady Lock (Continued)
0933	Airlock Ax Ax
0934	EVA Arms
0936	Steady Lock (Continued)
0938	Crewmen
0940	Umbilical Hoses & Attachment Tethered
0941	Crewmen
0944	Ax Lock Ax Pressure Gauge Lock Depressurized Steady Lock
0950	(b) (6) [redacted] (b) (6) [redacted]

USS Skylark (ASR-20) JOURNAL for the Period 0000 to 2400 hrs

ATTENDANCE FOR Sea Ops Area

TIME	RECORD OF ALL EVENTS OF THE DAY
	0000 - 0800
	Moored [redacted] (b) (6) [redacted] (b) (6)
	[illegible]
	[illegible]
	[illegible]
	[illegible]
	[illegible]
	[illegible]
0110	USS Yarnell made contact with USS Nitro [illegible]
	Mooring
0130	Set 10° [illegible]
0132	Set 20°
0133	[illegible]
0135	[illegible]
0201	Set 30 [illegible]
0204	[illegible]
0211	[illegible]
0217	[illegible]
0247	[illegible]
	[illegible]
0254	Set 40
	(b) (6) [redacted]
0302	[illegible]
0313	Pipe Alongside at [illegible] Pipe
0327	Secure Gangway [illegible]
	Set = AP
0400	Call (b) (6) [redacted] (b) (6) [redacted]
	Standing By Offload
0440	To Quarterdeck Station Fire Bill
0441	Pipe "All Hands Muster Fire Bill"
0445	Station Secured
0455	Patrol Quarters [illegible] Secured
0456	Offloading Complete
0500	Set (b) (6) [redacted]
0522	USS Yarnell [illegible] Moored Outboard [illegible]
	Engaged Again, [illegible]
0525	Pipe "Reveille"
0530	Secure AP Set (Two Anchor)
0535	Set Zero Six 027° (Inclusive)
0536	Proceeded To Starboard Mid Berth in Accordance
	with Use and Ecol Message [illegible]
0543	Assistance Tugs & Mooring Lines [illegible]
0547	Moored Port Side Pier Starboard Side [illegible]
0549	Secure Ops
0550	Set ZCD [illegible]

(b) (6)

(b) (6)

TIME	RECORD OF ALL EVENTS OF THE DAY
0831	
0832	
0845	
0846	
0847	
0906	
0907	
0915	
0918	
0920	
0923	
0926	
0938	
0940	
0942	
0943	
0945	
0948	
0949	
0952	
1000	
1016	
1017	
1018	
1026	
1027	
1028	
1033	
1034	
1038	
1043	
1044	
1047	
1049	
1100	
1102	
1112	

USS Shiloh (CG-67) ... Sunday ... April ... 19 ...

At Sea, Op Area ...

TIME	RECORD OF ALL EVENTS OF THE DAY
	0700-1200 Seal
1115	USS Ronald Reagan (CVN-76) ... Light Blue Smoke
	P/Yellow Flag Flashing Signal ... Left Light Blue Smoke
1113	P/Yellow Answering Pennant ...
1118	P/E 10° ...
1125	P/E 25 ...
	Ordered ... Ordered ...
1127	P/E 10° ... P/E 10° ...
	S/E 130° T
1128	P/E 25
	After steering ...
1132	P/E Full
1134	S/E 000° T (ORIGIN 015°)
1137	P/E 10° S/E 324° T (ORIGIN 310°)
1140	Clear (b) (6) ...
1142	S/E 309° T P/E 15
1144	Ordered ...
	Heading ...
1149	P/E 10° ...
1150	USS Sunbird (DDG-87) ...
1151	P/E 10°
1153	P/E 20
	(b) (6) Clark
1157	STEADY AS SHE GOES 140° T (140° PSTG)
1159	All ahead STEADY AS 140° T
	1200-1800
	All ahead (b) (6) ... (b) (6) ...
	Secured as before
1202	All ahead flank
1203	Steady ... (Courses)
1206	Small ...
1216	Clear
1220	30° (Courses) ... 140° T
1221	330° (Courses) ...
1225	All full ...
1229	Astern ...
1230	All ... Astern
1231	All ... Astern All ...
1233	All ... Astern All ...
1239	All ... Astern ...
1242	Astern ...
1245	All ... Astern
1246	Ahead
1248	All ... Astern ...
1249	All ... Astern
1250	Astern All
1251	All ... Astern
1252	Ahead
	Secured ...

USE Street Road ZONE DESCRIPTION DATE Friday 11 April 1952

ATTENDANTS Bob Op Ass. H

TIME	RECORD OF ALL EVENTS OF THE DAY
	Use Speed
1201	Steer By Stand Steer Ahead
1202	Cruise Level. Steer By Hs By Hs
1203	Steer Speed Limited to Master Clock
1205	By Hs Steer Ahead
1206	By Hs
1207	By Hs
1250	Steer 180° (Centre)
1456	Cruise Level. By Hs
1257	By Hs
1259	By Hs
1257	Commence to Accel°E
1300	Cruise Level
1301	Steer Steady As She Goes 270°
1304	Commence Decel to Set F
1306	Continue Decel to Set F (Completed)
1307	Engine Stop Ho Cool Down Use Radars (Off)
1307	Start to Accel
1308	Up Ops Ho Ops F (Completed)
1309	Go Ahead (Completed)
1310	By By
1315	Steer
1317	By Hs
1328	Radars (Off) Indicate Approach Speed Full Ahead Stop Full Astern
	Go Light Line Tripped
1333	Radars (Off) Also Side Fixed Marks
1335	Commence Light Line Passage By Buoys and
	Channel of Pool.
1344	Second Light Line Passed Complete
1341	By By
1346	Ops Ops
1349	Steer Ahead (Completed)
1401	Hrs Cruise
1404	Steer Ahead (Completed)
1406	Ops Ops
1408	Steer Ahead (Completed)
1501	Ops Ops (Completed)
1503	By Hs Commenced to Ease Ex Rev to Idle
1507	By By
1515	Cruise
1518	Steer As See Goes 270°
1518	Ops Ops Cruise By Stand
1520	Ahead Clear
1521	Ops Ops By By (Completed)
1526	Cruise By Stand
1527	Ease to Ahead By By
1528	Ops Ops

RECORD OF ALL WORKS OF THE DAY

TIME

(b) (6)

AIR Skyhawk (BSR-20) AIR DESCRIPTION 35 nm Northbound Base 4.50

LITHOSPHERE TYPE Bottle Op Base 10

TIME	RECORD OF ALL EVENTS OF THE DAY
	LOG - BASE Read
1324	A/B ½ A/B 3/2
1329	USS Oldendorf heavy 180° range 4,500 yds @ 130 RPGC
1328	A/C 20° Ready on 315° R/Cpc
1330	USS Oldendorf heavy 180° range 4,000 yds @ 130 RPGC
1336	A/B ½ A/B 3/2
1337	A/B ½ A/B 3/2
1343	A/B ½ A/B 2/2
1342	USS Oldendorf heavy 140° range 12,500 yds
1349	A/B ½ A/B 3/2
1350	A/B ½
1351	Darlene heavy 60° range six miles
1352	A/C 10°
1354	Ready on 315° R/Cpc
1355	Observed Sunset Turned on running lights
1353	A/B 2/2
1405	A/B ½ A/B 2/2
1406	A/B ½ A/B 2/2
1419	A/B ½ A/B 2/2
1424	A/B ½ A/B 2/2
1427	A/B ½ A/B 2/2
1446	Darlene heavy 030° range 6 miles
1451	A/B ½
1453	A/C 325° R/Cpc
1456	Mode 60 RPM
1462	A/C 340° R/Cpc
1903	Darlene heavy 080° range 35 miles
1909	A/C TO 330° R/TGC
1912	A/C TO 315° R/TGC
1930	Sunset heavily
	Mode OF night Control Tower (b) (6) Squawk
	Base - Base
	300 ft/sec (b) (6) Course (b) (6) Speed
	MAINTENANCE AT BASE
2000	Ships Position: 41°40'S, 46°30' W
2010	All By Flight
2015	A/C 120°R/TGC
2019	Steady on 120°R/TGC
2041	A/C 120°R/TGC, A/B 3/2
2042	A/C 120°R/TGC
2045	A/C 120°R/TGC
2056	A/C 120°R/TGC
2107	A/C 120°R/TGC
2108	A/C 120°R/TGC
2110	A/C 120°T (077°R/TGC) Increase Altitude
2117	Ships Log

USS Seawolf (SSN 21) PATROL NUMBER 1 ON Thursday 2 April 19 93

AT MAGNETIC TYPE Sea Area 4

TIME	RECORD OF ALL EVENTS OF THE DAY
	Set AR Secty
2116	Up 3rd
2135	Ge 180 ft (Conference)
2136	Up 1st
2141	Up 3rd
2155	Ge 240 ft
2156	Ge 180 ft (Conference)
2142	Ge 240 ft Ge 180 ft
2142	Ge 240 ft (Conference)
2142	Light
2146	Ge 240 ft (Conference)
2148	Ge 240 ft
2149	Ge 240 ft (Conference)
2150	Light Ge 240 ft
2151	Ge 240 ft (Conference)
2152	Light Ge 240 ft
2153	Ge 240 ft (Conference)
2156	Ge 240 ft
2157	Ge 240 ft (Conference)
2210	Light Up 1st
2212	Ge 240 ft Up 3rd
2213	Ge 240 ft (Conference)
2214	Ge 240 ft (Conference) Up 1st Up 3rd
2215	Up 1st Up 3rd
2256	Comms
2300	Ge 240 ft Comms
2302	Ge 240 ft (Conference)
2305	Comms
2320	Radar contact on Right 5 degrees Can not Assess
2323	Up 1st Up 3rd Ge 240 ft Ge 180 ft Steady
2325	Ge 240 ft Ge 180 ft
2326	Ge 250 ft
2327	Ge 220 ft (Conference) Secret Material Aboard
2331	Up 1st Ge 180 ft Ge 220 ft
2332	Up 3rd Ge 240 ft
2334	Ge 310 Comms Up 3rd
2335	Ge 315 (335 Pstec)
2336	Ge 320 (335 Pstec)
2338	Ge 310 ft Assumed Radar Contact Bearing
2340	Ge 300 Up 1st Up 3rd
2341	Up 1st Radar Contact Ceased
2344	Ge 310 ft (315 Pstec)
2345	Ge 310 Up 3rd Comms
2347	Ge 310 (315 Pstec)

(b) (6)

Enlisted Log

USS SKYLARK (ASR-20) ... FRIDAY 12 APRIL 1963

ATTENDANCE VICINITY 41° 45'N 65°-00'W

TIME	RECORD OF ALL EVENTS OF THE DAY 0000-0400
	000-CMO (b) (6) OMOW - (b) (6) OMO
	STREAMING IN COMPANY WITH U.S.S. RECOVERY (ARS-43), U.S.S. VREELAND (DLG-17), U.S.S. LIND (DD-703), U.S.S. SOUTHERN (ASR-16), U.S.S. NORFOLK
005	(DL-1), AT S.S. 5.8 KNOTS WITH COMSUBDEVGRU 2 EMBARKED, U.S.S. S.B. ROBERTS (DD-823), U.S.S. WILLIAM M. WOOD (DD-845) WITH COMDESRON 24 EMBARKED, U.S.S. BLANDY (DD-943) WITH DEPCOMSUBLANT EMBARKED
007	U.S.S. THE SULLIVANS (DD-537), U.S.S. SEA WOLF (SSN-575) AND U.S.S. SEADRAGON (SSN-686) AND THE P/N ATLANTIC AS A UNIT OF TG 89.7. BASE COURSE IS 310°T (335°PSTG) AT 5 KNOTS ON FOUR (4) MAIN ENGINES. TG 89.7 IS CONDUCTING A SEARCH FOR THE U.S.S. SCORPION (SSN-589). MATERIAL CONDITION "YOKE" IS SET THROUGHOUT THE SHIP. SOPA IS DEPUTY COMMANDER SUBMARINE FORCES ATLANTIC FLEET.
0000	LAT 41-46.4 POSITION AT 40.7'N 64-57.6'W
0005	C/C TO 320°
0155	C/C TO 350° (005° PSTG)
0243	C/C TO 355° (010 PSTG)
0253	C/C TO 325° C/C TO 320° (315° PSTG)
0258	A/A Y3 30 RPM
0314	C/C TO 320°
0317	A/A Y3
0319	C/C TO 005 (105° PSTG)
0339	A/A Y3 C/C TO 300°
0343	C/C TO 316°
0344	A/A Y3
0346	A/A Y3
0355	WATCH PROPERLY RELIEVED BY (b) (6) OMSA (b) (6) OMA
0357	MAKE 30 RPM
0358	C/C 330° T (PSTG 340°)
	(b) (6) OMOW - (b) (6) OMOW
0401	C/C 345° T
0403	C/C 335° T (PSTG 350°)
0415	MAKE 45 RPM
0442	OBSERVED SUNRISE SECURED ALL ANCHOR LIGHTS
0515	MAKE 40 RPM
0546	MAKE 45 RPM
0600	SHIP'S POSITION 41° 43.3' N 65° 42.4' W (b) (6) OMOW
	0401-0800
	0600 HRS (b) (6) OMOW (b) (6) OMOW
0800	ENDS EVOLUTIONS AS DESCRIBED
0800	ENDS DUTY AS UNDERWAY OFFICER
0800	ENDS DUTY AS UNDERWAY WATCH OFFICER AND TURNS OVER TO (b) (6) OMOW

(b) (6) OMOW

M/V SEAMARK (ASE 822) FOR YEAR 15 DATE 15 AUG 15 (DAY) (MONTH) (YEAR)

TYPHOON FROM MOBILE 41-58 N 65-14.5 W TO

TIME	RECORD OF ALL EVENTS OF THE DAY
	08 - 12 hours
1200	Ordered course 135°C and 200 revolutions
1145	2 PVG [illegible] (b) (6) was secured [illegible]
1146	Vessel 3/4 1/3 as [illegible] steering [illegible]
	(b) (6)
	1200-1600
	COD - 1716 (b) (6) (CMDR) - (b) (6) OM2
	"STEAMING AS REQUIRED"
1200	POSITION 41°58' N 65°-14.5' W
1344	COMMENCED MAKING 50 RPM
1421	A/A 2/3 4/PELLERIN
1422	4/C TO 133°T (157° PSTTGC)
1423	A/A 1/3
1425	COMMENCED MAKING 50 RPM
1514	A/A 2/3
1523	A/A 1/3
1532	4/C TO 138°T (146° PSTTGC)
1541	A/A 2/3
1545	CWO (b) (6) ASSUMED THE DUTIES AWO SEAMAN
1548	A/E STOP COMMENCED ANSWERING BELLS ON ELEC ENGINES A/A 2/3
1550	WATCH PROPERLY RELIEVED BY (b) (6) (RATE)
	(b) (6)
	1600 - 2000
	underway as before
	1600 CWO (b) (6) (CMDR) (b) (6) (RATE)
1603	P/E 10° steady on 140° T (PSTTGC 180°)
1607	S/C 150° T
1610	Shot [illegible] after steering special [illegible]
1613	S/C 165° T
1613	All [illegible] steering [illegible]
1620	P/E 20° S/C Full
1622	S/C 325° T (PSTTGC 345°)
1623	Ship [illegible]
1628	[illegible]
	P/E Full
	[illegible]
	P/E 5° steady on 140° T
1634	P/E 2/3 S/C 10° P/E Full
1635	P/E 10°
1636	P/E 5°
	S/C 320° T
1637	Made 90 RPM S/C 320° T
1638	P/E 5° P/E 20° P/E Full Ap
1639	S/C 310° T S/C 325° T
1640	S/C 340° T
	Alongside [illegible] steady [illegible]
1641	P/E 1/3 P/E 2/3

HMS Skylark (1858-20) ANTI-SUBMARINE 15 HMS Swallow 12 Basil 10 63

STATION Beechen Op Brest 19

TIME	RECORD OF ALL EVENTS OF THE DAY
	Mean + 2000 feet
1641	c/c 335° T c/c 328° T
1642	wake 90 80m
1643	c/c 340° T
1644	c/c 342° T
1645	c/c 343° T
1646	c/c 344° T
1649	c/c 342° T
	wake 32 80m
	c/c 341° T
1650	c/c 338° T wake 35 80m
	c/c 339° T
	c/c 340° T c/c 339° T
1651	c/c 340° T c/c 341° T
1652	c/c 343° T wake 32 80m
1653	c/c 342° T c/c 341° T c/c 342° T c/c 344° T
	wake 80 80m c/c 343° T wake 75 80m
1654	wake 90 80m
	Reason: c/c due on Divers
	while ...
1656	c/c 342° T c/c 346° T W/T c/c W/T 1/2 W/T 1/2 c/c 342° T
1657	W/T 1/2 c/c 338° T W/T 1/2
1658	Reason: due Divers on W/T
1659	c/c 345° T W/T 1/2 wake 85 80m
1700	wake 90 80m
1701	c/c 344° T c/c 345° T
1703	c/c 343° T wake 35 80m c/c 342° T wake 30 80m
1704	c/c 341° T c/c 340° T wake 37 80m
1705	c/c 339° T wake 83 80m c/c 340° T wake 30 80m
	c/c 338° T wake 82 80m
1706	c/c 337° T wake 92 80m wake 35 80m W/T 340° T
1707	c/c 338° T wake 84 80m c/c 339° T c/c 340° T
	wake 30 80m
1708	wake 25 80m c/c 341° T wake 10 80m
1709	c/c 342° T wake 65 80m c/c 343° T
1710	wake 60 80m wake 25 80m
1711	c/c 342° T c/c 341° T c/c 340° T
1712	wake 60 80m c/c 339° T c/c 338° T wake 62 80m
1713	wake 60 80m wake 85 80m wake 68 80m
1714	wake 30 80m c/c 340° T
1715	c/c 345° T wake 30 80m
1720	W/T line will not be completed in the area Labelled -
	Return to Base (Course 52 Speed Walkwell
	W/T Signal Pilot to Skywalker
1721	W/T 2/3
1723	c/c 342 340° T

Signature

ON Skyhook (USS Jason) AND STATION LC AND Tarawa 12 Depart Norfolk

WITHDRAWN FROM Bilge Oil Line TO Main Fuel Centrifuge (Port)

TIME	RECORD OF ALL EVENTS OF THE DAY Nov - 2020 AMAT
1225	P/E 30° S/E 245° T (Brgg 248°)
1227	P/W at Level
1234	Secure Main Engine, Assist to Level
1239	P/E 2°
1242	P/W Steadied P/E 10° Weather Bow 225° T S/E 230° T
1243	P/E 231° T P/E 10° P/E 228° T (Brgg 235°)
1244	P/E 225° T (Brgg 240°)
1247	P/E 2° P/E 230° T (Brgg 238°)
1251	P/E 5° P/E 245° T P/E 243° T (Brgg 248°)
1259	Observed Sunset Turned on Navigation Lights
1316	P/W 1/2 P/E 4m
1318	P/W Steadied
1319	P/W 1/2 P/W 2/3
1320	P/W Steadied P/W 1/2
1322	P/E 5°
1323	P/E 243° T P/W Steadied
1324	P/Stop * Manned & Released Engineroom Telegraph to Stop
	to Steady Pressure on the Hydraulic Fuel
1340	Call to the Mess Decks
1343	Steady Log & Take Last Bearing
	Set Alongside
1401	Rec'd Fuel at Pressure (b) (6) (b) (6) (b) (6)
	Rm3
1405	Set Away from Pier Side
1434	Secure Fuel Manifold
1446	P/W 2/3 P/W Steadied
1447	P/Stop P/W 2/3 P/E 20° Right Rudder 235° T
1449	Answering Bells on Spd (b) with Engine
	P/E 243° T (Brgg 248°)
1451	Secure all Ships Lines Ashore
	(b) (6) Aboard
	Pro Tem (b) (6) Aboard
2000	Set Condition Zebra, Set Cdr Log
2010	Rec'd Contact 2" Ash Pro Mess Decks
2011	Rec'd contact 3/4" Ash Rec'd Pressure 250 Set Test Pressure
	Main contact 3/4" Set Rec'd Pressure 250 Set Test Pressure
2020	Secured.
2030	Underway as Required
2034	P/E 335° T (Gyro Error)
2045	Rec'd contact 3/4" Rec'd Pressure 250 Set Test Pressure
2048	Rec'd contact 3/4" Rec'd Pressure 250 Set Test Pressure
2100	Secured Fuel Manifold Valves and Test Pressure
2104	Secured Fuel Centrifuge Supply Valves
2107	Secured Fuel Centrifuge Discharge Valves
2131	P/E 270° T Set Condition Zebra

TIME	RECORD OF ALL EVENTS OF THE DAY
1138	[illegible]
1143	[illegible]
1230	[illegible]
1252	[illegible]
1304	[illegible]
2205	[illegible]
2206	[illegible]
2208	[illegible]
2211	[illegible]
2213	[illegible]
2214	[illegible]
2215	[illegible]
2230	[illegible]
2231	[illegible]
2232	[illegible]
2233	[illegible]
2234	[illegible]
2235	[illegible]
2237	[illegible]
2240	[illegible]
2255	[illegible]
2256	[illegible]
2303	[illegible]
2310	[illegible]
2311	[illegible]
2313	[illegible]
2314	[illegible]
2318	[illegible]
2330	[illegible]
2346	[illegible]
2348	[illegible]
2350	[illegible]
2351	[illegible]
2352	[illegible]
2355	[illegible] (b) (6) [illegible] (b) (6)

USS SKYLARK (ASR-20) PORT NEW LONDON 15 MAR SATURDAY 13 APRIL 1963

FROM VICINITY 41°-45'N 69°-00'W TO NEW LONDON, CONNECTICUT

TIME	RECORD OF ALL EVENTS OF THE DAY 0000-2400
	000-1200 (b) (6) ONWATCH (b) (6)
	STEAMING INDEPENDENTLY ENROUTE FROM VICINITY 41°45'N 69°00'W TO NEW LONDON, CONNECTICUT IN ACCORDANCE WITH COURSE PLOT 2 WEEKLY EMBARKATION SCHEDULE 1963 AND CINCSUBLANT IN MOVEMENT ORDER 10-63. BASE COURSE IS 245°T (GAITPOSTED) SPEED 16 KTS ON FOUR(4) MAIN ENGINES. MATERIAL CONDITION "YOKE" IS SET. UNDERWAY WATCH SECTIONS
0040	PIT LOG READING 6805.8
0053	℄ TO 240°T (241°POSTED)
0314	℄ TO 235°T (235°POSTED)
0345	WATCH PROGRAM RELIEVED BY (b) (6) ONWATCH (b) (6) ONWATCH
0342	CHGD (b) (6) USE SJS RADAR AND SONAR
	0400-0800
	000-1200 (b) (6) ONWATCH (b) (6) ONWATCH
0403	℄ 240°T (POSTED 239°)
0429	OBSERVED SUNRISE
0542	OBSERVED NUMEROUS LOBSTER POTS IN VICINITY
0735	℄ 240°T (POSTED 239°)
0752	SIGHTED BLOCK ISLAND LIGHT 342° 18.5 MILES
0753	(b) (6) USE SJS RADAR AND SONAR
0805	OBSERVED STEAM YACHT IN VICINITY
	(b) (6) ONWATCH
	000-1200 (b) (6) USE 0800-1600 ONWATCH (b) (6)
	STEAMING AS BEFORE
0800	SHIP'S POSITION 40°-26'N 69°-24.2'W 2033 yds Pt Judith
1000	MADE DAILY INSPECTION OF SHIP'S COMPARTMENTS SATISFACTORY
1003	℄ TO 243°T (POSTED)
1100	CHRONOMETERS WOUND AND COMPARED
1146	CHGD (b) (6) USE TWO RADARS AND SONAR (b) (6)
	1200-1600
	000-1200 (b) (6) ONWATCH (b) (6) ONWATCH
	STEAMING AS BEFORE
1200	POSITION 40°-47.2'N 70°-42.6'W
1236	℄ TO 242°T
1321	SIGHTED BLOCK ISLAND BEARING 304° DISTANCE 23 MILES
1314	SIGHTED UNIDENTIFIED FISHING BOAT BEARING 230° DISTANCE 7.5 MILES
1351	℄ TO 300°T (301°POSTED)
1403	℄ TO 302°
1405	PASSED UNIDENTIFIED FISHING BOAT ABEAM TO PORT DISTANCE 1 MILE
1407	SIGHTED MONTAUK PT BEARING 296° & DISTANCE 22 MILES
1428	℄ TO 270° (271°POSTED)
1456	℄ TO 302°T (301°POSTED)
1512	MONTAUK SOUTHEAST LT BEARING 011° DISTANCE 8.1 MILES ENTERED UNDERWAY
	℄ TO 297° (296°T) 301°POSTED ENGINES

USS Skylark (ASR-20) ZONE DESCRIPTION +5 (Dial) DATE Saturday 13 April (Month) 1963

REPLENISHING FROM Vicinity 41°-45' N 65°-00' W TO Newfoundland, Connecticut

TIME	RECORD OF ALL EVENTS OF THE DAY 1200-1600 Continued
1543	S/C to 295° T (312° Psgc.)
1553	S/C to 293° T (304° Psgc.)
1557	Master Properly Relieved by (b) (6) Psgd.
	(b) (6) 1962
	1600 - 2000
	Underway as Before
	Sea (b) (6) Swell (b) (6) Clouds
1600	S/C 22 292° T (Psgc 310°)
1603	S/C 290° T (Psgc 308°)
1607	S/C 287° T (Psgc 305°)
1612	Sounded after steering speed was Reduced
1614	S/C 285° T (Psgc 303°)
1615	S/C 281° T
1616	Officer Assigned Inboard and Ready
1623	Range Rate Allowed to be Maintained 250 yards
1624	S/R 10°
1625	S/C 342° T (Psgc 000°)
1630	Sounded Special and not to Sound Until Working up Approach Line
	Set Watches
1632	S/C 346° T S/C 338° T
1635	Lines to Stand by Manila
1639	Inboard and Ready to all Concerned for Receiving
1640	S/R 5° S/R 5° S/C 334° Psgc
1640	Ready to 39° T (Psgc 000°)
	Radio Man Cautioned Passing Word Always to Use Code
	Words
	Ship to Pull Inboard
1641	Receiving Rate Always to be Held to 50 yards
1642	Lines Taken Inboard Commenced Pulling to Inboard to Hold Rate
1643	Range Was Closing Rapidly Still Pulled Inboard
	S/R 2½
	S/C 340° T
1644	Sounded Still Pulling Inboard
1645	Range 50 Was to be Held to 50 yards
	S/C 343° T (Psgc 003°)
1646	Hawsers Taken Aboard and Secured by Manila
	Range Was Closing Rapidly Still Pulled Inboard
1648	S/C 348° T (Psgc 008°)
1649	S/C 350° T (Psgc 010°)
1651	S/C 354° T
	Hawsers 20 yds and Steadily Secured by Manila
1652	Hawsers Taken and Secured by Manila
	S/R 1½
	S/C 352° T
1654	S/C 350° T
	Hawsers Taken and Secured by Manila

USS Skylark (ASR-20) ARRIVED FROM Pearl Harbor, T.H. DATE 15 Jan 43 SAILED FOR New London, Connecticut DATE 19 Jan 43

TIME	RECORD OF ALL EVENTS OF THE DAY
	Wed 20 Jan 43 Cont'd
1652	Sailing in accordance with Base Operation Order No. 1-43
	8/10 3/10
	8/10 5/10
1652	8/10 Sailing Steady on 332° T
	8/10 1/10 Sailing in company with Sub. Base
1653	8/10 332° T
	8/10 Log
1700	8/10 15° 8/10 1/10 8/10 3/10
1701	8/10 Log 8/10 2/10 8/10 Log
1702	8/10 3/10 8/10 Log 8/10 2/10 8/10 Log 8/10 2/10 8/10 1/10 8/10 Log
1703	Secured gun mounts for Cold Weather Operations
	Secured with Canvas covers and Steam pipes blown
	Various units of Operation Base Departed Channel
	8/10 1/10 8/10 1/10 8/10 2/10 10/10 8/10 Log Ships
*	Sent to Duty Commander re Submarine Escort Vessels Ships
1704	Secured Special Sea Detail under Watch with exception of
	Gun Crews
1705	Set Regular Underway Watch on Deck Section Four (4)
1706	Radio Directed to Use Low Power Circuit
	Now Under Control Channel Light Vessel
	(b) (6) Ships
1708	Radar Operating Aboard this Ship
	in Task Force
1815	
1835	
1842	
1845	
1857	Assumed Guard Circuit Control Radio Aboard
	Aircraft Warning Net
1910	(b) (6) Pilot Released and Aboard
	Base Radio Net

Enclosure 36

UNITED STATES - EAST COAST

GULF OF MAINE AND GEORGES BANK

GULF OF MAINE

GEORGES BANK

NEW HAMPSHIRE

MASSACHUSETTS

CAPE ANN

CAPE ELIZABETH

CAPE SABLE

BROWNS BANK

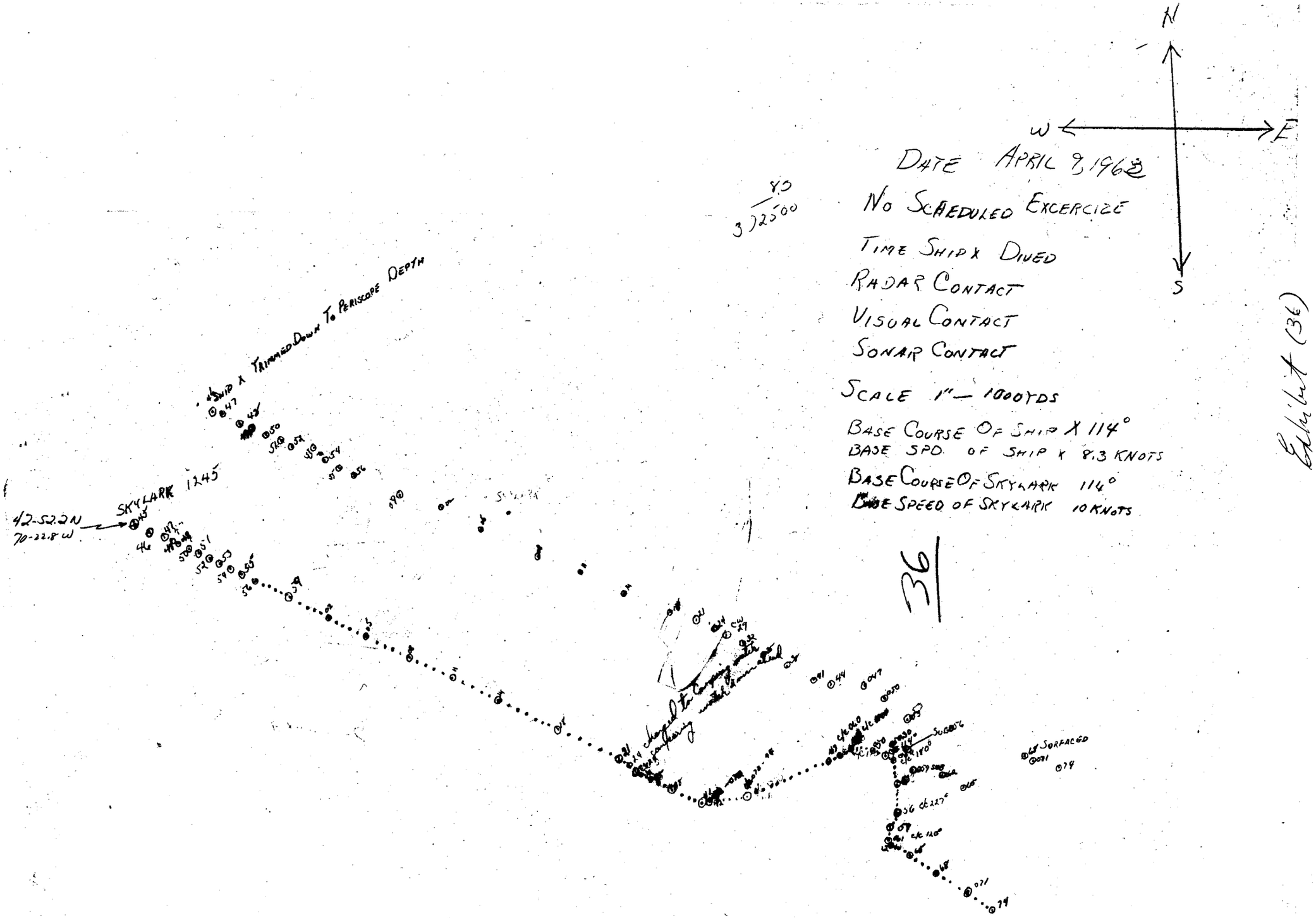
NORTHEAST PART

SOUTHWEST PART

(b)(1)

Exhibit (35)

EXHIBIT (35)


N
W
E
S
DATE APRIL 9, 1963
NO SCHEDULED EXCERCIZE
TIME SHIP X DIVED
RADAR CONTACT
VISUAL CONTACT
SONAR CONTACT
SCALE 1" — 1000 YDS
BASE COURSE OF SHIP X 114°
BASE SPD OF SHIP X 8.3 KNOTS
BASE COURSE OF SKYLARK 114°
BASE SPEED OF SKYLARK 10 KNOTS
4.3
3 02500
SHIP X TRIMMED DOWN TO PERISCOPE DEPTH
SKYLARK
1245
42-52.2 N
70-22.8 W
Changed to Camping
SURFACED
Exhibit (36)
36

No. 3000-B
Price 30 Cents

POSITION PLOTTING SHEET

LOGARITHMIC
TIME, SPEED, AND DISTANCE SCALE

Place right point of dividers on speed and left point on distance. Set right point on minutes, left point on hours indicated here. To find speed reverse the process.

For North Latitude
For South Latitude
turn chart and use outer circle reading

LATITUDE NATURAL SCALE

LATITUDE	NATURAL SCALE
40°	1.846.512
41°	1.808.126
42°	1.515.402
43°	1.804.478
44°	1.700.450
45°	1.726.023
46°	1.752.464

MERCATOR PROJECTION Scale: 1° Long. = 4 inches

(b)(1)

LIMITS OF SHEETS

3000-1 Latitude	41° to 44° N	
3000-2	37° to 41° N	or S
3000-3	33° to 38°	" "
3000-4	27° to 34°	" "
3000-5	23° to 30°	" "
3000-6	19° to 26°	" "
3000-7	15° to 22°	" "
3000-8	10° to 18°	" "
3000-9	6° to 14°	" "
3000-10	2° to 9°	" "
3000-11	1° to 5°	" "
3000-12	5° to 10°	" "
3000-13	9° to 14°	" "
3000-14	13° to 18°	" "

1st EDITION, July 1947

Price 30 Cents
NO 3000-B

Exhibit (37)

Exhibit (37)

RADIO LOG

OPNAV FORM 2810-1 (Rev. 11-68) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20)	(b) (6) RM3	1	S/S U/C	~~2040/2716~~

TIME	TRANSMISSION		
**NOTE	HAVINGTROUBLES WITH CLOCK, SO TIME IS APPROXIMATE /WH//		
0300Z	CONT	TI SKY	REQ PERMISSION TO GET UNDIEWAY K
	SKY	TI CONT	UNDERWAY K
0303Z	CONT	TI SKY	R OUT
	CONT	TI SKY	UNDERWAY K
0308Z	SKY	TI CONT	R OUT
	CONT	TI SKY	PASSING PT ALFA ENRTE BOSTON OPAREA K
0328Z	SKY	TI CONT	R OUT
0345Z	(b) (6) OFF TO (b) (6) ....1 KWR (8) STILL OUT OF SYNC...POSSIBLE		
	DIRTY PLATES...NO MSGS PENDING...O & E NRML (b) (6) /WH//		
0345Z	ASSUMED THE WATCH AL/CLR (b) (6) RM2 /J		
0402Z	NBL	DE NJOF	INT QSA K
0405Z	NJOF	DE NBL	QSA 5 AR
	NBL	DE NJOF	INT QSA K
	NJOF	DE NBL	QSA 3 K
0731Z	NBL	DE NJOF	QSA 3 AR
0823Z	CCC	TI SKY	K
	CCC	TI SKY	K
	SKY	TI CCC 21	K
	CCC	TI SKY	RDO CHCK K
	SKY	TI CCC	RD U LOUD AND CLEAR K
1824Z	CCC	TI SKY	R AR
0857Z	CCC	TI SKY	APPR CLEVELAND LEDGE WHAT TIME CAN WE EXPECT TO ENTER THE CANAL FROM THE WEST K
0857Z		DE CCC	KEEP COMING RIGHT ALONG K
0857Z		DE SKY	R AR
	CCC	TI SKY	PASSING CLEVELAND LEDGE ENTERING CHANNEL WHAT IS STATUS OF TRAFFIC IN CANAL TRAFFIC LIGHT IS RED
0917Z	(NO CALL-UP)		NO WESTBOUND TRAFFIC COME RITE LONG
	NBL	DE NJOF	INT QSA K
1238Z	NJOF	DE NBL	QSA 5 AR
1248Z	(b) (6) OFF TO (b) (6) // (b) (6) /WH//		
1248Z	ASSUMED THE WATCH CONDITIONS NRML (b) (6) /RC//		
1500Z	BS	TI WC	K
	WC	TI DS	R K (PRI-2150KCS)
1500Z	DS	DE WC	R AR
	DS	TI WC	REQ RADIO CK ON SEC K
1501Z	WC	TI DS	R AR
	WC	TI DS	K (SEC 333.0MCS)
	DS	TI WC	SHORT COUNT FOLS 1-5-1 K
1503Z	WC	TI DS	QSA 5 K
1503Z	DS	TI WC	R AR
1517Z	DS	TI WC	BELIEVE I HOLD YOU 140 DEG TRUE TAKE STA ON MY PORT BEAM DISTANCE 4000YDS K
1517Z	WC	TI DS	R AR
1518Z	DS	TI DS	WE CONCUR WILCO AR

DATE: 9 APR 1963 PAGE NO. 13

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1

(over)

OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION
15187	T..O..L..E..
15227	DS DE WC AM COMING TO COURSE 180 AM CONDUCTING PROPULSION TESTS BUILDING UP TO FLANK SPPED K
15227	WC TI DS R AR
16457	(b) (6) OFF TO (b) (6) RM3 AL/CLR (b) (6)
	MARTIN ON WATCH/WH/
	NBL DE NJOF R K
	NJOF DE NBL ???
	NBL DE NJOF QSA1 QSV K
	AA DE NRLX INT QSA QRK K
	AA DE NRLX QST K
	NBL DE NJOF INT QRV K
	DE NRLX INT ZSO NRL K
	NRLX DE NJOF INT ZNB NT K
	DE NRLX INT ZSO NAF K
15147	NRLX DE NJOF INT ZNB FA K
	NRLX DE NJOF INT ZNB FE K
	NJOF DE NRLX QS UF INT QSQ NAF PUR THIS FRQ K
	NAF DE NJOF K
	NJOF DE NRLX INT QSO NAF OF OR DOES HE GUARD THIS FREQ K
	DE NRLX INT Q QTHK
	NRLX DE NJOF INT ZNB TK K
	DE NRLX ZUG ZNB + THIS IS THIS CG K
	DE NJOF AS1 AR
20207	NBL DE NJOF K
	NBL DE NJOF K
	NBL DE NJOF K
	NBL DE NJOF QSV QSV K
	NBL DE NJOF INT ZNB LC K
	NJFO DE NBL ZNB JL + INT ZNB YR K (WRONG)
20287	NBL DE NJOF INT ZNB JX
	NKIV DE NBOF K
	NBL DE NKIV -T-.....NBL TRYING TO BREAK)
20317	NBL DE NJOF INT ZNB GS K
20327	NJOF DE NBL QRY2 AR
20367	NBL DE NJOF K
20377	NJOF DE NBL QRY2 IMI QRY2 AR
20387	SKY TI PTS CONT K
	PTS CONT TI SKY K
	SKY TI PTS CONT INT QSO NADQ K
20397	PTS CONT TI SKY R WT AR
	WAR C TI DIPS K
	PTS CONT TI THRESHER K
	THRESH TI PTS CONT K
	PTS TI THRESH INT QSU K
	THRESH TI CONT K
	CONT TI THRESH K
	SKY TI CONT K
	CONT TI SKY K
20437	SKY TI CONT -T- THRESHERS LAST K

3ND-P&PO 8462

Exhibit (38)
2

RADIO LOG

OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK	(b) (6)		OPS 1&5	4253/2150

TIME	TRANSMISSION		
	T.O.L.E.		
20437	CONT	TI SKY	I RELAY FROM THRESH - INT CALL ME THIS CIRCUIT K
	SKY	TI CONT	-T- THRESH AFIRM QRU RDO CHCK K
	CONT	TI SKY	R AR
	THRESH	TI SKY	FROM CONT - AFIRM CALL U QRU RDO CHK ONLY K
	SKY	TI CONT THRESH	T AR
20467	CONT	TI SKY	TRHESH -R- YOUR LAST AR
20487	SKY	TI CONT	-T- THRESH CSL WANTS TO KNOW HAVE YOU COMPLEATED INITIAL SUB OPS K
20487	SKY	TI THRESHER	R AS AR
	NJOF	DE NBL	INT 7NB AW K
20537	NBL	DE NJOF	7NB BD AS1 AR
20547	(b) (6)	OFF TO (b) (6) RM3 (b) (6)	//JDC//
	NBL	DE NJOF	INT 7NB RH K
		DE NBL	7NB PG KEEE 7NB PGL K
	NBL	DE NJOF	INT 7NB XB K
	NJOF	DE NBL	DE K
	NBL	DE NJOF	-T-R-0914527 FM NJOF TO SNTC H7UK /WH/
		DE NBL	INT QY YOUR - 022027. K
	NBL	DE NJOF	C 022027 K
2106?		DE NBL	RS1
	NJOF	DE NBL	INT 7NB WM K
		DE NJOF	7NB GB K
	NJOF	DE NBL	INT 7NB 1 K
		DE NBL	ZUG INT 7NB 1 K
	NBL	DE NJOF	QRL INT QSL K
		DE NBL	ZUG INT 7NB 1 K
		DE NJOF	7NB 4A K
21207	NJOF	DE NBL	R 0914527 MR
	SKY	TI PC	K
	PC	TI SKY	K
	SKY	TI PC	-T-COMSUBLANT ADMIN PTSMH - OUR INITIAL SUBOP COMPLETED K
	PC	TI SKY	T OUT
	TR	TI SKY	K
	SKY	TI TR	K
	TR	TI SKY	-FM COMSUBLANT ETC...WH/
21157	SKYT	TI TR	R OUT
	SKY	TI THR	K
	THR	TI SKY	K
	SKY	TI THR	-T-COMSUBLANT ADMIN PTSMH BT INITIAL DIVE SUCESSFULLY COMPLETED AM PROCEEDING WITH REMAINDER OF SEA TRIAL AGENDA K
	THR	TI SKY	R OUT
	PC	TI SKY	K

DATE: 9 April 1963

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION			
2115Z	T...O...L...E			
	SKY	TI	PC	K
	PC	TI	SKY	-T-COMSUBLANT ADMIN ETC...WH/
2118Z	SKY	TI	PC	R OUT
	SKY	TI	PC	K
	PC	TI	SKY	K
	SKY	TI	PC	-T-THRESHER- CAN YOU COME UP ON 2820 KCS K
	PC	TI	SKY	ROUT
	SKR	TI	SKY	K
	SKY	TI	THR	K
	THR	TI	SKY	FM PC - CAN U COME UP ON 2820 KCS K
	SKY	TI	THR	R WAIT OUT
	SKY	TI	THR	-T- PC - AM SECURING THIS FREQ AND SHIFTING K
	THR	TI	SKY	R OUT
	PC	TI	SKY	K
	SKY	TI	PC	K
	PC	DE	SKY	FM THR - AM SECURING & QSYING K
212°Z	SKY	TI	PC	R OUT
	NBL	DE	7ACF-	P K
	7ACF-	DE	NBL	INT 7NB NV
	NBL	DE	7ACF-	7NB SV K
	NBL	DE	7ACF-	-T-P-092330ZFM 7ACF- TO YASM INFO EWJH
	7ACF-	DE	NBL	INT WA 20970 - 25201 K
	NBL	DE	7ACF-	C WA 20970
	ZACF-	DE	NBL	INT ZNB 1 K
	NBL	DE	ZACF-	7NB 4A K
2345Z	7ACF-	DE	NBL	R 092330Z AR
2359Z	END OF OLD 7ULU DAY & LOG...O & E NRML/WH/			

3ND-P&PO 8482

Exhibit (38)
4

LOP 1

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20)	(b) (6) RM2	1	S/S OPS	2210/2350 KCS

TIME	TRANSMISSION
0001Z	BEGINS NEW ZULU DAY & LOG...O&E NRML/KWR'S SMKED) WH//
0445Z	(b) (6) RM2-P1 OFF TO (b) (6) RM3 AL/CLR (b) (6)
0845Z	(b) (6) RM3 OFF TO (b) (6) RM3 AL/CLR (b) (6) RM3//JDC//
0845Z	MARTIN HERE//WH//
	THR TI SKY K
	THR TI SKY K
Z	AA TI SKY INT ORK K
	ANY STA TI SKY INT ORK K
1005Z	THR TI SKY K
	THR TI SKY K
	SKY TI THR K
	THR TI SKY INT ORK K
	SKY TI THR ORK 5/5 K
1118Z	THR TI SKY QTK 5/5 AR
	SKY TI THR INT PRESENT POSIT K
1119Z	THR TI SKY R WAIT OUT
	THR TI SKY PRES POSIT - 64.58W 41.44N BELIEVE WE HOLD YOU 121° 40,000 YDS K
	SKY TI THR UNNERSTAN 121° 40,000 YDS K
	THR TI SKY C K
1123Z	SKY TI THR R OUT
	SKY TI THR - DO NOT BELIEVE CONTACT AT 121°, 4000 YDS IS US; I AM AT PERISCOPE DEPTH; MY NAVIGATIONAL POSIT 10 MI FM U K
	THR TI SKY R CONTACT 121° 40000 YDS BELIEVED TO BE WEATHER K
1127Z	SKY TI THR R OUT
	SKY TI THR INT SPEED K
	THR TI SKY9 SPEED 5 KTS K
	SKY TI THR R OUT
	SKY TI THR REQ U INCREASE SPEED TO 10 KTS & CIRCLE ON STATION TO PROVIDE NOISE SOURCE FOR MY SONAR K
	THR TI SKY R OUT
	THR TI SKY MY SPEED 10 KTS; CIRCLING ON STATION K
1135Z	SKY TI THR R OUT
	SKY TI THR I HOLD U VISUALLY BEARING 140 APPROX 7 MI FROM ME; AM CLOSING U TO ESTABLISH GERTRUDE COMM K
1140Z	THR TI SKY R OUT
	SKY TI THR WHAT WS YOU PRESENT TURN COUNT?
	THR TI SKY TURN COUNT - 80 RPM K
1149Z	SKY TI THR R OUT
	NBL DE NJOF P K
	NJOF DE NBL K
	NBL DE NJOF -T-P-1011557 FM NJOF TO YASM /CF/WH//
1201Z	NJOF DE NBL R 1011557 AR
	SKY TI THR REQ U LITE TO K
1219Z	THR TI SKY R OUT

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TIME	TRANSMISSION			
12197	T;..O...L...E (b) (6)			
12457	ASSUMED THE WATCH AL/CLR/			
14457	KWR'S OUT OF SYNC.....NO SIG..../			
15007	KWR1 IN SYNC ,KWR2 WON'T COME OUT OF HIGHSPEED.....			
16227	NBL	DE NJOF	O K	
16227	NBL	DE NJOF	O K	
17257	NBL DE	NJO	O K	
	NJOF	DE NBL	K	
	NBL	DE NJOF	-T-O-1016047 -FM NJOF -TO OLDK - -INFO SPIU BIKN GR47 BT	
16317	NJFO	DE NBL	INT QA POSITOON -41-43N - IMI WA 63-57W K	
		DE NJOF	C WA 64-57W CONDUCTING K	
		DE NBL	INT WA 64-57W CONNITING.	
		DE NJOF	WA 64-57W - CONDUCTING K	
		DE NBL	IMI INFO TO BT K	
		DE NJOF	INFO TO BT - -INFO SPIU BIKN GR47 K	
17377		DE NBL	AS AR	
17417	NJOF	DE NBL	IMI ZNB	
	NBL	DE NJOF	AS	
17437	NBL	DE NJOF	C AA BT - 17437 ZNB XN K	
	NJOF	DE BL	INT WA BY -UQC -INT AND TO EVERY - CW QHB CW - K	
		DE NJOF	C K	
17457		DE NBL	R 1016047 AR	
1800	NBL 18	DE NJOF	ZKR K	
18007	NJOF	DE NBL	R AR	
18137	NJOF	DE NBL	K	
	NBL	DE NJOF	K	
18137	NBL NBL	DE NJOF NJOF	K	
	NJOF	DE NBL	BT FM -YOUR 1016047 -REQ STA STATUES REPORT BT K	
		DE NJOF	IMI AB YOUR K	
		DE NBL	AB YOUR - NJOF DE NBL BT FM CSF 2 - YOUR	
18177	NBL	DE NJOF	R AS AR	
18187	NOT SENT		BI/MY	
	NBL	DE NJOF	-T-O- 1018187 -FM NJOF - TO OLDK - -INFO SPIU BIKN GR6 BT C/FILES JDC	
18247	NJOF	DE NBL	R 1018187 AR	
18247	NBL	DE NJOF	INT ZNB OJ K	
	NBL	DE NJOF	INT ZNB LJ	
	NJOF	DE NBL	ANB GT K	
18267	NBL	DE NJOF	R AR	

LOP 1

RADIO LOG
OPNAV FORM 2010-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20)	(b) (6) RM2		4253/OPS	

TIME	TRANSMISSION
18267	T.O.L.E.
18267	CONTINUESLY CALLING WARCLUB ON PRITAC AND SECTAC ..
18357	NADQ DE NJOF K (SECTAC CW
	NJOF DE NL K
	K
	NJO DE NBL BT DO U HAVE SINGLE SIDE BAND
18377	ON BOARD BT K
	NBL DE NJOF BT NEGATIVE SIGLE SIDE BAND BT K
18387	NJOF DE NBL R AS AR
18397	NJOF DE NBL ZUJ - ORX ' AR
18407	(CALLING NADQ PRI VOICE SEC CW NEG RESULTS)
	NJOF DE NAC K -U-
	NAC DE NJOF K
18427	NJOF DE NAC QSA 5 AR.
	NJOF DE NBL
	DE NJOF K
	-0- 1918407Z -FM OLDK -TO NJOF BT
	UNCLAS DESIRE CANCEL YOUR PRESENT OPS TO ASSIST IN SAR. REQ
	UEST SITREP BT
18487	NBL DE NJF INT AB FM - -0- 1918407
18487	NJOF DE NBL AS AS AR
18487	NJOF DE NBL R AR
18507	NUTA DE NBL K
18507	NUTA DE NJOF QR7 NBL AR
	NJF DE NBL K
	NBL DE NJOF K
19547	NJOF DE NBL ZUJ AR
	YAPD YAPD DE NBL NBL XMT NJOF ZKA ZKB IMI XTEEEEEEEEEEEEE
	XMT NJOF ZKA ZKB AR
	NJOF DE NBL INT R
19557	NBL DE NJOF R AR
19567	NUTA DE NBL K
19587	NUTA NUTA DE NBL NBL O K
19007	(CONTINUESLY CALLING NADQ VOICE AND MCW PRI AND SEC)
19027	NBWY DE NBL O K
19187	NBL DE NJOF O K
	NJOF DE NBL INT QSA K
	NBL DE NJOF QSA3 AS AR
	NBL DE NJOF O K
	INT ZNB RF K
	ZNB UB
1929	NJOF DE NBL R 1919237 - ZNB O
	K
	NJOF DE N -0- 1918577 -FM OLDK -TO NJOF BT
	UNCLAS REQUEST FOLLOWING A. INITIAL POSIT OF DIVE B. INITIAL
	COURES AND SPEED OF THRESHER C. POSITION ASAIT EEEEEEEE AIAL
	CONA EEEEEEE LAIST CONTALT D. EXPECTED TIME OF COMPLETION OF
	DIVE E. DEPR OF WATER BY SOFNDING AND SEU STATE BT K
	IMI WA LAST -
19337	NBL DE NJOF R 1919577 AR

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME		TRANSMISSION
1933Z	T..O..L..E..(b) (6)	ON WATCH ERE.....
2027Z	NBL DE NJOF	Q K
2027Z	NJOF DE NBL	QRY2 AR
	NBWY DE NBL	-O-1020027 -FM OLDK -TO NBWY -INFO BIKN Y77F BT UNCLAS SSOAC SEAWOLF
2035Z		ASGSSOAC AREAS A -5 A-6 BT K
	NJOF DE NBL	-O-1020257 -FM OLD EEEEEEEE
2038Z	NJOF DE NBL	AS AR
2039Z	NJOF DE NBL	AS
	NJOF DE NBL	ZFR QRV K
	NJOF DE NBL	K
2041Z	NBL DE NJOF	-T-O-1020157 -FM NJOF -TO OLDK BT
2050Z	NJOF DE NBL	R 1020157 AR
2100Z	NJOF DE NBL	BT INT INITIAL TIME OF DIVE BT K
2100Z	NBL DE NJOF	BT INITIAL OFTIME OF DIVE 0919227 K
	NJOF DE NBL	-O-1020577 -FM OLDK -TO NJOF -INFO Y77F BT
	UNCLAS REQUEST SITREPS TO COMSUBLANT AND COMSUBFLOT TWO EVERY 15 MINSTEA EVEN IF NEGATIVE BT K	
2119Z	NBL DE NJOF	R AR
2123Z	NBL DE NJOF	INT ZDK Y77F 1019257 K
	NJOF DE NBL	INT C Y77F 1019257 K
2125Z	DE NJOF	C K
	NJOF DE NBL	-O-1019257 -FM YCOMSUBLANT -TO COMSERVLANT -INFO DEPCOMSUBLANT COMSUBFLOT TWO COMSUBDEVGRU TWO USS SKYLARK USSRECOUSRY USS SUNBIRD BT UNCLAS 1. USS THRESHER CONDUCTING DEEP DIVE SEA TRIALS WITH SKY. ARK ESCORT AT 41-43N 64-57W. COMMUNICATIONS LOST AT 1014177. 2. REQUEST DIVERT RECOVERY TO ASSIST SKYLARK IN SEARCH FOR THRESHER TBT	
2129Z	NBL DE NJOF	R AR
2138Z	NBL DE NJOF	-T-O-1021307 -FM NJOF -TO Y77F OLDK GR9 BT C/FILS BT K
2140Z	NJOF DE NBL	R 1021307 AR
2144Z	NBL DE NJOF	INT ZDK Y77F 1020277 K
2144Z	NJOF DE NBL	AS AR
2146Z	NJOF DE NBL	ZUJ 1 AR
	NJOF DE NBL	ZUH K
2147Z	NBL DE NJOF	R AR
2153Z	NBL DE NJOF	-T-O-1021457 -FM NJOF -TO Y77F OLDK GR5 BT C/F/ BT K
2155Z	NJOF DE NBL	R 1021457 AR
2200Z	NBL DE NJOF	-T-O-1022007 -FM NJOF -TO Y77F OLDK GR5 BT C/F BT K
2202Z	NJOF DE NBL	R 1022007 AR
	NBL DE NJOF	-T-O-1022157 -FM NJOF -TO Y77F OLDK GR5 BT C/F BT K
2216Z	NJOF DE NBL	R AR
	NBL DE NJOF	-T-O-1022307 -FM NJOF -TO YZZF OLDK BT C/FILES BT K
2234Z	NJOF DE NBL	R 1022307 AR

LOB
1

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20)	(b) (6) RM2		4253/OPS	

TIME	TRANSMISSION
22347	T..O..L..E..
22477	NBL DE NJOF O K
22477	NJOF DE NBL AS AR
	NJOF DE NBL INT ZOD NQMR O K
22527	~~NJOF~~ NBL DE NJOF 7UG NQMR K
22527	NJOF DE NBL R AR
	NBL DE NJOF O K
	NJOF DE NBL K
	NBL DE NJOF -T-O-1Ø22457 -FM NJOF -TO YZ7F
	N OLDK BT C/FBT K
23Ø77	DE NBL R 1Ø22457 AR
	NBL DE NJOF O K
23157	NJOF DE NBL QRY 2 AR
	NJOF DE NBL K
	NBL DE NJ OF -T-O-1Ø23157 -FM NJOF -TO YZ7F -INFO OLDK BT C/F BTK
	NJOF DE NBL INT WA AT - 41-4Ø.8N 64-55W K
	DE NJOF C K
	DE NBL INT GR14 K
	DENJOF C K
23597	NJOF DE NBD R 1Ø23157 AR
0000Z	END OF DAY...END OF LOG....

DATE: 10 APR 12 1963 | PAGE NO.: THREE

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LOP 2

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20	(b) (6)		SAR	2720/243.0

TIME			TRANSMISSION
2220Z	SET LOG ON SAR FREQS ONLY		
2222Z	CAS JUIL	TI DIPS	DO U HOLD ANY CONTACTS
	DIPS	TI CAS J	WE HAVE AN OIL SLICK
	CAS J	TI DIPS	R I AM PROCEEDING YOUR POSIT K
2225Z	DIPS	TI CAS J	R AR
	DIPS	TI CAS J	FOR UR INFO WE HAVE VOIC E CONT WITH CSL ON SSB K
2231Z	CAS J	TI DIPS	R AR
2233Z		TI DIPS	BT ATTEMPT TO RAISE WAR CLUB CW ON YOUR UNDERWATER GADGET K
2235Z		TI CAS J	R AR
		TI CAS J	WE HAVE NO UNDERWATTER GADGET K
2237Z		TI DIPS	R AR
		TI DIPS	WHERE IS OIL SLICK IN RELATION TO YOU K
		TI CAS J	WE ARE RIGHT IN THE MIDDLE OF OIL SLICK
2244Z	ØØØ CLA J	TI DIPS	R AR
Ø134Z	CAS J	TI DIPS	DO U HOLD ANY WR NR BETWEEN 2242 AND 2248 K
		TI CAS J	NEGATE
		TI DIPS	ARE U GOING TO SURVICE THESE NRS K
		TI CAS J	DO NOT HAVE XMITTER AVAIL FOR S/S AT PRES TIME K
Ø135Z	CAS J	TI DIPS	R I WILL ADVISE ER
	DIPS	TI CAS J	MY INTENTIONS ARE TO PUT A BOAT IN WATTER AT FIRST LIGHT AND SEARCH THE OIL SLICK DO YOU HAVE ANY OTHER INST AT THIS TIME K
	CAS	TI DIPS	CONCUR YOUR PLAN REMAIN IN VIS OF OIL SLICK FOR THE NIGHT YOU ARE DATUM K
Ø2Ø4Z	DIPS	TI CAS J	R AR
	DIPS	TI CAS J	WILL LEAVE ONE AIRCRAFT ON SCENE OVERNIT WILL HAVE MORE AIRCRAFT AT FIRST LIGHT K
	QUICK D	TI DIPS	
	DIPS	TI QUICK D	READ U WEEK BUT AD GUARBLED K
	QUICK D	TI DIPS	INT QRU K
	DIPS	TI QUICK	QSA2-QRM K
Ø327Z	DIPS	TI QUICK	REQ UR PRES POSIT K TØ/MY/DATUM
Ø334Z	CAS J	TI DIPS	PASS TO QUICK DRAW YOUR POSIT AT DATUM K
		TI CAS J	R AR
		TI CAS J	POSIT AT DATUM 41-42 N 64-54W K
Ø337Z	DIPS	TI QUICK D	MY ETA Ø2Ø R K
	DIPS	TI CAS J	RESULTS 215Ø STILL NEGATIVE K
Ø338Z	CAS J	TI DIPS	R AR
		TI QUICK D	REQ UNIT IN COMPANY AND SEARCH PLAN IN USE K
Ø345Z	QUICK D	TI DIPS	R AR
	QUICK	TI DIPS	UNIT IN COMPANY CAS J SEARCH PLAN IN USE PARR SEARCH N AND S LEGS TO THE WEST
Ø347Z			
Ø348Z	DIPS	TI QUICK	R R

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NO DAILY LOG CHANGE DD TO WEAK OPS

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME			TRANSMISSION
ø348Z	QUICK	TI DIPS	CAS J STATIONED AT DATUM DUE TO NO UNDERWATER GADGET K
ø35øZ	DIPS	T I QUICK	-R- REQ ETA OF PRISE BT K
ø355Z	QUICK	TI DIPS	ETA PRIZE 11ø4øR K
		TI QUICK D	R AR
	DIPS	TI TIT W	BELIEVE I HOLD U 231 TITLE WAVE TEN ON COURSE ø85 SPD 12 INT CONC K
ø4ø5Z		TI DIPS	R AS AR
		TI TIT W	SIG FOLL AJ TAK REQ INST K
ø411Z		TI DIPS	R AR
	DIPS	TI TIT W	INT CORPEN AND SPD K
ø414Z		TI DIPS	R AR
ø416Z	CHIS A	TI DIPS	K
	TIT W	TI DIPS	MIKE CORP 18ø SPD 5
		TI DIPS	TAKE STATION 2,ØØØ YARDS OFF PORT BEAM K
	DIPS	TI TIT	INT TAKE STATION 2ØØØ YARDS OFF MY PORT BEAM K
ø42øZ	TIT W	TI DIPS	R AR
ø423Z	CAS J	TI DIPS	INT SET AND DRIFT K
	DIPS	TI CAS J	R AS AR
		TI DIPS	REQ U TAKE STATION 2ØØØ YARDS MY PORT BEAM PLAN TO COMMENCE SEARCH PARR SEARCH PLAN TO SOUTH OF DATUM CASS J LYING TO AT DATUM LEGS WILL RUN NORTH AND SOUTH WORKING TO EAST ENITIAL LEGS WILL BE 18ø SPD 5 I WILL POSITION MYSELF 2ØØØ YARDS WEST OF DATUM FOR COMMENCEMENT OF SEARCH BT K
ø428Z	DIPS	TI TIT W	R AR
	DIPS	TI CAS J	DRIFT 2.5 KNOTS SET 323 K
ø429Z		TI DIPS	R AR
ø432Z	DIPS	TI TIT W	INT CORPEN AND SPEED K
ø433Z	TIT W	TI DIPS	MIKE CORPEN 18ø SPD 5 K
ø433Z		TI TIT W	R AR
ø44øZ	DIPS	TI TIT W	TIT W LOWERING SUPER WHEAT WILL HAVE TO MAINTAIN SPEED FOR A WHILE BT K
ø44ØZ	TIT	TI DIPS	R AR
	CAS	TI DIPS	REQ UTRAIN POWERFUL LIGHT IVRT AS DATUM BEAKON K
ø447Z	DIPS	TI CAS J	R AR
	DIPS	TI CAS J	TRAINING 24 INCH SEARCH LIGHT K
ø449Z	CASJ	TI DIPS	R AR
ø451Z	TIT W QUIC D	TI DIPS	DATUM NOW HAS VIRT BEAKON K
ø451Z	DIPS	TI TIT W QUICK D	R AR
ø458Z	TIT W QUICK D	TI DIPS	I AM CONDUCTING VISUAL AND SONAR SEARCH WITHIN MY CAPABILITIES XMITTING CW ON GIRT AND QHB K
ø457Z	DIPS (LATE ENTRY)	TI TIT W	TIT W READING MORSE CODE VIA GIRT DO YOU KNOW OF ANY XMISSIONS OF SUCH
ø459Z	DIPS	TI TIT W QUIC D	R AR
	DIPS	TI CAS J	INT REAPER 12 SRECOVERY'S SEARCHLIGHT K WAFER
ø5ø5Z			

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RADIO LOG 2 of 2
OPNAV FORM 2010-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-2)	(b) (6) RM3		SAR OPS	2820 KCS

TIME	TRANSMISSION		
Ø5Ø5Z	T.O.L.E.		
	CAS J	TI DIPS	WAFER 12 HOLDS SEARCH LIGHT IN INSIGHT INT CAS J SECURE SEARCH LIGHT W K
		TI DIPS	REF UR LAST NEG K
Ø5Ø7Z		TI CAS J	INT 12" LIGHT BE ELUMINATION ENOUGH K
		TI DIPS	REMAIN ANS MANY VIRT LIGHTS AS POSSIBLE AND SECURE 24 INCH SEARCH LIGHT K
Ø51ØZ	DIPS	TI CAS J	R WILCO AR
	DIPS	TI CAS J	CAS J WILL TRAIN 2 12 INCH SEARCH LIGHTS VIRT K
Ø51ØZ	CAS J	TI DIPS	R AR
	TIT W	TI DIPS	INT TRFC K
Ø512Z	DIPS	TI TIT W	NEG AR
Ø514Z	TIT W QUICK D	TI DIPS	UPON SIGHTING ANY DEBRIS OF WRECKAGE BREAK OFF IMM AND RECOVER SAME AND INFORM ME K
Ø515Z	DIPS	TI TTT W QUICK R AR	
	DIPS	TI QUICK	I AM CIRCLING AND INVESTIGATING SMELL OF OIL K
Ø544Z	QUICK D	TI DIPS	R A
		TI DIPS	INT YOUR LAT AND LONG OF YOUR DATUM
Ø545Z	QUICK D	TI DIPS	R AR
	QUICK	TI DIPS	CAS J IS AT DATUM POSIT AT DATUM 41-42N 64-54W K
Ø547Z	DIPS	TI QUICK K	R AR
	CAS J	TI DIPS	ARE YOU STILL IN OIL SLICK K
Ø549Z			(UNABLE TO RAISE CAS J ABOVE ENT UHF)
	QUICK	TI DIPS	REQ STATUS OF INVESTIGATION K
Ø553Z		TI QUICK	WAIT AR
	DIPS	TI QUICK	AM STILL CIRCLING AREA WHERE ORIG FOUND OIL K
	QUICK D	TI	
	DIPS	TI QUICK D	AC TO 3 LINE LORAN I HOLD CAS J 3 MILES FROM LAST POSIT YOU GAVE ME K
	QUICK D	TI DIPS	CAS J IS ATTEMPTING TO REMAIN IN OIL SLICK AND PICK UP DEBRIS K
		TI QUICK	R I A
Ø556Z	DIPS	TI QUICK D	AJ REQ INST K
	QUICK	TI DIPS	REQ U TAKE STATION 2ØØØ YARDS MY STBD BEAM. AM CONDUCTING PARALLES SEARCH LEGS NORTH AND SOUTH, SOUTH OF DATUM AND TO THE EAST. TIDAL WAVE ON STAT 2ØØØ YARDS MY PORT BEAM. MIKE CORPEN 18Ø SPD 5 K
Ø5Ø9Z	DIPS	TI QUICK	R AR

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION		
Ø519Z	T.O.L.E.		
Ø626Z	TT W	TI DIPS	IX TO FOLL 9 TURN 9 TURN STBY IX K
Ø629Z		DI TTW	R AR
Ø63ØZ	QUICK DRAW	TI DIPS	TRUE YOUR STATION 2ØØØ YARDS 27Ø FROM ME K MIKE CORPEN Ø9Ø SPD 5 K
Ø631Z	DIPS	TI QUICK D	R AR
Ø635Z	TT W	TI DIPS	YOUR STATION WILL BE Ø9Ø 2ØØØ YARDS FROM ME K
Ø635Z		TI TIT W	R AR
Ø715Z	DIPSW	TIXXXXS TT W	WE ARE PROCEEDING TO INVEST NOISE OF BATTING ON METAL K
	TIT W	TI DIPS	R AR
Ø716Z	TIT W	TI DIPS	REQ YOU EVALUATE AND REPORT
Ø716Z	DIPS	TI TIT W	R AR
Ø7ØØZ	(LATE ENTRY)	TIT QUICK	SIG FOL IX TO FOL 9 TURN K
		TI QUICK TIT	R AR
Ø7Ø1Z	DIPS QUICK	TI DIPS	XXXX Ø9 STBY IX K
Ø7Ø1Z	DIPS	TI TIT QUICK	R AR
	DIPS	TI TIT W HULL	THE SOUNDS WE HEAR COULD BE FROM POND ON VERY STEADY AND ON SAME BEARING AND WILL PASS OVER THE SOURCE GET A SOUND AS WEDO THERE IS A 5 DEGREE LAYER AT 18Ø FT WHICH PREVENTS US FROM GET AN ECHO RANGE ON OBJ K
Ø722Z	TIT	TI DIPS	R AR
	DIPS TT W	TI QUICK D	ARE YOU GIRATING WHICH SOUNDS LIKE CLANG OR BEATING ON METAL NEGATIVE
	DIPS	TI QUICK	BEAR 256 FROM ME RNAGE UNKNOWN AM TURNING LEFT TO INVESTIGATE
Ø732Z	DIPS	TI QUICK D	AFIRM K
Ø732Z	QUICK	TI DIPS	R A
	QUICK	TI TT W	YOUR BEARING OF BANGING ON BULK IS OPSITE OF TITLE WAVE K
Ø736Z.		TI QUICK D	R AR
	DIPS TT W	TI QUICK D	NOISE WE HEARD HAS BEEN IDENT AS OUR OWN FATHOMETER K
Ø739Z		TI DIPS TI TT W	R AR WE HAVE THE NOSE ON GIRTRUDE IT COULD BE WHALES FEEDING K
Ø746Z	TIT W	TI DIPS	R AR
Ø747Z	TIT W	TI DIPS	REQ YOU VERIFY K
	DIPS TT W	TI QUICK	DID EITHER OF YOU JUST XMIT CW ON SONAR K
Ø748Z	DIPS	TI QUICK	R I AM RE-JOINING AR
		TI TIT W	MY NOISE EVALUATED AS WHALES K R AR
Ø751Z		TI TIT W	WILL DO YOU DESIRE ME TO TAKE MY SECTOR ASSIGNED BY CHISEL ALFA K
Ø752Z	TIT W	TI DIPS	R AS AR

RADIO LOG LOP 2

OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (AR-2)	(b) (6) RM3		SAR	2820 KCS

TIME	TRANSMISSION
Ø752Z	T.OLL.E.
Ø755Z	TIT W TI DIPS REQ YOU SEND ME CHISEL A 11Ø25ØZ K
Ø725Z	(RECEIVED 11Ø25ØZ FROM TT W C/FILES JDC)
	TIT W QUICK D TI DIPS INT TO CONTINUE PRESENT SEARCH PATTERN UNTIL NEW ON SCENE COMANDER ARRIVES
Ø834Z	DIPS TI QUICK TIT W R AR
Ø852Z	QUICK D TI DIPS SIG FOFL IX TO FOL TURN 9 K
	TI QUICK D R AR
Ø853Z	QUICK D TI DIPS TURN 9 STBY IX
	QUICK TI DIPS INT R K
	QUICK TI DIPS INT R K
	QUICK TI DIPS K
	QUICK TI DIPS K
	DIPS TI QUICK R AR
	QUICK TI DIPS INT R IX K
	DIPS TI QUICK AFIRM WAVE IX TURN K
Ø855Z	QUICK TI DIPS R AR
Ø9Ø8Z	DIPS TI PRIZE REQ SITREP K
Ø9Ø8Z	PRIZE TI DIPS R AS AR
Ø91ØZ	PRIZE TI DIPS REQ NR OF LAST SITREP RECEIVED K
Ø91ØZ	DIPS TI PRIZE R AS AR
Ø911Z	DIPS TI PRIZE LAST SITREP RECEIVED NR ONE K
Ø911Z	PRIZE TI DIPS R AS AR
Ø931Z	DIPS TI PRIZE DESIRES SITSUM K
	PRIZE TI DIPS R AR
	DIPS TI PRIZE IS POINT OBOE MSG 11Ø25ØZ STILL BEST DATUM AVAILABLE K
Ø939Z	PRIZE TI DIPS R AS AR
	PRIZE TI DIPS REF UR LAST AFIRM K
Ø94ØZ	DIPS TI PRIZE R AR
Ø946Z	PRIZE TI DIPS (BT ØØØ SIT SUM SENT C/FILES)
Ø946Z	DIPS TI PRIZE WAIT AR
	TI PRIZE R SITSUM K
Ø948Z	PRIZE TI DIPS R AR
	DIPS TI CAS J INT QRU K
Ø954Z	CAS J TI DIPS NEGATE AR
	TI PRIZE INT BEAR AND DIST OF OIL SLICK FRO DIPS
1ØØ1Z	PRIZE TI DIPS R AR
	CAS J TI DIPS ARE U STILL IN OIL SLICK K
	NEGATE WE ARE RET UP WIND TO OIL SLICK SEARCHING FOR DEBRIS ALONG THE WAY K
1ØØ3Z	TI DIPS RAR
	PRIZE TI DIPS CAS J WAS STATIONED IN OIL SLICK LAST NIGHT WHILE OTHER UNITS CONDUCTED SEARCH [redacted] CAS J STATES HE IS PROCEEDING TWARDS OIL SLICK NOW
1ØØ5Z	
1ØØ6Z	DIPS TI PRIZE R AR
	PRIZE TI DIPS REF MSG 11Ø5Ø2Z REQ REP PARA 2. POSIT TO WITHIN K
1Ø11Z	TI PRIZE R AS AR

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION		
1011Z	T.O.L.E.		
1022Z	DIPS	TI PRIZE	I DO NOT HOLD K6LA 110502Z K
1023Z	PRIZE	TI DIPS	R AR
	DIPS	TI PRIZE	INT ZDK K6LA 110502Z K
	PRIZE	TI DIPS	ZUH ZDK MSG INCOMPLETE K
1025Z	DIPS	TI PRIZE	R AR
1027Z	DIPS	TI PRIZE	PROCEEDE DATUM INACORD MY MSG 110250Z
1027Z	PRIZE	TI DIPS	R AR
1045Z	CHIS A	TI DIPS	COMSUBFLOT TWO 110158Z DIRECTS ME TO MAKE SITREP EVERY HALF HOUR. DO YOU DES ME TO CONTINUE K
		TI CHISA	NEG CHISA WILL MAKE ALL FUT SITREPS K
		TI DIPS	R AR
		TI CHIS A	INT NR LAST SITREP K
		TI DIPS	NR LAST SITREP 31 K
1046Z	DIPS	TI CHIS A	R AR
1053Z	CHISA	TI DIPS	NEXT SITREP DUE 1100Z K
1053Z	DIPS	TI CHISA	R AAAR
	CJ	TI DIPS	MY CORP IN 270 SPD 5 KTS - HOW DO YOU PLAN TO TRANSFER OIL SAMPLES K
			PLAN TO TRANSFER OIL SAMPLES BY LIGHT
1331	DIPS	TI CJ	MESSENGER K REQ CSE & SPD K
		TI DIPS	280 SPD 7 KTS K
		TI CJ	R OUT
	DIPS	TI PRIZE	WHEN WUZ LAST TIME U POSITIVELY IDENT OIL SLICK K
		TI DIPS	WE IN PROCESS OF BRINGING OIL SAMPLES A BOARD WILL CALL U BACK K
1342Z		TI PRIZE	R OUT
	PRIZE	TI DIPS	LAST SIGHTING OF OIL SLICK BY ME WAS LAST NIGHT AT 1850. CJ MAY HAVE BEEN IN OIL SLICK TO A LATER HOUR K
1352Z	DIPS	TI PRIZE	R OUT
	PRIZE	TI DISP	I AM IN OIL SLICK- POSIT IS 41-41N 64-50 OILSLICK MUCH SMALLER THAN NOTED LAST NIGHT K
1448Z	DIPS	TI PRIZE	R OOT
	HIGH JUMP	TI DIPS	CAN U GIVE ME MY POSIT - MYLORAN IS BAD
	DIPS	TI HGJ	R WAIT OUT
	DIPS	TI HOLD	CAN GIVE U POSIT IFN U WANT K
	HOLD	TI DIPS	AS WE DO NOT HOLD U VISUALLY WUD PREFER POSIT FM HGJ K
	DIPS	TI HOLD	R OUT
	DIPS	TI HGJ	UR POSIT 41-07N 65-13W K
1248Z	HGJ	TI DIPS	R OUT
LATER	ENTRY		
	NJOF	DE NQMR	INT WB 120045Z -COMOCEANSYSLANT K
	NQMR	TO E NJOF	R K
1233 Z	NJOF	DE NQMR	R 120045Z AR
	NJOF	DE K6LA	-P- 121910Z FM K6LA -TO NJOF GR19 BT
	UNCLAS HAVE MAN OL MEN WHO LAST HEARD THRESHER ON UQC PREPARE TO		
	HIGHLINE TRANSFER THIS AFTERNOON FOR RETURN CONUS. BT		
1927Z	K6LA	DE NJOF	R AR

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LOP 1

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20)	(b) (6) RM2		4253KCS	

TIME	TRANSMISSION
00007	NU DAY NU LOG ..... (b) (6) ON ERE
	NBL DE NJOF 0 K
	NJOF DE NBL K
	NBL DE NJOF -T-0-110001Z -FM NJOF -TO Y77F
00057	OLDK GR5 BT C/F BT K
00067	NJOF DE NBL R 110001Z AR
	NBL DE NJOF -T-0-110015Z -FM NJOF -TO Y77F
	OLDK GR5 BT
00237	NJOF DE NBL R 110015Z AR
	NJOF DE NBL 0 K
	NJOF YJKF DE NBL -0-102210Z -FM NOMR -TO OLDK Y77F
	-INFO YPKF NJOF SSIL GR 38 BT UNCLAS COMSUBLAEVGAU 2 ON BOARD PROCEEDING TO LAT 41-43N LONG 64-57W. ETA 110400R. WILL ASSUME ON SCENE COMMANDERS RESPONSIBLETS UPON ARRIVAL IN ACCORDANCE WITH CICKLT EEEE EEE WITH CINCLANTULT 1-62. REQUEST SUMMARY SITREP SNCLUDING LIST OF FORCES ORDERED TO SAR AREA BT K
00367	NBL DE NJOF R XR 7B0 0 K
	NJOF DE NBL K
	NBL DE NJOF -T-0-110030Z -FM NJOF -TO Y77F
	OLDK GR31 BT C/F BT K
00417	NJFO DE NBL R 110030Z AR
	NBL DE NJOF -T-0-110045Z -FM NJOF -TO Y77F
00537	OLDK GR5 BT C/F BT K
00537	NJFO DE NBL R 110045Z AR
01007	NBL DE NJOF 0 K
	NJOF DE NBL K
00017	DE NJOF -T-0-110100Z -FM NJOF -TO Y77F OLDK
	C/FILES
00027	NJOF DE NBL R 110100Z AR
01167	NBL DE NJOF -T-0-110115Z -FM NJOF -TO Y77F OLDK
	GR5 BT C/FILES BT K
01167	NJOF DE NBL R 110115Z AR
	NBL DE NJOF INT QIC NUTA K
	NJOF DE NBL R QIC AR
01287	NUTA DE NJOF INT ZDK WR NR 2242 TO 2248 K
01287	NJOF DE NUTA AS AR
	NJOF DE NUTA ZUG WR NRS HAVE ERVICED NSS FOR
	ZDK WR NR 2244 ORX WHEN RECD K
01337	NUTA DE NJOF RRAR
	NBL DE NJOF O K
	NJFO DE NBL K
	NBL DE NJOF -T-0-110130Z -FM NJOF -TO Y77F
	OLDK GR5 BT C/F BT K
01357	NJOF DE NBL R 110130Z AR
	NBL DE NJOF -T-0-110145Z -FM NJOF -TO Y77F OLDK
0148	NJOF DE NBL R 110145Z - ZB0 0 K

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION
Ø1487	T..O..L..E..
	NJOF DE NBL -O-11Ø1317 -FM OLDK -TO NQMR -ONFO Y77F YJKF NJOF SSIL NAYG BT UNCLAS A. YOUR 1Ø221Ø7 NOTAL 1. FORCES ORDERED TO SAR AREA OS SB ROBERB WIB DEPCOMSUBR AND EMBRRKED , WARATGTON EMBARKED -EMBARKED , WAENREING TO N WITH CDS 24 37ARKED , BLANDY , THE SULLIVANS , SEAWOLF, SEAOWL, SUNBIRD, 4P24S FM CO MFAIRWING 3, YARNELL ,
SKYLARK IN OIL SL	AND RECOVERY ON STATION. 2. SUMMARY SITREP SKYLARK AND RECOVERY ICK POSIT 41-40.8N 64-55W. PIECES OF CORK ATED PALTIC SPLASTIC HUVE BEEN SIGHTED AND RECOVERED. SHTATION REMLDS UN RECOVERED. SITUAT REMARNS UNCHANGED BT K
	NBL DE NJOF IMI INFO TO BT IMI SAR AREA TO DEP COMSUBLANT K
	DE NBL IMI KINFO - INFO Y77F YJKF NJOF SSIL NAYO BT -SAR AREA TO DEPCOMSUBLA -SAR AREA; SB 16ERSROBERTS WITH DEP.
Ø2117	NBL DE NJOF R AR ØØØØ
	NJFO DE NBL -P-11Ø1587 -FM OLDK -TO NJOF -INFO Y77F E7XL BT UNCLAS A. MY 1Ø2Ø577
	NOTAL 1. CHANGE SITREPS TO HAPLF HOUR BT K
Ø2137	NBL DE NJOF R AR
	NJOF DE NBL --O-11Ø2Ø77 -FM OLDK -TO NQMR -INFO Y77F YJKG T2 SSIL NAYO BT UNCLAS A. MY 11Ø1317 1. DEPCOMSUBLANT EMB RKED IN BLANDY VICE S.B. ROBERTS BT K
Ø2257	NBL DE NJOF R AR
Ø2357	NBL DE NJOF -T-O-11Ø23Ø7 -FMNJOF -TO Y77F OLDK
Ø2367	NJOF DE NBL R 11Ø23Ø7 AR
Ø3Ø47	NBL DE NJOF -T-O-11Ø2597 -FM NJOF -TO NSS C/F
Ø3Ø57	NJOF DE NBL R 11Ø2597 AR
Ø3137	NBL DE NJOF -T-O-11Ø3ØØZ -FM NJOF -TO Y77F OLDK GR13 BT C/F BT K
	NJOF DE NBL IMI WA CHANGE K
	DE NJOF WA CHANGE - IN K
Ø3147	NJOF DE NBL R 11Ø3ØØZ AR
	NBL DE NJOF -T-O-11Ø33Ø7 -FM NJOF -TO Y77F OLDK GR11 BT C/F BT K
Ø3357	NJOF DE NBL R 11Ø33Ø7 AR
	NBL DE NJOF -T-O-11Ø2ØØ7 -FM NJOF -TO HAMI BT
Ø3467	NJOF DE NBL R 11Ø2ØØZ AR
	NBL DE NJOF -T-O-11Ø4ØØ7 -FM NJOF -TO Y77F OLDK GR5 BT C/F BT K
Ø4Ø47	NJOF DE NBL R 11Ø4ØØ7 AR
	NBL DE NJOF -T-O-11Ø43Ø7 -FM NJOF -TO Y77F OLDK GR10 BT C/F BT K
Ø433Z	NJFO DE NBL R 11Ø43ØZ AR
	NBL DE NJOB -T-O-11Ø435Z -FM NJOF -TO E7XL -INFO NQMR GR24 BT C/F
Ø443Z	NJOF DE NBL R 11Ø435Z AR
Ø4467	NJOF DE NQMR ZUI 711111Ø435Z INT C GR24 K
	DE NJOF C K
Ø4477	DE NQMR R AS AR

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Log 1

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-58) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK ASR-20	(b) (6) RM2		4253KCS	

TIME	TRANSMISSION		
0447Z	T..O..L..E..		
	NJOF	DE NBL	INT C AA BT (FEW ERRORS)
0450Z		DE NJOF	C AND TO CONTACT -
0454Z	NJOF	DE NQMR	R 110435Z AR
0515Z	NBL	DE NJOF	-T-O-110500Z -FM NJOF -TO Y77F OLDK +INFO E7XL EWJO GR5 BT C/F BT K
0517	NJOF	DE NBL	R 110500Z AR
	NBL	DE NJOF	-T-O-110530Z -FM NJOF -TO Y77F OLDK -INFO E7XL EWJO GR5 BT C/F
0532Z	NJFO	DE NBL	R 110530Z AR
	NJOF	DE NQMR	ZUI 110435Z -INT ZDK WA BT K
0552Z		DE NJOF	(COMPLIED)
	NJOF	DE NQMR	INT WA STOCONKCT - WAS TO BE IN VICIN ITY OF ST NNKOWN POINT TOREEEE POINT TO FCOMKCT K
	(OPNOTE)	DE NJOF	(CORRECTED HIM)
0554Z		DE NQMR	R AR
0603Z	NBL	DE NJOF	-T-O-110600Z -FM NJOF-TO Y77F OLDK -INFO E7XL EWJO GR15 BT C/F BT K
0606Z	NJOF	DE NBL	R 110600Z AR
0607Z	NBL	DE NQMR	-FM NQMR -TO Y77F -INFO HARK -INFO ETCI YTJW GR8 BT N/C
	NBL	DE NJOF	-T-O-110630Z -FM NJOF -TO Y77F OLDK -INFO E7XL EWJO GR5 BT C/F BT K
0633Z	NJOF	DE NBL	R 110630Z AR
	NJOF	DE NBL	-O-110511Z -FM E7XL -TO NJOF BT UNCLAS NVC ZUI YOUR 110435Z MSG 110233Z NOT ORIG THIS HDQTRS SUSPECT MAY BEEN ORIG EX7R IN E7XL IN NIWO REQ YOU RELAY DIR ADVISE DIRECT. ANVISE THIS HDQTRS BT K
0639Z	NBL	DE NJOF	R AR
0750Z	NBL	DE NJOF	-T-O-110700Z -FM NJOF -TO Y77F OLDK -INFO E7XL EWJO GR5 BT C/F
0707Z	NJOF	DE NBL	R 110700Z AR
	NBL	DE NJOF	-T-O-110730Z -FM NJOF-TO Y77F OLSK -INFO EWJO E7XL GR5 BT C/F BT K
0733Z	NJOF	DE NBL	R 110730Z AR
	NBL	DE NJOF	-T-O-110800Z -FM NJOF -TO Y77F OLDK -INFO EWJO E7XL GR5 BT C/F
0803Z	NJOF	DE NBL	R 110800Z AR
	NJOF	DE NQMR	INT ZDK NMEEEE 7DK NQMR 110250Z K
0810Z	NQMR	DE NJOF	ZUG AR
	NJOF	DE NBL	P R
	NBL	DE NJOF	K
	NJOF	DE NBL	-P-110805Z -FM E7XL -TO NJOF BT UNCLAS SVC MY 110611Z. ADVISE BT K
0812Z	NBL	DE NJOF	R AR

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION
Ø8127	T..O..L..E..
Ø8327	NBL DE NJOF -T-O-11Ø83Ø7 -FM NJOF -TO YZZF OLDK -INFO EJWO E7XL GR5 BT C/F BT R P K
Ø8347	NJOF DE NBL R 11Ø83ØZ K
	NBL DE NJOF -T-P-11Ø8257 -FM NJOF -TO E7XL GR11
Ø839 7	NJOF DE NBL R 11Ø8257 AR
	NBL DE NJOF -T-O-11Ø9ØØ7 -FM NJOF -TO YZZF OLDK -INFO EWJO E7XL GR5 BT C/F
	DE NBL INT "A SITREP - THIRTY K
	DE NJOF C K
Ø9Ø87	NJOF DE NBL R 11Ø9ØØZ AR
	NJOF DE NBL TNT ORU K
	NBL DE NJOF ORU INTORU K
Ø9477	NJOF DE NBL ORU AR
	NJOF DE NBL INT SITREP K
	DE NJOF ZUG K
1Ø197	DE NBL QBM YZZF - INT SITREP K
1Ø2Ø7	DE NJOF AS AR
1Ø227	NBL DE NJOF -T-O-111Ø157 -FM NJOF -TO YZZF OLDK -INFO E7XL EWJO NQMR BT
1Ø267	NJOF DE NBL R 111Ø15Z AR
1Ø497	NJOF DE NBL ZREEEEE QBM OLDK - SITREP DUE EVERY 3Ø MIN K
1Ø497	NBL DE NJOF R AR
	NBL DE NJOF ZOF OLDK BT EWJO WILL MAKE ALL FUTURE SITREPS BT K
1Ø547	NJOF DE NBL R AR
	SKY TI HOLD REQ POSIT OF OIL SLICK K
	HOLD TI SKY WE IN MIDDLE OF OIL SLICK - POSIT 41-41N 64-52W; OIL SLICK IS MUCH SMALLER THAN NOTED LAST NITE K
	SKY TI HOLD REQ YOU TAKE SAMPLES & PLACE GREEN DYE MARKER IN OIL SLICK K
15Ø[illegible]	TI SKY R OU T
	SKY TI HOLD WHAT-TYPE DEBRIS DID U PICK UP? K
	HOLD TI SKY WE-HAVE SMALL CORK & PLASTIC PARTICLE OF WHAT APPRARS TO BE PART OF A STYRO FOAM; THE OIL SLIC K APPEARS TO BE COMING UP TO ØØ ; GREEN DYE IS IN WATER; REQ INSTRUCTIONS K
	SKY TI HOLD WHAT TYPE DEBRIS AND WHAT TIME DID YOU PICK ITUP?
	HOLD TI SKY DEBRIS RECOVERED AT 1Ø17537 CONSISTED OF APPROX IØ SMALL PIECES OF BLACK CORK EACH ABOUT 3/4 CUBE. ONE PIECE SOFT YELLOW PLASTIC SIMILAR TO THAT FOUND IN CHILDREN'S TOYS ABOUT 1 1/2 LONG AND 3/4 LONG. ONE SOFT PLASTIC TUBE WITH WRITING "BAKERS FLAVORS BETTER TOO SQEEAE-GENTLY" COLORED BLUE & WHITE STYTPOFOAM RECEIVED AT 11Ø842Z FROM USS RECOVERY WITH SOME ADDIT+ IONAL PIECES OF CORK AND TARRY SUBSTANCE IN A WATER GLASS BT..
1542Z	DIPS TI HOLD ROUT -
	DIPS TI HOLD PREPARE DEBRIS FOR IMMEDIATE TRANSFER TO DUCCKSKIN WHO IS CLOSING YOU NOW K
1613Z	HOTL TI DIPS R OUT
	DIPS .. .. .. TI HOLD PROCEED TO GREEN DYE MARKER K
162Ø7	HOLD TI DKPS R OUT

3ND-P&PO 8482

Exhibit (38)

Cop. 1

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-56) Recorder from FPSO Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK (ASR-20)			S/S SAR	2820 243 0

TIME	TRANSMISSION		
1620	T...O...L...E		
	SKY	TI HOLD	KEEP ONE CONTAINER OF OIL ON BOARD AND GIV E IT TO EXCLAMATION WHEN HE COMES TO PICK IT UP
16257		TI SKY	R OUT
	SKY	TI HOLD	DO YOU HAVE GREEN DYE MARKER IN SITE
	HOLD	TI SKY	NEG K
16307	SKY	TI HOLD	R OUT
		TI HOLDS	REQ U CLOSE EXCL AT THIS TIME K
17427	HOLDS	TI DIPS	R AS AR
			BLANDY IMM
	HOLDS	TI DIPS	PICKING UP RUBBER GLOVES K
	DIPS	TI HOLDS	REQ U TURN DOWN RET GAIN LOUD BACK GRI WE ALL ALSO RECOVERING RB
		TDIPS	R AR
	HODS	TI DIOS	BUCK CLOSING ME FOR TRANSFER K
16447	DIPS	TI HOLD	STBY K
	HOLD	TI DIPS	R AR
	HOLD S	TI DIPS	HAVE RECOVERD ONE ORRANGE RUB GLOVE ONE WHITE RUBBER GLOVE LOST ONE ORRANGE GLOVE - DO U DESIRE I TRANSFEI THESE WITH OTHER DEBRIS K
17557	DIPS	TI HOLD	R AR
	DIPS	TI HOOD	REF YOUR LAST ARIRM PASS OFF GLOVES WITH OTHER DEBRIS K
17507	HOLDS	TI DIPS	R AR
	DIPS	TI HOLDS	HAVE MARKED OBJECT IN WATER WITH SMOKE FLOAT AM CLEARING AREA REQ YOU COME IN RECOVER K
17547	HOLDS	TI DIPS	R AR
			I AM CLOSING EXCLI IN ORDER TO EFFECT RECOVERY WHERE IS OBJECT IN REL TO HI K
17537	DIPS	TI HOLD	OBJECT MARKED WITH SMOKE POT AR
	DIPS	TI HOLD	REQ U COMPLETE TRANSFER WITH BUCK NOW WILL CALL FALTER TANGO TO RECOVER OBJ
17587	HOLD	TI DIPS	R AR
18407	HOLDS	TI DIPS	TRANSFER COMPLEATED K
18417	DIPS	TI HOLDS	R AR
	NJOF	DE NBL	K
	NBL	DE NJOF	L
	NJOF	DE NBL	QSV K
	NQMR	DEKTLI	INT QD K
	NBL	DQ MR	K
	MQMR	DE NBL	QOD NJOF K
	DBL	DE NQMR	QOD K
		DE NBL	
21357	NBL	DE NJOF	INT QRU K

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION		
2257	T...O...L...E		
	NQMR	DE NJOF	-T-NBL INT QRU K
		DE NQMR	QRM IMI K
	NQMR	DE NJOF	-T-NBL INT QRU K
2139Z	NJOF	DE NQMR	AS AR
		DE NQMR	K
		DE NJOF	K
		DE NQMR	QRU K
2142Z	NQMR	DE NJOF	QRU AR
2147Z	NJOF	DE NQMR	QRU NBL K
	NIWO	DE NJOF	-T-E7XL BT MY BEST SPEED IN THESE SEAS IS 6 KNOTS - REQ INSTRUCTIONS K
	RDLD	TI DIPS	K
	DIPS	TI QWIKDRAW	WILL RELAY UR TRF K
	QD	TI DIPS	-T-MY BEST SPD 6 KTS REQ INSTR K
		TI QD	R OUT
2240Z	DIPS	TI QD	HOLD R UR TRF OUT
	QD	TI HOLD -T-DES	REQ U REMAIN VICINITY OF DATUM K
	DIPS	TI QD	- " " " " K
2248Z	QD	TI DIPS	R OUT
	NBL	DE NJOF	INT QRZ K
	NQMR	DE NBL	K
	NQMR	DE NJOF K	INT QRZ K
2254Z		DE NQMR	INT QSO NIWO K
	NQMR	DE NJOF	K
		DE NQRM	K
		DE NQMR	////R/AR
	NQMR	DE NJOF	NIWO GUARDS 2820 KCS K
2257Z		DE NQMR	R AR
			EX REVERSING CR 090 K
	DIPS	TI FAUTL T	ATLANTIS MAINTAINING PRES POSIT TO TAKE WATTER AND BOTTOM SAMBLES. I AM MAINT+AINING POSITION ON ATLANTI
	NBL	DE NJOF	P K
	NBL	DE NJOF	P K
	NBL	DE NQMR	QRZ NJOF K
	NBL	DE NQMR	QSA QRZ NJOF K
	NQ	DE NBL	QRX 2 Q NJOF K
1117Z	NBL	DE NJOF	K
	NQMR	DE NBL	ZOD NJOF K
	NBL	DE NQ	INT QSAP K
	NQMR	DE NBL	ZOD NJOF K
	NJOF	DE NQMR	ZOE K
1129Z	NQMR	DE NJOF	-T-P-121033Z FM NJOF TO YZZF CF/WH//
END OF 11TH		DE NQ	NT
DEC 12	K6LA	DE NJOF	FM NJOF TO HAMI CAS 12222307 INT GR 69
0116Z	K6LA	DE NJOF	C K
0116	NJF	DE K6LA	12223Z AR
	... ...		
	NO DAILY LOG CHANGE DUE TO WEATHER & OPS JLE		

LOP 2

RADIO LOG
OPNAV FORM 2810-1 (Rev. 11-58) Recorder from H-50 Cog. "I" Stock

ACTIVITY	OPERATOR	CREW	CIRCUIT	FREQUENCY
USS SKYLARK	(b) (6) RMB		SAR	2629 - 243.[illegible]

TIME	TRANSMISSION		
1927Z	T.O.L.E.	(CARRIED THROUGH FROM LOG 3 11TH)	
1946Z	K6LA	DE NJOF	P K
1946Z	NJOF	DE K6LA	QRY2 AR
	NJOF	DE K6LA	K
2004Z	NJOF	DE K6LA	R 121938Z
2035Z	K6LA	DE NJOF	-P- 122ψ2ψZ -FM NJOF -TO K6LA C/FILES
2042Z	NJOF	DE K6LA	R122ψ2ψZ AR
(LATE ENTRY)			
	DIPS	TI QWIK D	-R-122ψψ2Z FM OUTRAGE TO DIPS INFO HOLDS GRNC BT A. YOUR 1ψ16ψ4Z. 1. REQ CONF REPORT VERBATUM TRANSCRIPT OF TIMES & CHECKS OF LAST 3 TRANSMISSIONS RECD FM WC INCLUDING ONE REPORTED REF A AND RESPONSE AS PERTINANT K
2027Z	QWIK D	DE DIPS	R OUT
	DIPS	TI QD	- UPON COMPLETION OF PERSONNEL TRANSFER EXCLAMATION PICKING UP PERSONNEL. REQ NR TO BE TRANSFERRED FM DIPS TO EX K
2033Z	QD	TI DIPS	R OUT
	QD	TI DIPS	-T-HOLDS - MY 122ψ2ψZ REFERS UR LAST QUESTION K
2042Z	DIPS	TI QD	R OUT
(END LATE ENTRY/SH//)			
	DIPS	T I EX	AM GONNA MAKE ψ5 NOTS TO EXPEDITE CLOSE UP...1ψ KNOTS AT HIGH LINE...WHAT IS UR BEST SPD IN THESE SEAS? K
	EX	TI DIPS	BEST SPD ±3 KTS
	DIPS	TI EX	R PORT QTR; READY FOR PERS TRANSFER R
	(LATE ENTRY)		CORPIN 325 SPD 12 KTS INT SATISFACTORY
	EX	TI DIPS	1ψ KYS SAT OUT
	**QWIKDRAW DETATCHED AT #152Z		
	EX	TI DIPS	REQ PERM TO TRANSFER 2 RESERVES W TWO DIPS PERSONELL K
2157Z	DIPS	TI EX	PERGRA K
	DIPS	TI EX	REQ U TAKE CORPIN 345 SPD 1ψ KTS WILL ATTEMCTOO COME ALONG SIDE TO PORT K
2215Z	EX	TI DIPS	R OUT
	DIPS	TI HOLDS	HIGH LINE WILL NOT VE COMPLETED U ARE DETACHED - RETURN TO NLON K
2218Z	HOLDS	TI DIPS	R OUT /SH//**********
	DIPS	TI HOLDS	U R TO MAKE OKN MOVREP
	Ø/P HOLD	TI DIPX	R OUT
	DIPS	TI HOLD	WHAT IS UR ETA NLON ?
	HOLD	TI DIPS	ETA NLON 131745Z WILL SEND REVISED ETA ASAP DO U DESIRE TO BE INFO OR ACTION ADDEE K
	DIPS	TI HOLDS	R REQ ME BE INFO ADDEE K
2235Z	HOLDS	TI DIPS	R OUT

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OPNAV FORM 2810-1 (Rev. 11-58) Continued

TIME	TRANSMISSION
2235Z	T...O...L...E...(b) (6) STILL HANGING IN THERE//WH //
	(RETURN TO CONUS AT PRESENT MOMENT//AT NLON/ NOONE SS TO
	LEAVE OR BOARD UNTILL DULLY AUTHORIZED BY COMPETENT
	AUTHORITY) //WH//
	DIPS TO HOLD REQ U VERIFY U ETA K
	HOLD TI DIPS NEW ETA - 1319ZZR - NLON K
2249Z	DIPS TI HOLD R OUT
2359Z	END OF DAY END OF LOG.....(b) (6) RM3_____//

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MILES

ZONE TIME	WIND DIR	WIND SPD.	VISIBILITY	WEATHER	BAROMETER	TEMP DRY	TEMP WET	CLOUDS AMT.	CLOUDS HGT	CLOUDS TYPE	SEA TEMP	WAVES DIR.	WAVES HGT.
01	050°	5	10	CLR	2962	41	39	—	—	CLR	44	050	1
02	045	5	10	CLR	2961	40	39	—	—	CLR	44	045	1
03	045	5	10	SCT	2960	40	40	2	2000	SC	44	045	1
04	350	4	10	SCT	2957	40	40	2	2000	SC	44	350	1
05	Moving through Sapa Cod Canal												
06	340	1	10	CLR	2956	40	37	—	—	—	45	335	1
07	341	1	10	CLR	29.55	44	40	—	—	—	45	335	3
08	285	11	10	CLR	29.52	46	40	0	—	CLR	45	280	2
09	295	12	10	CLR	29.49	45	40	0	—	CLR	45	280	2
10	255	7	10	CLR	29.47	45	40	0	—	CLR	45	260	2
11	250	3	10	SCT	29.45	47	42	1	1600	Cu	43	250	1
12	245	5	10	SCT	29.41	46	41	1	2600	CU	42	245	1
13	175	4	10	SCT	2939	43	42	1	2000	CU	40	175	1
14	185	5	10	SCT	2937	48	43	1	2000	CU	40	185	1
15	185	7	10	SCT	2936	45	41	1	2000	CU	40	185	1
16	185	7	10	SCT	2935	45	41	1-5	2000	CU	41	185	1
17	140	5	10	Sct	29.35	42	38	2	10000	Ac	41	135	1
18	150	6	10	Sct	29.37	42	38	3	10000	Ac	41	145	2
19	150	5	10	Sct	29.36	40	38	2-5	10000	Ac	42	145	2
20	250	5	10	CLR	29.36	40	38	0	—	CLR	42	250	1
21	210	4	10	CLR	29.36	40	38	0	—	CLR	42	200	1
22	210	6	10	CLR	29.36	40	38	0	—	CLR	42	200	1
23	210	5	10	CLR	29.44	44	40	0	—	CLR	44	210	.5
24	205	4	10	CLR	29.63	42	39	0	—	CLR	44	280	.5
23	195	5	10	CLR	29.36	40	38	0	—	CLR	42	190	1
24	195	5	10	CLR	2936	40	30	0	-	CLR	42	190	1

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DATE 10 April 1963 MILES

ZONE TIME	WIND DIR.	WIND SPD.	VISIBILITY	WEATHER	BAROMETER	TEMP DRY	TEMP WET	CLOUDS AMT.	CLOUDS HGT	CLOUDS TYPE	SEA TEMP	WAVES DIR.	WAVES HGT.
01	140	1	10	BKN	2934	40	39	.8	2000	Ac	41	140	.5
02	140	1	10	OVC	2932	42	41	.10	2000	A/c	41	140	.5
02	140	1	10	BKN	2932	40	39	.8	2000	A/c	41	140	.5
04	080	1	10	BKN OVC	29.32	40	39	8	10000	Ac	41	080	1
05	081	1	10	BKN OVC	29.32	40	38	8	10000	Ac	41	081	.5
06	040	1	10	BKN OVC	29.30	40	38	8	7000	Ac	41	045	1
07	040	2	10	BKN OVC	29.29	41	38	8	9000	Ac	41	040	1
08	010	3	10	OVC	29.29	41	39	10	2000	ST	41	000	1
09	015	7	10	OVC	29.27	42	39	10	2000	ST	45	010	1
10	355	5	10	OVC	29.27	44	42	10	2000	ST	45	000	1
11	350	5	10	OVC	29.26	47	44	10	2000	ST	45	350	1
12	350	4	10	OVC	2923	49	45	10	2000	ST	45	350	.5
13	350	4	10	OVC	2920	49	45	10	2000	ST	45	350	1
14	010	4	10	OVC	29.19	51	42	10	2000	ST	46	010	1
15	345	2	10	Scat OVC	29.20	45	42	8	10000	Ac	47	015	1
16	340	1	10	BKN OVC	29.20	43	41	8	10000	Ac	49	020	1
17	150	1	10	BKN OVC	29.20	42	41	6	9000	Ac	49	150	1
18	290	1	10	BKN OVC	29.31	38	36	6	12000	Ac	49	310	1
19	290	11	10	BKN OVC	29.23	42	40	6	6500	As	49	300	1
20	300	6	10	SCT	29.26	43	41	.4	10000	AC	45	300	1
21	300	7	10	CLR	2925	42	40	—	—	CLR	45	300	1
22	270	8	10	CLR	2925	38	34	—	—	CLR	45	265	2
23	280	8	10	CLR	2924	38	34	—	—	CLR	45	265	2
24	250	8	10	Hkn	2922	40	38	6	2000	Cu	45	250	2

DATE 11 April 1963 MILES

ZONE	WIND		VISIBILITY	WEATHER	BAROMETER	TEMP		CLOUDS			SEA	WAVES	
TIME	DIR.	SPD.				DRY	WET	AMT.	HGT	TYPE	TEMP	DIR.	HGT.
01	280	8	10	Sct	29.21	40	36	5	2000	Cu	45	280	2
02	300	8	10	Sct	29.20	40	38	4	2000	Cu	45	300	2
03	320	8	10	Sct	29.20	40	38	3	2000	Cu	45	320	2
04	295	8	10	SCT	29.20	40	38	5	2000	CU	45	295	2
05	280	[illegible]	10	SCT	29.17	39	37	3	2000	CU	45	280	3
06	295	12	10	SCT	29.17	42	39	2	2000	Cu	45	290	3
07	295	12	10	SCT	29.15	42	38	3	2000	CU	45	295	3
08	270	12	10	Sct	29.13	42	40	5	2000	Cu	45	270	3
09	330	1	10	Sct	29.13	4	42	5	2000	Cu	45	330	2
10	280	12	10	Sct	29.09	40	38	8	2000	Cu	45	280	2
11	285	10	10	Sct	29.08	40	38	7	2000	Cu	45	285	3
12	280	10	10	SCT	29.08	40	38	10	2000	CU	45	285	4
13	280	12	10	OVC	29.01	40	38	10	2000	CU	45	285	4
14	270	19	10	OVC	29.00	41	38	10	2000	CU	45	270	5
15	270	22	4	OVC	28.99	41	38	10	1600	ST/CU	45	270	5
16	300	12	7	Ovc	28.96	40	38	10	2000	St	45	300	4
17	205	14	7	Ovc	28.90	40	38	10	2000	St	45	205	4
18	315 psbl	15	7	Ovc	28.90	39	38	10	2000	St	45	315 psbl	5
19	[illegible]	[illegible]	6	Ovc	28.90	36	36	10	2000	St	46	310 psbl	5
20	[illegible]	[illegible]	6	OVC	28.90	42	41	10	2000	ST	45	310 psbl	4
21	[illegible]	[illegible]	6	OVC	2890	38	37	10	2000	ST	45	310T	5
22	[illegible]	[illegible]	6	OVC	2888	39	37	10	1600	ST	45	300	5
23	285	10	6	OVC	2886	39	38	10	1600	ST	45	280	6
24	290	30	6	OVC	2889	39	38	10	1600	ST	45	290	6

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MILES 6809.6 6683.4 126.2

ZONE	WIND		VISIBILITY	WEATHER	BAROMETER	TEMP		CLOUDS			SEA	WAVES	
TIME	DIR.	SPD.				DRY	WET	AMT.	HGT	TYPE	TEMP	DIR.	HGT.
01	310	30	6	OVC	28.94	39	37	10	1600	ST	45	315	6
02	320	30	5	OVC	28.96	39	37	10	1600	ST	45	320	6
03	315	35	5	OVC	29.01	38	37	10	1600	ST	45	315	6
04	350	30	6	bkN	29.08	38	36	8	1600	st	40	340	5
05	340	30	9	bkn	29.10	38	36	8	1600	st	45	340	6
06	000	30	9	bkn	29.16	38	36	8	1600	st	40	000	6
07	350	25	9	bkn	29.21	41	38	8	2000	Cu	40	000	6
08	355	27	10	BKN	29.24	40	38	8	2000	CU	40	355	6
09	355	27	10	BKN	29.27	41	39	8	2000	CU	40	355	5
10	000°	30	10	BKN	29.30	40	37	8	2000	CU	40	000°	5
11	345	26	10	BKN	29.33	39	37	6	2000	AC CU	40	340	5
12	340	25	10	SCT	29.35	40	37	5	6500	AC	40	340	5
13	340	25	10	SCT	29.38	40	38	5	6500	AC	43	340	5
14	330	25	10	SCT	29.39	40	37	3	6500	AC	43	335	5
15	335	20	10	BKN	29.43	42	39	9	6500	AC	43	335	4
16	330	12	10	bkn	29.43	40	36	9	6500	Ac	43	330	3
17	Maneuvering for night lines with USS Shandy												
18	270	10	10	clr	29.47	40	38	—	—	—	43	270	3
19	270	10	10	clr	29.60	68	68	—	—	—	43	265	2
20	270	10	10	CLR	29.53	38	35	-	-	CLR	43	265	3
21	270	10	10	CLR	29.52	39	37	—	—	CLR	43	265	3
22	265	10	10	SCT	29.54	40	38	1	2000	CU	43	265	3
23	265	10	10	SCT	29.54	40	38	1	6500	SC	43	265	3
24	270	10	10	CLR	29.54	42	40	0	—	CLR	40	270	3

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MILES

ZONE	WIND		VISIBILITY	WEATHER	BAROMETER	TEMP		CLOUDS			SEA	WAVES	
TIME	DIR.	SPD.				DRY	WET	AMT.	HGT	TYPE	TEMP	DIR.	HGT.
01	260	11	10	CLR	29.55	42	40	Ø	—	CLR	41	260	3
02	270	12	10	CLR	29.55	43	41	Ø	—	CLR	41	265	3
03	275	10	10	CLR	29.54	43	41	Ø	—	CLR	41	270	3 2
04	280	10	10	clr	29.54 29.56	42	40	Ø	—	clr	41	270	2
05	280	10	10	clr	29.58	43	41	Ø	—	clr	41	270	1
06	270	10	10	clr	29.60	42	40	Ø	—	clr	41	260	1
07	275	10	10	clr	29.61	42	40	Ø	—	clr	41	255	1
08	260	4	10	CLR	29.63	46	44	Ø	—	CLR	41	250	1
09	260	5	10	CLR	29.63	47	45	Ø	—	CLR	41	255	1
10	265	4	10	SCT	29.62	46	43	2	1800	Ci	41	260	1
11	265	3	10	SCT	2962	45	43	2	4800	Ci	41	260	1
12	315	4	10	SCT	2961	56	50	5	20000	Ci	43	310	1
13	285	7	10	BKN	29.60	48	44	6	20000	Ci	44	285	1
14	270	11	10	BKN	29.57	48	44	6	2000	Ci	45	270	1
15	235	11	10	SCT	29.54	47	44	5	20000	Ci	45	235	1
16	280	3	10	Sct	29.53	50	44	5	20000	Ci	45	280	.5
17													
18													
19													
20													
21													
22													
23													
24													

10 April 1863
Scale 1" = 1000 yds.
start 0921

(b) (6)

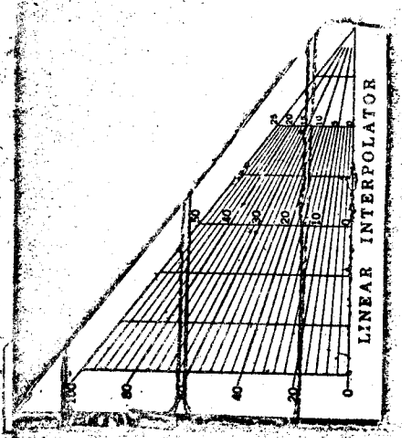
0921 10 April 63
1145 10 April 63

Exhibit (40)

Ex 40

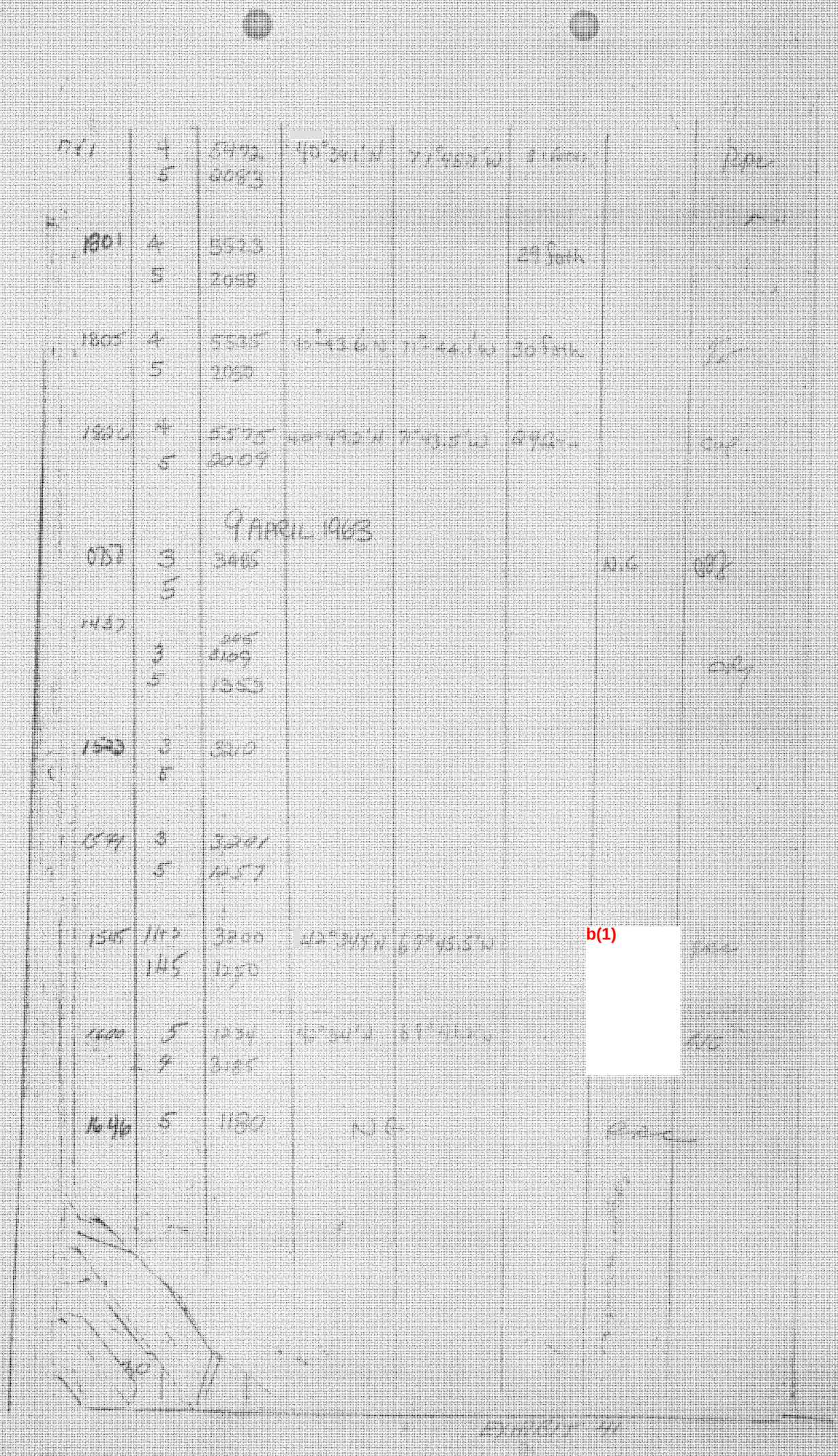
B

LIBRARY RECORD



7530-222-3524
FEDERAL SUPPLY SERVICE
(GPO)

EXHIBIT 41 15 pages
1

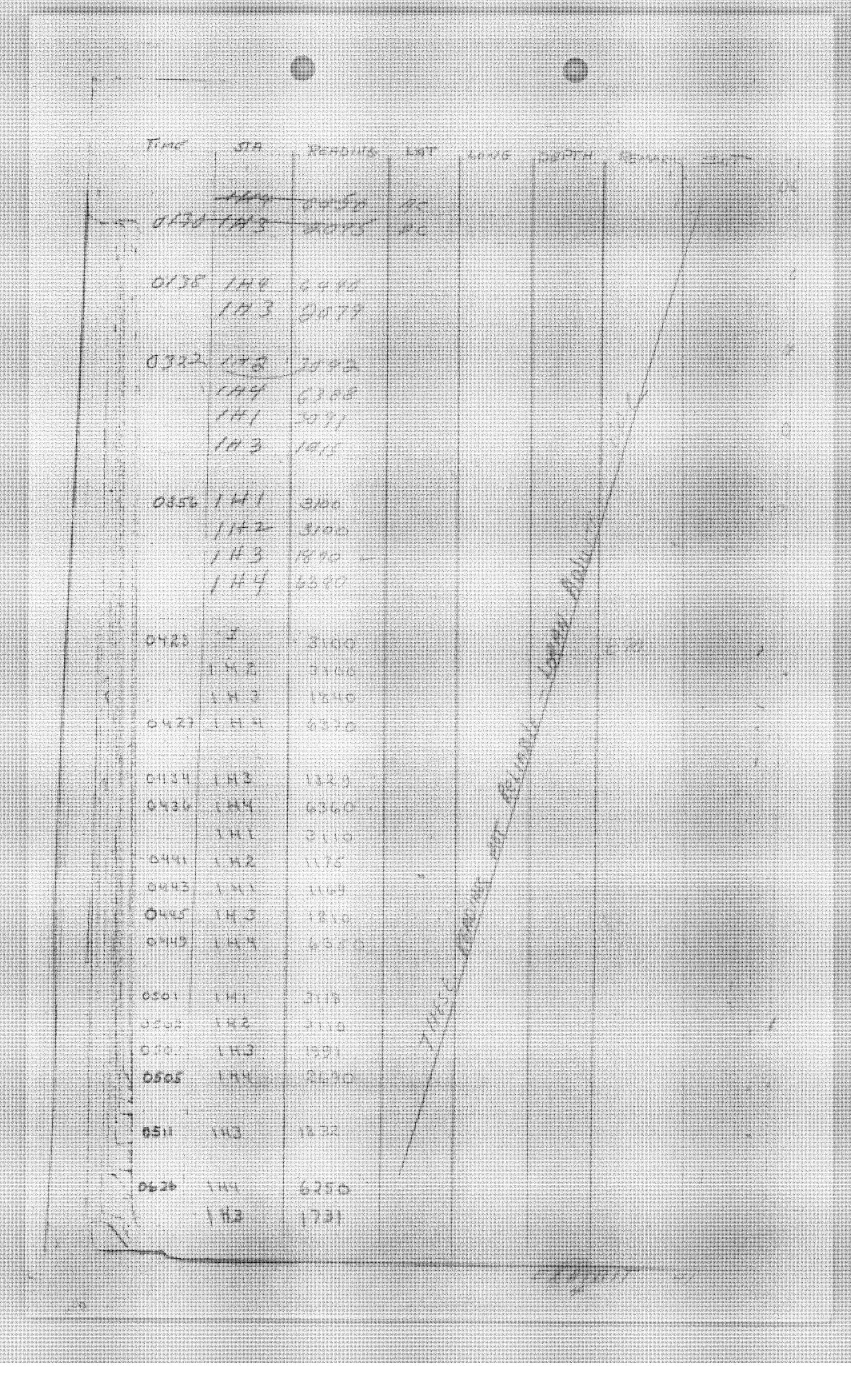


9 APRIL 1963

b(1)

7 APRIL 1980

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	DIST
1113	3	3093					
	5	1150					
1119	3	3080	42 27.5 N	69 03.6 W	42		6M
	5	1142					
1146	1H5	1132	42 26.1	69 03.9 W	123 fms		
	1H3	3038					
1804	1H5	1148	42 24.4 N	69 03.6 W	119 fms		
	1H3	3005					
1836	1H3	2907			116 fms	MC	
	1H5	950					
1921	1H4	1583					
	1M3	2858					
1944	1M3	2836					
	1M5	1042					
	1M4	1592					
2038	4	7015			N. 6 fms		
	3	2710					
359	4	6570			N.6		
	5	5912					
	3	2618					
910	3	2645					
	4	6560					
1AL	3	2910				MC	
0959	3	2810					
	4	6425					
1105	3	2875					
	4	6064					
	5	1845					



TIME	STA	READING	LAT	LONG	DEPTH	REMARKS
~~0434~~	~~1H3~~	~~3003~~				
0438	1H4	6480				
	1H3	3079				
0322	1H5	3092				
	1H4	6368				
	1H1	3071				
	1H3	1915				
0352	1H1	3100				
	1H2	3100				
	1H3	1890				
	1H4	6340				
0423	1	3100				
	1H2	3100				
	1H3	1840				
0423	1H4	6370				
0434	1H3	1829				
0436	1H4	6360				
	1H1	3110				
0441	1H2	1175				
0443	1H1	1169				
0445	1H3	1210				
0449	1H4	6350				
0501	1H1	3113				
0502	1H2	3110				
0503	1H3	1991				
0505	1H4	2490				
0511	1H3	1832				
0626	1H4	6250				
	1H3	1731				

10 APRIL 1993

TIME	SRC	ADC	LAT	LONG	DEPTH	REMARKS	INIT
0159	IH3	1730	LOP	LOP	1320fms		RPC
	IH4	6255	41°46'N	65°01.2'W			
0240	IH3	1730	42°06'N	65°21.2'W	1180fms		RPC
	IH4	6255					
0421	IH3	1732	41°45'N	64°57'W	1380fms	✓	RPC
	IH4	6253					
0449	IH4	6241	41°46'N	64°54'W	1380fms		RPC
	IH3	1718					
0953	IH4	6241	41°43'N	64°51'W	1400fms		
	IH3	1732					
1113	IH 4	6241	41°43'N	64°03'W	1420fms		RPC
	IH 3	1734					
1150	IH3	1740	41°45'N	63°07'W	1430fms		RPC
	IH4	6250					
1159	4	6241	41°41.2'N	63°06.3'W	1430fms		CMC
	3	1749					
1320	3	1734	"	"	1420fms		CMC
	4	6239					
1325	4	6241	41°34.1'N	63°03.1'W	1400fms	WEATHER	CMC
	3	1744					
1352	4	6225	41°33.4'N	63°02.0'W	1400fms		CMC
	3	1734					
1402	4	6234	41°32.5'N	63°02.5'W	1400fms		CMC
	3	1741					
1514	3	1734	41°33.4'N	62°52.0'W	1500fms		CMC
	4	6230					

10 APRIL 1963

1558	1H4	6230	41°38.6'N	65°00'W	1500 Fms	PRC
	1H3	1770				
1635	1H4	6228	41°38.1'N	65°00.8'W	1550 fms	PRC
	1H3	1773				
1703	1H3	1748	41°40.8'N	64°54'W	1430 Fms	PRC
	1H4	6230				
1755	1H3	6230			1400 fms	
	1H4	1732				
1800	3	1735	41°40.8	64°55'N		
	4	6230				
1832	3	1732				
	4	6332				
1856	3	1740	41°38'N	64°51°W	1370 Fms	PRC
	4	6322				
1942	1H4	6221			1340	PRC
	1H3	1721				
1949	1H3	1730	~~41°38'N~~	~~64°56'W~~	1350	
	1H4	6331	41°31'N	64°53 W		
2025	1H3	1700	41°42' N	64°47'W	1320	PRC
	1H4	6232				
2050	3	1695	41°41 N	64°44.8'W	1290 Fms	
	4	6231				
2107	1H4	6333	41°41.5'N	64°41'W		
	3	1686				
2124	3	1699	41°41.4'N	64°40'W	1300 fms	
	4	6233				

EXHIBIT 41

6

Time	Sta	Reading	Lat	Long	Remarks	Initials
0033	3	1764	41°-52'N	65°-24'W	1540 fath	
	4	6290				
0102	3	1785				
	4	6282				
					No Good 1625	
0208	4	[illegible]				
	3	1780				
0253	3 2	[illegible]	41°-34'N	64°-44'W	1625 FTH	
	4 3	1760				
0317	1H3	1430				
0320	1H3	1790				
0334	1H2	1398				
	1H3	1727				
0504	3	1780				
	4	[illegible]				
	1	3025	41 29.9'N	64°38'W	1250 FMS	
	2	1405	{41 40..3N"	64 55W}	oil sick	
0547	2	1395			1590	
	3	1736				
1616	3	[illegible]				
	2	[illegible]				
0630	2	1387	41°34'N	64°44.1W	1520 FMS	
	3	1749				
0646	2	1357	41°36.1'N	64°50'W	1500 FMS	
	3	1748				
0702	2	1350	41°38.4'N	64°52'W	1425 fms	
	3	1740				

EXHIBIT 7

11 APRIL 1963

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	MET
0806	2	1345	41°36.8'	64°51.2	1480		
	3	1750					
0902	2	1340	41°38.5'N	64°54.2'W	1480 fm		
	3	1752					
	4	6230					
0931	2	1350	41°41.0	64°55.0			
	3	1754					
	4	6230					
1018	2	1345	41°39.6N	64°53.0W	1490		
	3	1746					
1121	IH 2	1350	41°36.8'N	64°51.5'W	1480		
	IH 3	1744					
	IH 4	6228					
1159	2	1359	41°36.2W	64°54.2W	1480 fm		
	3	1753					
	4	6228					
1235	3	1745	41°40.1W	64°53.0'W			
	4	6229					
	2	1310					
1345	2	1407	41°32.1	64°34.0			
	3	1727					
1401	2	1415	41°36.1	64°35.5W	1580		
	3	1720					
	4	6205					
1422	2	1405	41°36.8W	64°38.0W	1580 fm		
	3	1720					
1433	2	1400	41°37.5'N	64°40.1W	1560		
	3	1720					
	2	1398					

APRIL 1963

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	TAPE
1440	2	1392	41°37.6'N	64°42'W	1540		ONL
	3	1782					
1455	2	1385	41°37.1'N	64°35.4'W	1490		ONL
	3	1727					
1516	2	1373	41°37.3'N	64°36.5'W	1460		ONL
	3	1735					
1537	3	1739	41°36.3'N	64°36.1'W	1530		ONL
	2	1379					
1620	2	1446	41-40.3'N	64°33.2'W	1485		ONL
	3	1735					
1651	1W2	1335	41-39.5'N	64°36.2'W			ONL
1654	1W3	1752					
1656	1W2	1302	Aground		140 fms		
1743	1W2	1318	41°39.6'N	64°40.5'W			ONL
1746	1W3	1770					
1816	1W2	1302	41-41.7'N	64°45.5'W			ONL
	1W3	1770					
1833	1W2	1285	41-42.2'N	64°48.9'W			ONL
	1W3	1778					
1855	2	1379	41°43.5'N	64°50'W	OUT	OUT 15	ONL
	3	1783					
1909	2	1352	41°41.1'N	64°42.1'W	OUT	OUT 15	ONL
	3	1785					
1946	2	1376					
	3	1792					
1959	2	1365	41°32.1'N	64°34.1'W	OUT		ONL
	3	1794					

(CONTINUED)

11 APRIL 1963

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	CHART
2202	4	1552					
	3	1780					
2230	3	1766	41°32'N	64°53.1W	OUT		
	2	1356					
2304	2	1345	41°39'N	64°54'W	OUT		
	3	1250					
2355	2	1533	41-40.7N	64-54.2W			
	3	1763					

12 APRIL 1963

0036	2	1317					
	3	1775					
0825	2	1845	41°49'N	64°55.5W	OUT		
	3	1769					
0902	3	1780	41°43.8N	65°12.5W		OUT	
	2	1843					
0927	3	1838	41°34.7N	65°19.1W			
	3	1764					
0939	2	1859	41°32.7N	65°20.1W			
	3	1768					
1010	2	1837	41°31'N	65°21.4W			
	3	1761					
1041	2	1821	41°29.5N	65°23.4W			
	3	1755					
1116	2	1818	41°28.5N	65°25.0W	OUT		
	3	1744					
1200	2	1210	41°26.2	65°29.5W			
	3	1740					
	4	6313					

EXHIBIT #1

12 APRIL 1963

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	INIT
1257	2	1295				7.5 KM	BG
	3	1715					
1310	2	1192	42-43.8N	65-23.6W			BG
	3	1710					
1351	2	1157	42-45.5N	65-28.2W			BG
	3	1706					
1454	2	1205	42-03.5N	65-23.5W			BG
	3	1695					
1535	1H2	1235	42° 01' N	65° 18.8' W			BG
	1H3	1695					
	1H4	6530					
1727	1H2	1236	42-05.4	65-19.8			
	1H3	1656					
	1H4	6395					
1822	1H2	1173					
	1H3	1589					
2015	2	1149	41°44'N	65°51.3'W	58 FATH		BG
	3	1971					
	4	6379					
		4855					
2055	1H3	2070	41°55'N	66°20'W	48 FMS	NONE	BG
	1H2	1131					
2116	1H2	1145					
	1H3	2130				NG	BG
	1H3	1401				NG	
	1H2	1150					
2307	2	1127	41°34'N	66°12.2'W	48 FMS	OK	BG
	3	2161					

EXHIBIT (K)

Time	STA	READING	LAT	LONG	DEPTH	REMARKS	ENG
0150	2	1120	41°30'N	67°19'W	45 fms	OK	OK
	3	0921					
2238	2	1149					OK
	3	9381					
2244	2	1023	41°34.5'N	67°39'W	43 fms		OK
	3	2357					
2306	2	1026					
	3	2920					
2328	3	8470	41°33'N	66°37'W	36 fms		OK
	2	1079					
0056	2 3	2700					
	3 4	6365				No good	OK
0121	2						
	3	2760				No good	OK
	4	6357					
	5	1005					
0138	2	1050	41-12.5'N	67-32.0'W	23 fms	OK	
	3	2808					
	4	6360					
0213	2						
	3	2790	41°67.1'N	67°40.0'W	24 fms	OK	
	5	1015					
0247	3	2785				No good	OK
	5	1010					
0303	3	3030				27 fms	OK
	5	1011					
0340	3	3120					
	5	1035					
		3420					

EXHIBIT 44

13 APRIL 1963

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	INIT
1352	3	3150	40°55.5'N	68°08.6'W	30		
	5	1035					
	4	6240					
	2	985					
	2	830					
	3	3275					
	4	6204	N				
	5	1145					
0459	3	3310	40°44.5'N	68°26.3'W	29		
	4	6192					
	5	1045					
0521	3	3365	40°41.1'N	68°19.5'W	30		
	4	6175					
	5	1080					
0555	1H3	3450	LOP		31		
	1H4	6150					
	1H5	1100					
0601	1H5	1105	LOP		32		
	1H4	6135					
	1H3	3473					
0612	1H3	3485	40°35.1'	68°19.6'W	35		
	1H4	6137					
	1H5	1072					
0637	1H3						
	1H4	6108	40°31.8	68°38.4'W	37 Fms		
	1H5	3560					
0652	1H3	3520	40°28.7'N	68°09.7'W	42 Fms		
	1H5	6089					
0656							

END OF NIGHT 4/13

13 APRIL 1963

Time	Sta	Reading	Lat	Long	Depth	Remarks
0710	1H 5	1165	40° 27.5' N	69° 06.8' W	41	
	1H 4	6071				
	1H 3	3608				
0757	3	3696			38	328° 17,400
	4	6041				
	5	1211				
0823	3	3745	40°26.6' N	69°31.8' W	36 Fms	025.5° 13,650
	4	6048				
	5	1230				
0843	1H5	1246				051.5° 18,150
	1H4	6046				
	1H3	3779				
0907	3	3811	40°01.5'N	69°47'W	36 fms	CAL
	4	6041				
	5	1261				
0935	3	3858	40°30.8'N	69°51.3'W	34 fms	CAL
	4	6045				
	5	1293				
1003	3	3096	40°32.5'N	70°04.5'W	31 fms	CAL
	4	6022				
	5	1331				
1031	3	3927	40°36.2'N	70°14.7'W	29 fms	CAL
	4	6054				
	5	1361				
1057	3	3946	40°39.9'N	70°24.3'W	28 fms	CAL
	4	6014				
	5	1399				
1125	4	6000	40°43.6'N	70°33'W	28 fms	CAL
	5	1439				

EXHIBIT 41
14

12 APRIL 1963

TIME	STA	READING	LAT	LONG	DEPTH	REMARKS	INT.
1144	5	1479	40°44.5'N	70°38.2'W	31 fms		CAL
	4	5979					
1203	4	~~5970~~ ~~1300~~	40-47.4N	70-43.4W	29 fath		
	5	~~5970~~ 1505					
1220	4	5950	40-49.5N	70-49.6W	27 fath		
	5	~~5950~~ 1550					
1252	4	5910	40°52.8'N	70°59.5'W	27 fath		
	5	1625					
1311	4	5887	40°55.3'N	71°05.8'W	25 fath		
	5	1670					

EXHIBIT 41
15

NAVIGATORS WORK BOOK

EXHIBIT 42 - 10 pages
1

PM ☆

Date	9 APRIL 1963	9 APRIL 1963	9 APRIL 1963
Body	REGULUS	MARS	SIRIUS
W.T.	Z	Z	Z
W.E.			
GCT	23-39-58	23-40-50	23-41-46
GHA.	189-59	60-47	192-29
Corr	2-30	0-13	0-27
SHA *	208-24		259-07
GHA	400-53	61-00	452-03
a ☽	67-53 ~~E-W~~	68-00 ~~E-W~~	68-03 ~~E-W~~
LHA			
t	27 ~~E-W~~	7 ~~E-W~~	24 ~~E-W~~
DEC.	12-09 ~~N-S~~	20-45 ~~N-S~~	16-40 ~~N-S~~
Alt	51-53.2 +64	67-42.2 +97	22-20.7 -94
d	7.6	14.6	9.4
Hc	52-00.8	67-56.8	22-17.3
Ho	51-07.7	67-19.3	22-04.1
a	53.1 A	37.5 A	13.2 A
Z	134	162.5	153.9
Zn	N 134 E	N 162.5 E	S 153.9 W
Obs Zn	134	162.5	333.9
Gyro Error			
Hs	51-15.1	67-20.3	22-12.5
IC	0.0	0.0	0.0
Ht eye	-6.6	-6.6	-6.6
Alt Corr	-0.8	-0.4	-1.8
Date Corr	2.4	7.0	8.4
Ho	51-07.7	67-19.3	22-04.1
aL	42 N	42 N	42 N

EXHIBIT 42

Date	9 APRIL 1963	9 APRIL 1963	9 APRIL 1963
Body	BETELGEUSE	POLARIS	CAPELLA
W.T.	Z	Z	Z
W.E.			
GCT	23-42-37	23-44-40	23-45-32
GHA.	192-29	192-29	192-29
Corr	0-40	1-10	1-23
SHA *	271-43		281-31
GHA	464-52	193-39	475-23
a λ	67-52 E-W	68-18 E-W	68-23 E-W
LHA			
t	37 E-W	125-21 E-W	47 E-W
DEC.	7-24 N-S	N-S	45-58 N-S
Alt	42-30.8 -.79		56-27 -18
d	4.7		.4
Hc	42-26.1		56-26.6
Ho	42-38.0		56-51.8
a	11.9 T		25.2 T
Z	126		066.8
Zn	N 126 W		N 066.8 W
Obs Zn	234		293.2
Gyro Error			
Hs	42-45.6	42-24.9	56-59.0
IC	0.0	0.0	0.0
Ht eye	-6.6	-6.6	-6.6
Alt Corr	-1.0	-1.0	-0.6
Date Corr	7.6	+7.6 -0.6	7.2
Ho	42-38.0	(42-24.3)	56-51.8
aL	42 N	42 N	42 N

EXHIBIT 42
3

POSIT

b(1) 42°-29.7'N
68°-44.5'W

(b) (6)

EXHIBIT 4

AM ☆ 11 APRIL

Date	11 APR 63	11 APR 63	11 APR 63
Body	POLARIS	DUBHE	REGULUS
W.T.	Z	Z	Z
W.E.			
GCT	04-58-53	05-00-11	05-01-23
GHA.	271-11	273-12	273-42
Corr	2-13	0-03	0-21
SHA ♈		194-38	208-21
GHA	273-24	468-23	482-27
a λ	65-00 E-W	65-23 E-W	65-27 E-W
LHA	208-24	108-23	122-27
t	E-W	43 E-W	57 E-W
DEC.	N-S	61-57 N-S	12-09 N-S
Alt		57-46.5 +31	32-20.7 +48
d		.9	6.1
Hc		57-47.4	32-26.8
Ho		57-15.6	32-06.8
a		31.8 A	20.0 A
Z		036.9	103.8
Zn		N 036.9 W	N 103.8 W
Obs Zn		323.1	256.2
Gyro Error			
Hs	40-52.0	57-22.8	32-14.9
IC	0.0	0.0	0.0
Ht eye	- 6.6	- 6.6	- 6.6
Alt Corr	- 1.1	0.6	- 1.5
Date Corr	+ 54	- 7.2	8.1
Ho	41-38.3	57-15.6	32-06.8
aL	42 N	42 N	42 N

EXHIBIT 42
4

Date	11 APR 63	11 APR 63	11 APR 63
Body	ARCTURUS	VEGA	DENEB
W.T.	Z	Z	Z
W.E.			
GCT	05-03-21	05-04-25	05-05-41
GHA.	273-42	273-42	273-42
Corr	0-50	1-06	1-25
SHA *	146-30	81-05	49-58
GHA	421-02	355-53	325-05
a ☽	65-02 E-W	14-53 E-W	65-05 E-W
LHA	61-02	4-07	34 55
t	4 E-W	69 E-W	100 E-W
DEC.	19-22 N-S	38-45 N-S	45-09 N-S
Alt	66-45.0 +99	38-40.8 +46	22-22.1 +61
d	7.9	6.9 -	5.5
Hc	66-52.9	38-47.7	22-22.6
Ho	67-22.0	38-37.1	22-19.7
a	29.1 T	10.6 A	2.9 A
Z	170.4	069.4	048.9
Zn	N 170.4 E	N 069.4 E	N 048.9 E
Obs Zn	170.4	069.4	048.9
Gyro Error			
Hs	67-29.0	38-44.9	22-28.6
IC	0.0	0.0	0.0
Ht eye	6.6	6.6	6.6
Alt Corr	0.4	1.2	2.3
Date Corr	7.0	7.6	8.9
Ho	67-22.0	38-37.1	22-19.7
aL	42 N	42 N	42 N

EXHIBIT 42
5

POSIT

41-37' N (b) (6)
64°-49' W

1 EXHIBIT

AM ☆

Date	11 APR 63	11 APR 63	11 APR 63
Body	ARCTURUS	POLARIS	DENEB
W.T.	Z	Z	Z
W.E.			
GCT	08-55-17	08-56-39	08-57-49
GHA.	331-21	331-21	331-21
Corr	1-20	1-40	1-58
SHA ♦	146-30		49-58
GHA	479-11	333-01	383-17
a λ	119 65-11 E-W	64-41 E-W	65-17 E-W
LHA		268-17	
t	54 E-W	E-W	42 E-W
DEC.	19-22 N-S	N-S	45-09 N-S
Alt	39-25.7 -43		59-43.8 +16
d	5.0		1.4
Hc	39-20.7		59-45.2 +10
Ho	39-01.1	LAT 41°-38.6' N	58-56.9
a	19.6 A		58.3 T
Z	099.1		069.8
Zn	N 099.1 W		N 069.8 E
Obs Zn	260.9		069.8
Gyro Error			
Hs	39-08.9	41-18.3	59-04.1
IC	0.0	0.0	0.0
Ht eye	6.6	6.6	6.6
Alt Corr	1.2	1.1	0.6
Date Corr	3.8	+20.3 7.9	7.2
Ho	39-01.1	(41-38.6)	58-56.9
aL			
	42 N	42 N	42 N

EXHIBIT 42
6

Date	11 APR 63	11 APR 63	
Body	ANTARES	ALTAIR	
W.T.	Z	Z	Z
W.E.			
GCT	08-58-57	09-00-23	
GHA.	331-21	333-52	
Corr	2-15	0-06	
SHA *	113-13	62-46	
GHA	446-49	396-44	
a λ	64-49 E-W	64-44 E-W	E-W
LHA			
t	22 E-W	28 E-W	E-W
DEC.	26-21 N-S	8-46 N-S	N-S
Alt	18-32.8 +96	48-24.3 +85	
d	8.6	13.6	
Hc	18-41.4	48-37.9	
Hq	18-58.3	48-50.4	
a	16.9 T	12.5 T	
Z	159.3	135.6	
Zn	S 159.3 W	N 135.6 E	
Obs Zn	339.3	135.6	
Gyro Error			
Hs	19-07.6	48-57.8	
IC	0.0	0.0	
Ht eye	6.6	6.6	
Alt Corr	3.7	0.8	
Date Corr	9.3	7.4	
Hq	18-58.3	48-50.4	
aL			
	42 N	42 N	

EXHIBIT 42
7

POSIT 41°-40'N 64°-42'W

EXHIBIT 42
7

PM ✡

Date	12 APR 1963	12 APR 1963	12 APR 1963
Body	POLARIS	CAPELLA	SIRIUS
W.T.	Z	Z	Z
W.E.			
GCT	23-34-01	23-34-57	23-36-00
GHA.	192-56	192-56	192-56
Corr	1-00	1-14	1-30
SHA *		281-31	259-07
GHA	193-56	475-41	453-33
a ☽	65-30 E-W	65-41 E-W	65-33 E-W
LHA		15-41	93-33
t	128-26 E-W	50 E-W	28 E-W
DEC.	N-S	45-58 N-S	16-10 N-S
Alt		54-24.3 -21	26-02.8 -92
d		-.4	-9.2
Hc		54-23.9	25-53.6
Ho	MT. 41-53.3	54-12.0	25-56.4
a		11.9 A	2.8 T
Z		N 066.1 W	S 149.9 W
Zn		293.9	210
Obs Zn			
Gyro Error			
Hs	41-53.0	54-19.3	26-04.0
IC	0.0	0.0	0.0
Ht eye	-6.6	6.6	6.6
Alt Corr	-11.1 -2.3	0.7	2.0
Date Corr		7.3	86
Ho		54-12.0	25-56.4
aL			

EXHIBIT 42
8

1840 POSIT 41°53.6'N

EXHIBIT 42
9

Date	12 APR 1963	12 APR 1963	12 APRIL 63
Body	REGULUS	ARCTURUS	DENEBOLA
W.T.	Z	Z	Z
W.E.			
GCT	23-36-50	23-37-46	23-39-22
GHA.	192-56	192-56	192-56
Corr	1-43	1-52	2-21
SHA *	208-24	147-30	183-12
GHA	403-03	341-23	378-29
a ☽	65-03 E-W	65-23 E-W	65-29 E-W
LHA	43-03	19-00	18-29
t	22 E-W	84 E-W	47 E-W
DEC.	12-09 N-S	19-22 N-S	14-47 N-S
Alt		17-15.2 -63	41-30.5 -69
d		-5.0	-2.1
Hc		17-10.2	41-28.4
Ho	68-23.6	17-02.1	41-21.4
a		08.1 A	7.0 A
Z		N 079 E	N 109.4 E
Zn		079	109.4
Obs Zn			
Gyro Error			
Hs	68-30.6	17-11.8	41-29.1
IC	0.0	0.0	0.0
Ht eye	6.6	6.6	6.6
Alt Corr	0.4	3.1	1.1
Date Corr	7.0	9.7	7.7
Ho	68-23.6	17-02.1	41-21.4
a L			

65 27.2 W

EXHIBIT 42
9

PM ☆

Date	12 APR 1913		
Body	BETELGEUSE		
W.T.	Z	Z	Z
W.E.			
GCT	23-40-30		
GHA.	195-27		
Corr	0-08		
SHA *	271-43		
GHA	467-18		
a ☽	65-18 E-W	E-W	E-W
LHA	107-18		
t	42 ~~E~~-W	E-W	E-W
DEC.	7-24 ~~N~~-S	N-S	N-S
Alt	39-24.7 -77		
d	—4.6		
Hc	39-20.1		
Ho	39-26.4		
a	6.3 T		
Z	N 120.8 W		
Zn	239.2		
Obs Zn			
Gyro Error			
Hs	39-34.2		
IC	0.0		
Ht eye	6.6		
Alt Corr	1.2		
Date Corr	7.6		
Ho	39-26.4		
a L			

EXHIBIT 42
10

USS THRESHER (SS(N)593)
FLEET POST OFFICE
NEW YORK, N. Y.

SSN593/ww1
9080
Ser: 158

APR 8 1963

From: Commanding Officer, USS THRESHER (SSN 593)
To: Commander Portsmouth Naval Shipyard, Portsmouth, New Hamp.
Commander Submarine Force, U.S. Atlantic Fleet (ADMIN), Portsmouth, N.H.

Subj: Certification for Sea Trials

Ref: (a) CONSUBLANT Regulations, Article 5137

1. As directed by reference (a), it is reported that Dock Trials and Post Cruise have been satisfactorily completed.

J. W. HARVEY

Copy to:
CONSUBDEVGRU TWO

CO C
XO
OPS Dave

Exhibit (43)

SSN593/ww1
9080
Ser: 161
APR 5 1963

CO
XO
0/6 Rue

From: Commanding Officer, USS THRESHER (SSN 593)
To: Commander Submarine Development Group TWO

Subj: Correction of Salvage Inspection Deficiencies

Ref: (a) OinC SSN 606 (TINOSA) ltr ser 109 of 29 Mar 63
(b) COMSUBLANT INST 9080.3

1. In accordance with reference (b) the deficiencies noted in reference (a) and enclosure (1) thereto have been corrected as follows:

Deficiency (by compartment and item number on enclosure (1) to reference (a); where applicable, paragraphs of the basic letter are noted in parentheses)	Corrective Action
Fwd Escape Trunk	
7.a.	Handwheel is now marked.
10.	Label plates have been located in close proximity to the indicated valves.
13.	Hoses have been stowed in clamps.
24.a.	Divers knife will be installed prior to departure for sea.
26, 27, 28.	These items are included in change order 310 (see paragraph 2.)
Forward Compartment	
1.b.	Gasket has been cleaned.
1.f., 4, 14.	Reports of unsatisfactory condition have been submitted to PNSY; operation is considered adequate for safe conduct of sea trials.

Deficiency (by compartment and item number on enclosure (1) to reference (a); where applicable, paragraphs of the basic letter are noted in parentheses)	Corrective Action
2.(2.b)	Cable has been secured to frame to prevent interference.
6 6.	Rubber cover has been replaced.
14.a., 14.b.	Oxygen will not be loaded prior to sea trials.
14.c. (2.a.)	Remote operator has been repaired.
17.	Leakage was caused by faulty fitting on hose used by inspectors; fitting has been replaced.
Midships Compartment	
1.c., 1.g.	Gasket and grease fittings have been cleaned and all paint removed.
2.	Flapper has been regreased and operates freely.
5.	41 cans of CO_2 absorbent are now present.
Reactor Compartment	
4.b.	Proper strainer is installed.
Auxiliary Machinery Space	
4.a.(2.c.)	Bracket on high salvage valve has been welded for improved strength characteristics; low salvage valvage operated hard due to excessive seating force applied with salvage wrench from topside. Valve is now free for proper operation.

Exhibit (44)
2

Deficiency (by compartment and item number on enclosure (1) to reference (a); where applicable, paragraphs of the basic letter are noted in parenthesis)	Corrective Action
Engine Room	
6.c.	Deficient battle lantern has been repaired.
12.a, 12.b.	Oxygen will not be loaded prior to sea trials.
15.(2.d)	Escape bill has been posted.
After Escape Trunk	
2.	Side door has been cleaded.
3., 14 (2.e)	Door seats at b(1) or less as required by builder's dock trials and is considered satisfactory.
8.b.(2.f), 25(2.g)	Reports of unsatisfactory condition have been submitted to PNSY for procurement of material. Considered satisfactory for safe conduct of sea trials.
17., 18.c.,28,29,30.	These items are included in change order 310. (see paragraph 2.)
26.a.	Divers knife will be installed prior to departure for sea.
Messenger buoys	
10.	Detailed specifications, builders dock trials and reference (b) to reference (a) require 1000 lbs maximum on both buoys. Considered satisfactory.

Exhibit (44)
3

Deficiency (by compartment and item number on enclosure (1) to reference (a); where applicable, paragraphs of the basic letter are noted in parentheses)	Corrective Action
Salvage Deck Plate Identification Markings.	Engine Room low salvage valve was inspected by ship's force when in drydock. 8 buttons are adjacent to plate and operation was satisfactory.
Miscellaneous Items.	
2.d.	Plans have been distributed in accordance with COMSUBLANT Force Regulations.
2.e.	Tank training has been scheduled for refresher training period at New London.

2. Change Order No. 310 to THRESHER's shipbuilding contract was not accomplished during the Post Shakedown Availability and will appear as an FAT item. This change order remodels the escape trunks to accomplish certain improvements. Deficiency items referenced to this paragraph will be corrected upon accomplishment of the change order and are not now required.

3. The following items indicated as not now corrected will be reported at a later date:

Fwd Compt 1.f, 4,14.

Aft Escape Trunk 8b (2.f), 25 (2.g).

Miscellaneous Items 2.e.

4. By copy of this letter Officer in Charge USS TINOSA (SSN 606) is requested to convey my sincere personal appreciation to LT R. M. Morrision, USN and LT F. T. PATE, USN for their meticulously thorough inspection of THRESHER. Their patience and competance under the most difficult conditions while THRESHER was nearing completion of her Post Shakedown Availability could not pass without comment.

J. W. HARVEY

Copy to:
COMSUBLANT(ADMIN) PTSMH (Direct)
OinC SSN606 (TINOSA)(Direct)
COMNAVSHIPYD, Portsmouth, N.H. (Direct)

Exhibit (44)
4

Unclassified

NAVAL MESSAGE
OPNAV Form 2110-28A (10-58)

RELEASED BY	DRAFTED BY	PHONE EXT. NR.	COPY NR.
H.N. LARCOMBE, CDR, USN			
DATE	**TOR/TOD**	**ROUTED BY**	**CHECKED BY**
8 APR 1963			2 OF 2

MESSAGE NR.	DATE/TIME GROUP (GCT)	PRECEDENCE	FLASH	EMERGENCY	OPERATIONAL IMMEDIATE	PRIORITY	ROUTINE	DEFERRED
	Ø81829Z	ACTION				XXXXX		
		INFO					XXXXX	

FROM:
COMSUBLANT ADMIN PTSMH

TO:
USS THRESHER

INFO:
CNO / CINCLANTFLT / COMEASTSEAFRON / COMONE / COMSUBLANT / DEPCOMSUBLANT COMNAVSHIPYD PTSMH / COMSUBFLOT TWO / COMSUBDEVGRU TWO / COMSUBRON TEN USS SKYLARK

A. COMSUBFLOT TWO OPSKED 14-63
B. COMSUBLANT INST P-5400.4
C. COMSUBLANT OPORD 1-61
D. COMSUBFLOT TWO OPORD 1-62
E. COMNAVSHIPYD PTS NH Ø51313Z APR 63 (NOTAL)
F. COMFAIRDET BRUNSWICK Ø51505Z APR 63 (NOTAL)
G. COMNAVB BSN Ø51424Z APR 63 (NOTAL)
H. COMSUBLANT NOTICE Ø3121[illegible] 13 JULY 62

1. THIS IS CSLAP OPORD 2-63
2. WHEN RFS ABOUT 9 APR PROCEED TO BSN OPAREA AND RDVU WITH USS SKYLARK IAW REF A.
3. CONDUCT OPS IAW REF A THRU D.
4. AREAS ASSIGNED IAW REF E THRU G.
5. COMMUNICATIONS IAW REF A, C AND D.
6. MAKE OWN MOVREP.
7. MAKE CHECK REPORTS IAW REF D AND H.
8. UPON COMPLETION OF OPS REQUIRED BY REF B DETACH SKYLARK AND PROCEED DIR PORTSMOUTH TO ARR 11 APR.

XO_____ COMM_____

DISTRIBUTION:

Unclassified

CATEGORY	EXPLANATION:	DATE/TIME GROUP
	"A"—Paraphrase not required except prior to category "B" encryption. Physically remove all internal references by date/time group prior to declassification. "AC"—Paraphrase not required except prior to category "B" encryption. Physically remove all internal references by date/time group prior to declassification. No unclassified references if the date/time group is quoted.	Ø81829Z APR 63

Exhibit (45)

SSN 593/4710

ACTION

Ref(m)

1200
213
213X
300
310
2301

NNNN

LMA040
SXC056
RR RUEGMA
DE RUEGXC 009
RUEGMA T NADG
ZNR

//R O U T I N E // DISTR:865/THRESHER/DO/
18302/19 JAN.63/ED

R 191730Z
FM DEPCOMSUBLANT
TO CINCLANTFLT
BUSHIPS
INFO CNO
COMSUBLANT
COMSUBDEVGRU TWO
USS THRESHER
NAVSHIPYD PTS NH
BT

UNCLAS
THRESHER PSA
A. NAVSHIPYD PTSMTH 182129Z
B. NAVSHIPYD PTSMTH 032525Z 213
1. RECOMMEND APPROVAL PARA 2 REF A;
EXTEND THRESHER PSA COMPL TO 30 MAR.
2. RECOGNIZE SOME ADDITIONAL WORK AND OTHER
DIFFICULTIES REPORTED REF A AND B MAY HAVE
BEEN UNFORESEEABLE AND BEYOND SHIPYARD CONTROL.
HOWEVER REPEATED COMPLETION DATE CHANGES AND LENGTH

79134

PAGE TWO RUEGXC 009
OF TIME INVOLVED INDICATE IMPROVEMENT NECESSARY IN
SHIPYARD PRODUCTION PLANNING, SCHEDULING AND
MANPOWER APPLICATION.
3. DELAYS SERIOUSLY IMPAIR OPERATIONAL PLANNING
AND SCHEDULING AND RESULT IN LOST OPERATING TIME.
4. REQUEST SHIPYD BE INSTRUCTED TO EXPEDITE THRESHER
WORK ALL POSSIBLE THAT WILL CONTRIBUTE TO
EARLIEST POSSIBLE COMPLETION.
BT
19/1755Z (REF 182129Z: THRESHER PSA COMPLETION DELAY, REQ FOR...)
(REF 032525Z: THRESHER PSA COMPLETION DELAY, REQ FOR...)

Exhibit (46)(M)

SUMMARY OF THRESHER PERSONNEL SITUATION

OFFICER

1. Basic allowance of 9 plus training allowance of 2.

2. Attached were 13 as follows:

NO.	RANK	SS QUAL.	NUC. TRA.	
4	LCDR	4	4	
4	LT	2	3	*1 remained in port.
5	LTJG	0	5	

3. CO (Yr. Grp. '50) and XO (Yr.Grp.'53) had been aboard about 3½ mos. First time in these jobs for each.

ENLISTED

1. Basic allowance - 85
   Attached - 98 * 2 remained in port.
   Qualified - 70

2. Of 96 embarked 56 had been on board one or more years; of these 35 had been on board 2 or more years.

3. Breakdown by pay grade:

RATE	BASIC ALLOW.	ATTACHED	SS DESIG
E9	-	1	1
E8	3	4	3
E7	11	9	9
E6	21	29	20
E5	21	37	30
E4	19	8	4
E3	10	8	3
E2	-	2	-
	85	98	70

Exhibit (47)

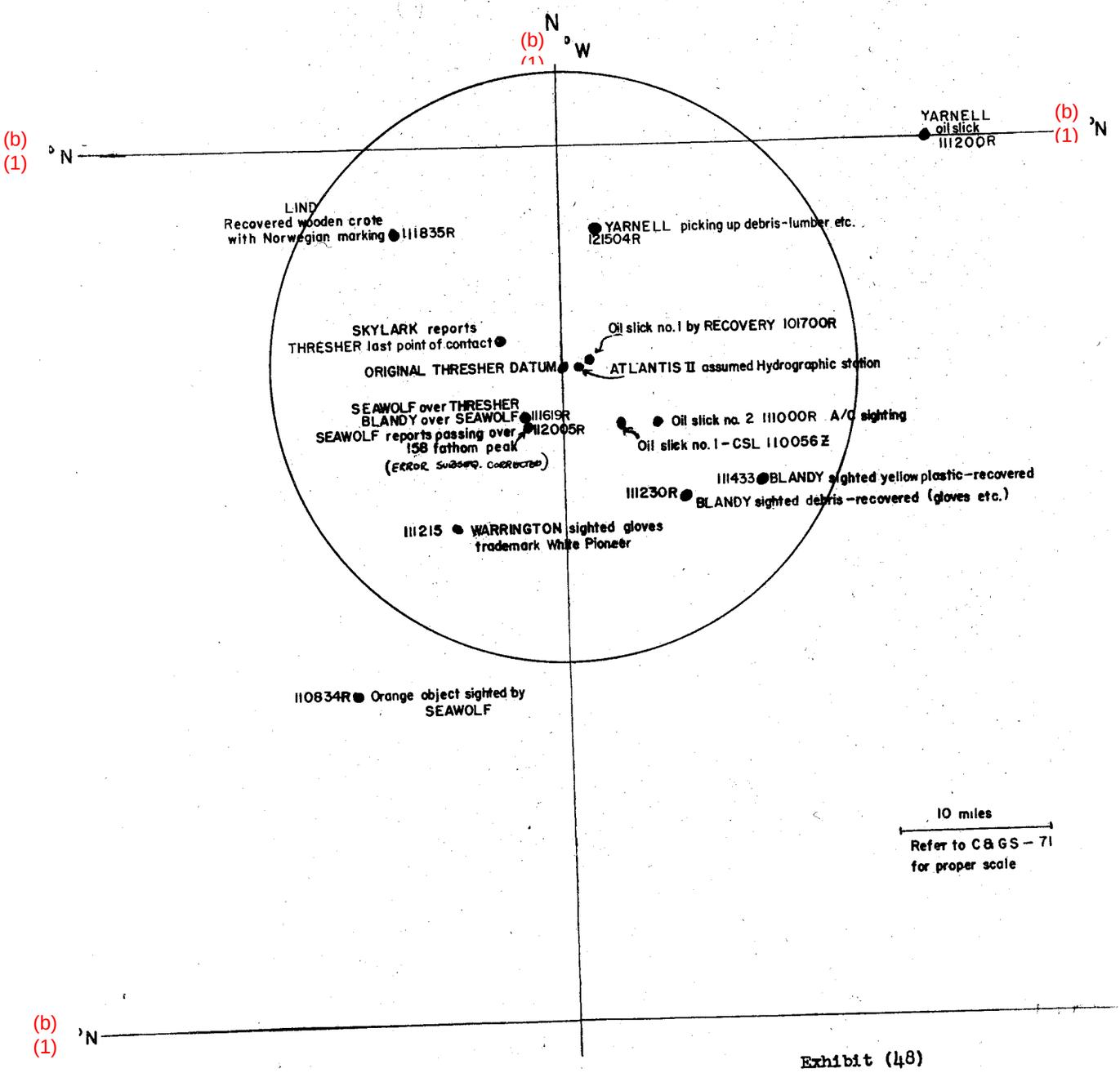

N
(b) (1)
W
(b) (1)
N
(b) (1)
N
YARNELL
oil slick
111200R
LIND
Recovered wooden crate
with Norwegian marking
111835R
YARNELL picking up debris-lumber etc.
121504R
SKYLARK reports
THRESHER last point of contact
Oil slick no. 1 by RECOVERY 101700R
ORIGINAL THRESHER DATUM
ATLANTIS II assumed Hydrographic station
SEAWOLF over THRESHER
BLANDY over SEAWOLF
111619R
SEAWOLF reports passing over
158 fathom peak
112005R
(ERROR SUBSEQ. CORRECTED)
Oil slick no. 2 111000R A/C sighting
Oil slick no. 1 - CSL 110056Z
111433 BLANDY sighted yellow plastic-recovered
111230R BLANDY sighted debris-recovered (gloves etc.)
111215 WARRINGTON sighted gloves
trademark White Pioneer
110834R Orange object sighted by
SEAWOLF
10 miles
Refer to C&GS - 71
for proper scale
(b) (1)
N

Exhibit (48)

ORIGINAL

U.S.S. SEAWOLF (SSN575)
Fleet Post Office
New York, New York

SSN575/FWV:gs
3000
Ser 028
APR 13 1963

From: Commanding Officer, USS SEAWOLF (SSN575)
To: Commander Task Group 89.7 (Deputy Commander Submarine Force U.S. Atlantic Fleet)

Subj: U.S.S. THRESHER (SSN593), Report of event 68 in case of

Ref: (a) Your Message 120315Z of APR 63

Encl: (1) Narrative
(2) Track Charts
(3) Sonar tapes and Sonar report
(4) Report of Radioactivity of Sea water samples taken at or near Datum
(5) Radio Circuit Logs
(6) File of most significant messages sent and received
(7) BT cards taken in area of Datum
(8) List of Navigational points and DRC resets

1. In accordance with reference (a), Enclosures (1) through (8) are forwarded. This report is classified ~~Confidential~~ Unclassified due to various information contained herein as to the capabilities of ship's and equipment involved. All times are ROMEO except those in enclosures (5) and (6), which are ZULU.

(b) (6)

W. B. BRITTAIN, JR.

Copy to:
COMSUBLANT (with encl (1))
COMSUBDEVGRU TWO (CTG 89.7.2) (with encl (1))
COMSUBFLOT TWO (with encl (1))
COM SUB RON TEN (with Encl (1))

ORIGINAL

GROUP 4
DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS

Exhibit (49) 12 pages
1

Unclassified

Narrative of USS SEAWOLF (SSN575) Operations conducted in search for USS THRESHER (SSN593)

(Event 68)

General: The following narrative is logically divided into four phases, each of which began with a dive below layer depth and was then interrupted by surfacing or coming above the layer for communications with the Task Group Commander and for fixing the ship's position in order to accurately check the location of the datum. These phases are called DIVES ONE through FOUR and, of them, DIVES ONE and TWO are of most significance. All times are ROMEO.

10 April 1963

1439 Received COMSUBFLOT TWO's msg 1018422 directing SEAWOLF and SEA OWL to suspend operations and proceed to LAT 41-43N LONG 64-57W and join in search for USS THRESHER.

1452 Informed COMSUBFLOT TWO that we were enroute datum and that ETA in area was 110900R. Commenced sending our 102032Z to COMSUBLANT to give info on our track to datum. Can only make ten knots at periscope depth and transmit.

1601 Messages sent. Went deep to 300 feet and increased speed to flank. We require a 20 knot SOA including time to copy FOX and communicate as necessary.

2200 Came to periscope depth to copy FOX and communicate with NBL. No traffic from NBL, one FOX message.

2229 Surfaced to make better speed while communicating. Making flank speed, SEAS SLIGHT FROM ASTERN.

2241 Clear on FOX. Dived to 300 feet, speed flank. Next communications period 110400R.

11 April 1963

0400 At periscope depth to copy FOX and communicate with NBL. Surfaced in order to make good speed while communicating and to copy many messages pertaining to this operation. Making flank speed. Luckily weather is nice.

0720 Advised USS NORFOLK of who we were. It should be noted that SAR frequency 2820 KCS is listed as voice and CW. This frequency is extremely crowded with both CW and Voice, each interfering with one another. We are trying without success to get our OpOrder from CTG 89.7. We have received one from CTG 89.7.2. Still surfaced at flank speed. We have set a top quality surface bridge and periscope lookout team to look for debris, etc.

Unclassified

0753 Sighted through periscope a possible red object which might have been a kapok life jacket of that color. Circled back and searched area with three passes; nothing could be found. USS ROBERTS, whose search area this was, hove into view and very kindly sent us CTG 89.7's OpOrd via UQC. Turned over datum on red object to ROBERTS.

0842 All ahead flank - heading for our assigned search sector.

0920 Received message from NORFOLK to proceed to datum and search submerged for 2 hours. We are nearly in the sector assigned for our search (a little late due to search and communications at time 0753) but now head for datum at flank speed.

1010 Sighted and investigated trash and garbage in water, posit LAT 41-44N, LONG 65-01.9W. Nothing significant; sent my 111525Z and continued to datum.

START OF DIVE ONE

1032 Submerged at datum to 300 feet. There is a 20° positive gradient from 60 to 100 feet.

1043 Rigged for patrol quiet.

1045 Changed depth to 400 feet, on EP motors. Calling THRESHER on UQC every few minutes.

1110 Sampled circ water system for radioactivity of sea water. Sample indicated 10 times background. Depth 450 feet. This reading was in error, see enclosure (4).

1114 Went to 500 feet.

1123 Went to 600 feet.

1129 Went to test depth. Still calling THRESHER.

1138 Came up to 400 feet.

1140 Seawater sample at test depth showed activity 20 times background. This reading was also in error and we knew that it had to be. See enclosure (4)

1152 SQS-4 has active target brg 135°, range 2000 yards.

1159 Contact bears 130°, 1900 yds. Heading towards this bearing.

Unclassified

Unclassified

1201 Contact bears 139°, 3160 yards.

1202 Contact bears 139°, 3000 yards. Contact plots stationery. The reason for range increase is believed to be that we had two contacts on same bearing and lost the first one when we got about 1000 yards from it, at the same time acquiring the second one. Our SQS-4 is mounted topside and loses targets beneath us at varying ranges (depending on water depth and down angle) as we pass over.

1207 Lost contact as we closed.

1211 Heard 23.5 KC tone on KYCOM receivers in sonar and radio (we have two of them both manned - BQC's in forward and after rooms also manned). This signal is from another BQC (ours are passive) and might be THRESHER. Tone is steady, brg 015°. Taping tone signal.

1213 To THRESHER via UQC "Turn BQC on and off - we hear you".

1216 To THRESHER "If it is your BQC, send "As".

1217 To THRESHER "Request steady keying on BQC".

1219 To THRESHER "Send us a series of 5 dashes on BQC". We hear what may be interrupted keying now, maybe dashes, but no particular number. Echo ranging of DD's is causing us much interference.

1229 At 72 feet, must report to CTG 89.7, and try to quiet echo-ranging interference.

1236 Surfaced. Sent my 111735Z to CTG 89.7 reporting probable BQC and asking for active sonar silence.

END DIVE ONE

1340 Still on surface. Sent my 111830Z to CTG 89.7 amplifying BQC report. Requested permission to dive. Permission immediately granted by CTG 89.7 111840Z.

START OF DIVE TWO

1341 Dived to 400 feet. Started second communication attempts.

1349 To THRESHER on UQC "If you are receiving my Gertrude, key your BQC".

General Note: During Dive TWO SEAWOLF completely unplugged and turned off own BQCs to be certain that we were emitting no signal.

Unclassified

Enclosure (1)

Exhibit (49)
4

Unclassified

1354 To THRESHER on UQC "If you hear my transmission, key your underwater telephone.

1355 Received BQC 23.5 KC tone three times on both RYCOMS. Taping continuously.

1358 To THRESHER "If you can hear me, transmit on your underwater telephone".

1400 More UQC to THRESHER. Receiving 23.5 KC tone notes. We feel sure we hear two BQC tones; one at 23.5 KC (very sharp, clear tone) and one at nearly 24 KC (fuzzy, modulated signal and weaker than other).

1401 Two more 23.5 KC tones. To THRESHER "We hear your underwater telephone. Send 5 dashes". All UQC messages to THRESHER were repeated 3 or 4 times. Taking water samples for radioactivity frequently. See enclosure (4).

1405 Trying to call SEA OWL on UQC to relay message to CTG 89.7.

1406 Receiving tone signal on RYCOMs, 23.5 KC, on 30 seconds then off 30 seconds. Accurately timed by stopwatch - taped on both RYCOMs. Lasted some time. Brg 230°(t).

1408 To THRESHER "We hear your underwater telephone. If you will send 5 dashes we will have positive identification - send 5 dashes - send 5 dashes, etc".

1410 Frequency shifts between two BQC's are now quite evident.

1411 Turned to 230°. To THRESHER "Continue keying your underwater telephone".

1413 Turned to 240°, present bearing to tone.

1415 Now hold signals on 23.5 KC and 3.5 KC (BQS-6 sonar which THRESHER has). Signals on 3.5 KC are 15 seconds apart, heard on RYCOM in sonar and passive sonars. Both frequencies are from same bearing.

1420 To THRESHER "Send VICTORS, send letter V, etc". Possible CW transmissions on 23.5 KC.

1422 Turned to 215°(t), best bearing.

1424 3.5 KC signal ceased. Total of 37 pings heard counted on RYCOM.

Unclassified

Enclosure (1)

Exhibit (49)
5

Unclassified

1427 To THRESHER "Continue keying your sonar and telephone, we are trying to pass over you".

1427 Believe we passed directly over THRESHER. Had bearing rate on 23.5 KC of 10 degrees a minute or more. Posit LAT 41-41.2, LONG 65-02.2. Sounding 1350 fathoms. Changed depth to 100 feet, we must let boss know.

1430 Heard CW on RYCOM at frequency 23.5 KC. Returning to 400 feet, spiraling down over datum. Hard to get bearing as signal is heard on all bearings - believe we are over him.

1432 CW very garbled and everyone listening has different opinion of letters sent by CW at this time. Taped in sonar and radio. Letters which are heard by various SO and RM at this time and after subsequent analysis are listed in sonar report.

1432-30 To THRESHER "Believe we hear you sending CW note. Send us a message, send us a message, etc".

1433 May hear very weak voice on 8KC over RYCOM. This is voice frequency of a BQC or UQC. Unreadable.

1435 To THRESHER "Continue CW transmissions. We cannot read your voice".

1438 To THRESHER" Request you continue CW transmissions - We are able to read you - repeat".

1442 Keying SQS-4. To THRESHER "Send CW, send CW, repeat".

1443 Sending CW on our UQC. To THRESHER "Send CW, send CW, repeat".

1448 May have CW on 23.5 KC, bearing 043. Changed course to 043°.

1449 Tones now bear 225°. Believe we passed over him again. Can read some letters but no message content.

1454 On top of CW source. Position is within 200 yards of that obtain first time we passed over. Tone has rapid bearing rate.

1455 Up to 100 feet. Must report to CTG 89.7.

1500 At periscope depth.

1505 Surfaced. Sent my 112005Z. Communicating with SEA OWL to have her close us and act as UQC relay to CTG. Lying to on surface.

END OF DIVE TWO

Unclassified

Unclassified

1540 Sent my 112040Z to TG Commander amplifying my 112005Z and requesting permission to dive. Received permission quickly. SEA OWL to remain in constant UQC communications with us.

START OF DIVE THREE

1553 Dived to 500 feet.

1558 To THRESHER "This is SEAWOLF. Send CW". Sent on SQS-4 also.

1603 At 540 feet. To THRESHER "Send CW".

1604 Sent more UQC - no joy of any kind.

1606 To THRESHER "Send CW 3 times in row".

1611 Sounding at 600 feet is 1300 fathoms. We are 300 yards brg 135° from SEAWOLF's datum.

1617 Commenced SQS-4 echo ranging.

1622 Changed depth to 400 feet. This has been depth at which we heard THRESHER.

1624 Banging (metal on metal) heard on sonar, brg 130° (BQR-4A). Datum bears 130° about 300 yards and bearings agree.

1627 To THRESHER "Bang 5 times on hull".

1629 To THRESHER "Bang 5 times on hull".

1634 May have had BQC 23.5 KC tone for about 10 seconds.

1635 Echo ranging, classified DD. CTG 89.7 has ordered all ships to secure echo ranging and fathometers.

1640 To THRESHER "Bang on hull 5 times". Maneuvering to pass over datum.

1643 To THRESHER "Bang on hull 5 times. Give us a signal".

1647 Heard bangs bearing 155°.

1650 Heard bangs brg 157°, loud, spaced about 8 seconds apart.

1651 To THRESHER "Give us 5 bangs".

Unclassified

Unclassified

1653 Bangs heard brg 157°, loud. He does not give us number asked for. All of these bangs were taped. They sound like metal on metal. Could be sounds from DD's in vicinity (SEAWOLF and SEA OWL crews have been warned to be quiet). No DD can be heard on this bearing.

1654 Steady on course 157°. Sounding 1300 fathoms, ship's depth 400 feet.

1656 Passing over sound source. Sounding 1300 fathoms. DRC indicates that we are 1300 yds south of datum found in DIVE TWO. Banging is in groups of three (We wonder about "SOS" but cannot distinguish dots from dashes). All this on tape in enclosure (3). Hear intermittent weak signal on radio room RYCOM, 23.5 KC.

1657 Commenced Williamson turn.

1701 Active DD sonar brg 205°. Asked SEA OWL to shut him up.

1705 To THRESHER "Bang on hull".

1715 Several DD's echo ranging. Asked SEA OWL to have them stop.

1719 Tapping sounds brg 018°. 13 seconds apart.

1722 DD's are drowning out our sonars. Asked SEA OWL to have them clear area.

1723 Tapping bears 020°, 15 second intervals. Turning toward.

1724 Tapping bears 023°. SEA OWL reports DD's clearing area to East.

1725 To THRESHER "Rap on hull 3 times".

1727 Heard 3 taps brg 021°. To THRESHER "We heard your 3 taps, do it again".

1730 To THRESHER "Bang on hull 3 times".

1732 Commenced making square search around datum at distance about 2000 yds.

1739 To THRESHER "Send us a signal on sonar".

1752 Continuing to ask THRESHER for a "signal on sonar".

1753 Echo ranging 10 KC brg 180°. Classified DD.

Unclassified

1753 By UQC attempting rendezvous with SEA OWL to send msg to CTG 89.7. UQC is terrible through this 20° positive layer. No wonder SKYLARK lost contact with THRESHER yesterday. Unless SEA OWL is within 1000 to 2000 yds of us we cannot read him. Closing SEA OWL at 10 knots.

1803 Calling SEA OWL by UQC. Very garbled. Am up at 200 feet now.

1805 Returned to 400 feet. Believe UQC better if we are not so close to layer.

1807 Calling any station on UQC.

1808 Communicating with SEA OWL. Louder but still garbled. Closing her.

1818 By UQC sent my msg 112300Z to CTG 89.7 via relay ship SEA OWL. SEA OWL gives us good loran fix LAT 41-41.7 LONG 65-04.2. Will now return to datum.

1830 Using UQC to THRESHER. Commencing circling datum.

1831 To THRESHER "Bang on hull, Bang on hull, etc".

1837 Have 15 KC echo ranging. This is DD.

1843 Asked SEA OWL to try and clear area of DDs.

1847 Due to saturated sonars (by DD's) decided to blow sanitaries and carry out other noisy ship function's now. We were getting in bad shape.

1850 LIND traversing area and saturating sonars. She is passive.

1851 SEA OWL says she is trying to clear area of DDs.

1903 Another loran fix obtained from SEA OWL.

1924 Exchanged info with SEA OWL concerning data we are collecting, better communications with her relaying to CTG 89.7, and position of a pinnacle (sea mount) reported by DD this morning. Also Atlantis II hydrographic ship enroute to area. Suggested SEA OWL get permission to dive to 200 feet (below layer) and will stay 400 feet or below. If we have info for CTG 89.7, we can send it to him and he can go to surface and relay. SEA OWL likes idea and will try to get permission. Asked for posit of pinnacle.

1945 From SEA OWL got posit of pinnacle, LAT 41-40.8 LONG 65-03. Supposedly rises to 480 feet below surface. This is practically our position. Altered course and went active to try and locate pinnacle. Have contact brg 295° range 2100 yds right where pinnacle should be.

Unclassified

Enclosure (1)

Exhibit (49)

Unclassified

1951 Brg 295°(t), 1500 yds. Mushy echo return. Maybe pinnacle. Relayed this info to SEA OWL. Headed for pinnacle. SEA OWL asked if we will cross it for sounding and that is what we are going to do. Came from 400 ft to 200 ft.

1954 Steering 295°. This posit is very close to our datum on THRESHER.

1956 DD interference. SEA OWL says he will clear him out.

2000 Lost contact on pinnacle about 1000 yds. Turned on fathometer and shortly thereafter recorded sounding of 135 fathoms under keel. This sounding was incorrectly taken - it represented triple or third echo (135 fathoms on 600 fathom scale is same as 1350 on 6000 fathom scale). Notified SEA OWL before we realized that we had erred.

2010 Williamson turn - have active contact again. Passed over pinnacle shortly thereafter taking continuous soundings but recorded depths of 1350 fathoms only.

2015 SEA OWL says CTG 89.7 wants accurate fix on pinnacle. Trying for same. Told SEA OWL my info at 2000 was wrong.

2021 Opened to 1000 yds and made another Williamson. Again, active SQS-4 contact in the right place. Heading toward.

2030 Slowed to minimum turns for maximum opportunity to get sounding on a pinnacle. Still calling THRESHER every few minutes "Send us a signal, rap on hull or use telephone - send us a signal.

2039 Still headed for pinnacle range 525 yds, bearing 000°, Heard bangs on sonar. To THRESHER "We may hear your banging, repeat it, bang 3 times".

2046 Passed over nebulous pinnacle. No change in soundings. To THRESHER "Believe we heard you but could not get bearing, bang on hull 3 times".

2051 Turning to West to investigate DR position of double sonar contact we had from 1152 to 1207 this morning. It is shown some 3000 yds from our present position (all by DR). Still active on SQS-4.

2057 Sonar contact brg 270° range 800 yds. Went to dead slow and passed over it but no change in soundings.

2102 Making a Williamson turn looking for sonar contact again.

2107 Have double contacts both brg 150°, ranges 1000 and 1950 yds. Headed towards.

2109 Slowed to minimum turns.

2112 Passed over first contact. Sounding 1300 fathoms. Continuing to head at second contact.

Unclassified

Enclosure (1)

Exhibit (49)
10

Unclassified

2125 Passed over second contact. Sounding 1300 fathoms. We just are unable to explain these strange zero speed SQS-4 contacts unless they are fish, kelp or some other ordinary sea phenomena. Our SQS-4 downward beam width (the book says that is is nil, that it is in the horizontal plane, although there is bound to be some little downward spread and we were carrying a 4° down bubble to search below us) precludes a bottom contact at ranges of 2000 - 3000 yards or closer.

2130 Still calling THRESHER on UQC to ask for a signal. Returned to 400 feet depth.

2137 Calling THRESHER asking for 3 bangs in a row. Sonar reports 3 bangs followed by by two bangs. EQC watch is forward room also heard 3 distinct raps and then 2 raps after a second request from SEAWOLF for bangs. A minute later EQC watch reported he heard rattling or rapid rapping.

2144 Heard more bangs. Again calling THRESHER but hear no more raps.

2152 It is time to report to CTG 89.7 again or he may worry about us. We lost contact with SEA OWL while chasing "pinnacles".

2210 Sending UQC msg to BLANDY for CTG 89.7, my 120310Z.

2300 Completed sending 120310Z msg to BLANDY.

END DIVE THREE

2308 Told CTG 89.7, via UQC to BLANDY, that CDR PACKER of ComSubLant Staff was riding us. He has been extremely helpful to the Commanding Officer in terms of advice in many matters as well as being another pair of very experienced hands in helping us collect information and evaluate it. However he rightly feels that CTG 89.7 may be short handed in his staff and required his help.

2341 Heading for SEA OWL (got range and bearing from BLANDY) to set up our UQC relay system again and proceed to search datum further. CTG 89.7 has told us he has no traffic for us and to continue search.

2345 BLANDY reports a ship taking deep water soundings 4 miles from us on bearing of SEA OWL. Steering dog leg around posit.

12 April 1963

0010 Heard rapid fathometer, probably hydro ship. Frequency 12 KC.

0045 Unable to locate SEA OWL with UQC. She is probably searching her assigned sector as we are well into it now trying to find her.

Unclassified

Unclassified

0050 At periscope depth getting fix so can return to datum.

0148 Nearly at datum, ventilating.

0200 Copying fox.

START DIVE FOUR

0318 Changed depth to 400 feet. At datum.

0325 To THRESHER "Send CW". Circling over datum. Continuing calls every few minutes.

0349 Went active on SQS-4.

0350 Heard echo ranging brg 002°. Classified DD.

0359 Secured echo ranging. No contacts.

0402 Echo ranging bears 243°.

0413 Still calling THRESHER on UQC and intermittenlly using UQC in CW mode "Send signal".

0430 Heard fathometer from unknown vessel in area.

0441 NORFOLK reports SKYLARK may be using fathometer.

0445 Continuing search around datum. Still calling THRESHER on UQC. No answers, no signals.

0527 Sounding 1200 fathoms. Keel depth 400 feet.

0552 At periscope depth to communicate with CTG 89.7. Survey ship in sight brg 289°.

END DIVE FOUR

0623 Sent my 121115 to CTG reporting lack of any type of signals on DIVE FOUR. No pinnacle found.

0635 Received CTG 89.7 msg 121135Z stating SEAWOLF cease present Ops and return NLON.

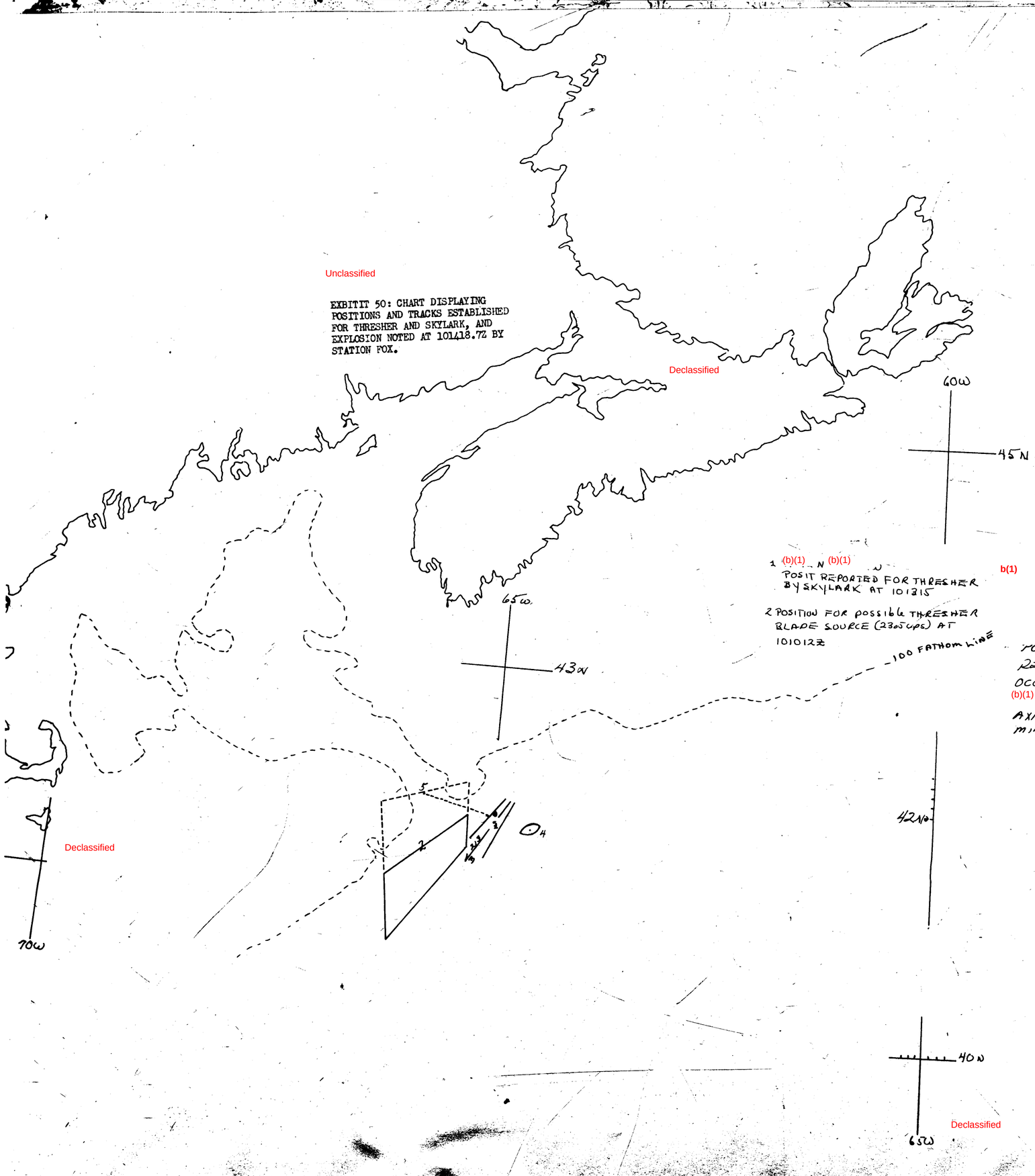
END NARRATIVE

Unclassified

Unclassified

EXBITIT 50: CHART DISPLAYING POSITIONS AND TRACKS ESTABLISHED FOR THRESHER AND SKYLARK, AND EXPLOSION NOTED AT 101418.7Z BY STATION FOX.

Declassified



1 (b)(1) N (b)(1) W b(1)
POSIT REPORTED FOR THRESHER BY SKYLARK AT 101315

2 POSITION FOR POSSIBLE THRESHER BLADE SOURCE (2305 CPS) AT 101012Z

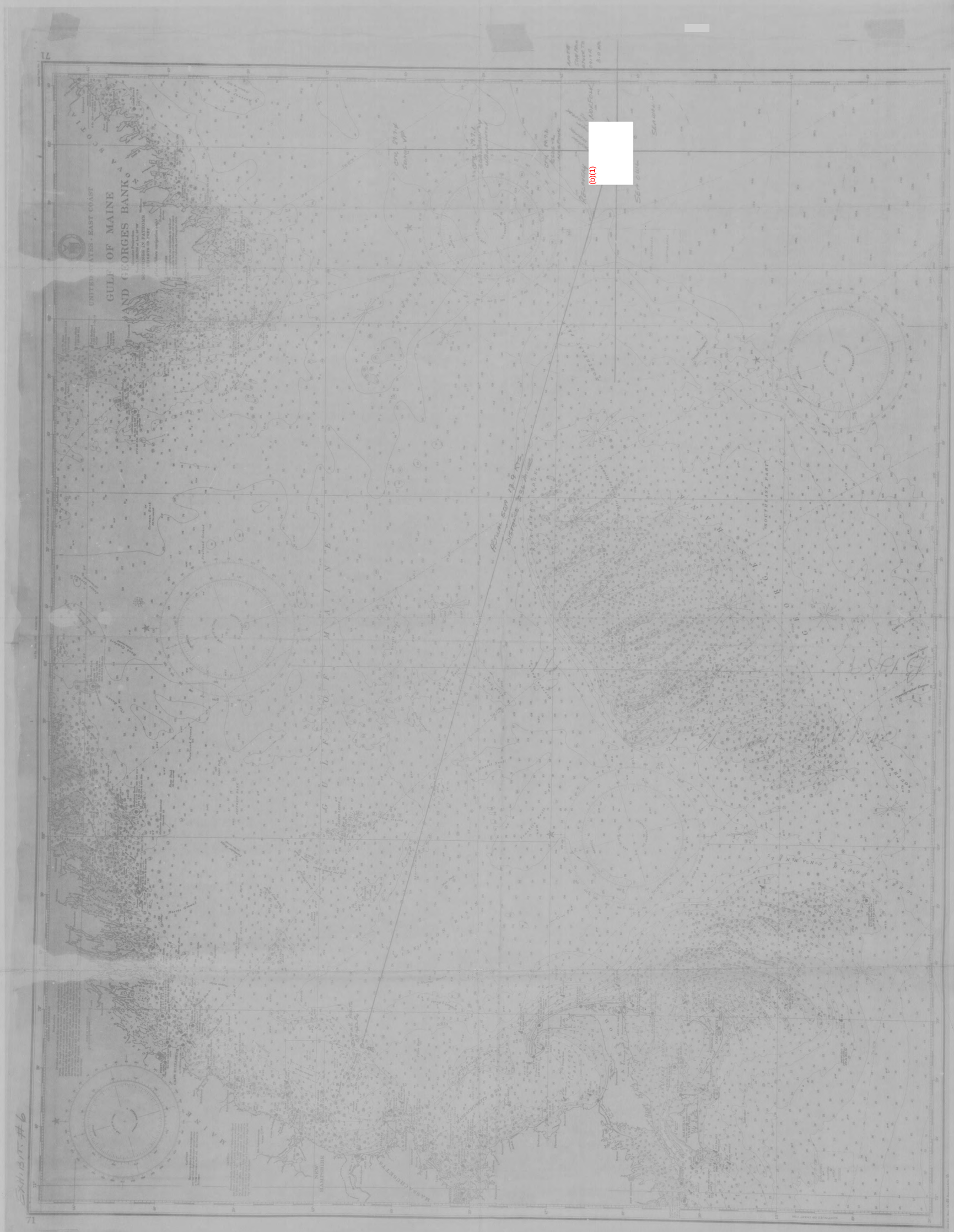
POSITION ESTABLISHED BY RCA DATA REDUCTION COMPUTER FOR EXPLOSION OCCURING 101415.6Z POSITION:
(b)(1) N (b)(1) "W
AXIS OF ELIPSE (MAJOR): 101 N miles
MINOR AXIS: 50 N MILES

5 TRACK OF SKYLARK FROM 100845Z - 101047Z

Declassified

Declassified

WARNING
THIS PAPER IS ELECTRO-CONDUCTIVE
KEEP AWAY FROM OPEN CIRCUITS



WARNING
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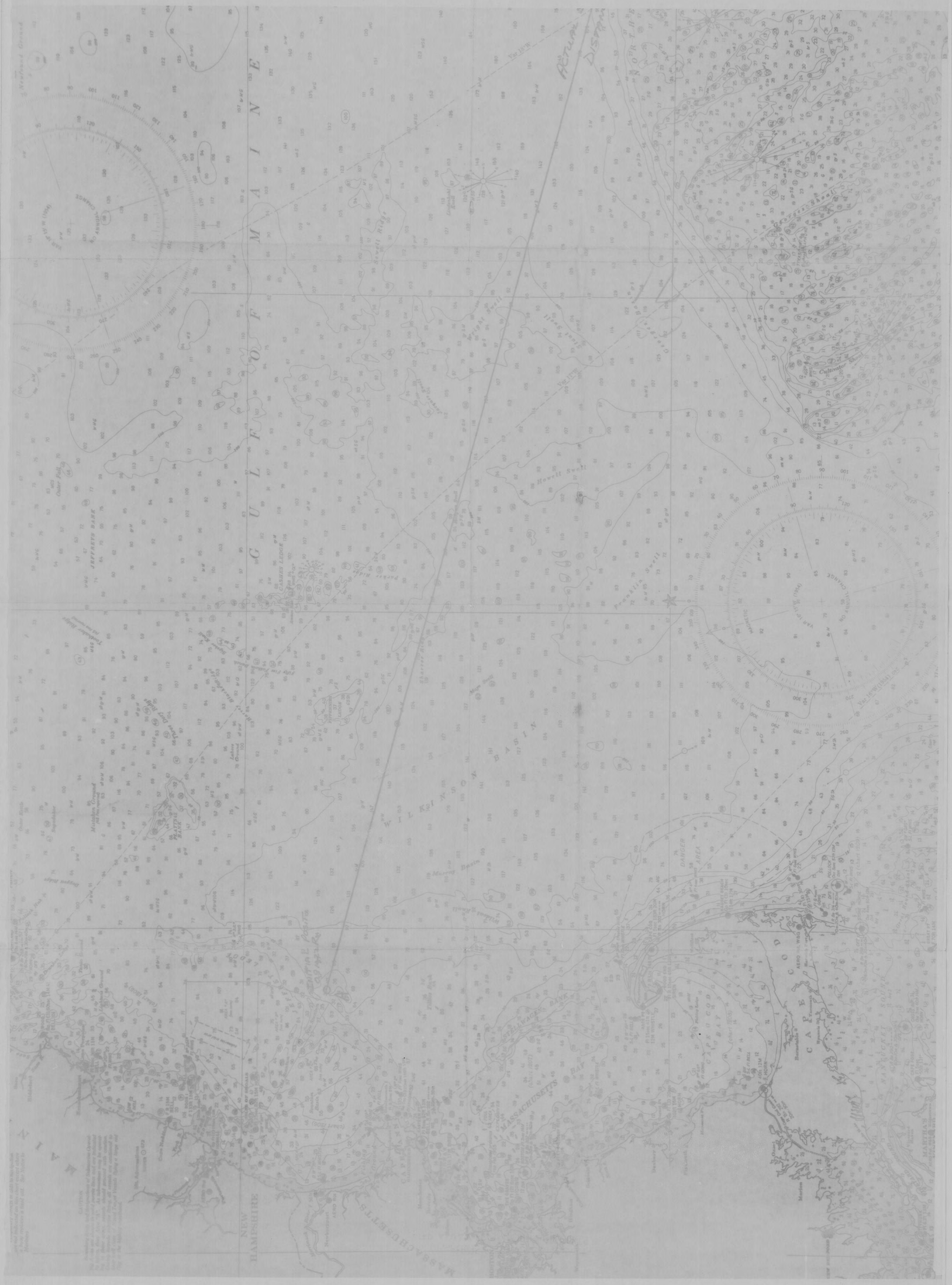
KEEP AWAY FROM OPEN CIRCUITS



Blow up Left Side
Exhibit (6)

(b)(1)

Blow up Right Side
Exhibit (6)

VOLUME VIII OF 12 VOLUMES

RECORD OF PROCEEDINGS

of a

COURT OF INQUIRY

convened at

U. S. Naval Submarine Base New London
Groton, Connecticut

and

Portsmouth Naval Shipyard
Portsmouth, New Hampshire

by order of

Commander in Chief
U. S. ATLANTIC FLEET

To inquire into the circumstances
of the loss at sea of

USS THRESHER (SS(N)593)

which occurred on

10 April 1963

Ordered on 10 April 1963

Exhibits 51 to 90

EX 51

Unclassified

Station	Reported Time	Sound Travel Time	Corrected Time
11	101429.4Z	10.6 min.	101418.8Z
13	101423.5Z	5.1 min.	101418.4Z
14	101418.8Z	.9 min.	101417.9Z
15	101424.6Z	4.6 min.	101420.0Z
17			
18	Negative		
19	101433.8Z	14.5 mins.	101419.3Z
22	101440.7Z	21.9 min.	101418.8Z
23	101442.2Z	23.3 min.	101418.9Z
24	Negative		
25	~~101446.9Z~~	28.4 min	~~101418.5Z~~
26	101448.9Z	30.4 min.	101418.5Z
27	101454.2Z	35.6 min.	101418.6Z
31	101430.1Z	11.4 min.	101418.7Z

28.9
27.6

28.4

Unclassified

L 10

EXHIBIT (51)

1. ASSUMPTIONS:

A. SHIP'S AT TEST DEPT WITH NEUTRAL BUOYANCY
B. 0° TRIM
C. PROCEEDING AT 6 KNOTS
D. FLOODING TAKES PLACE IN THE ENGINE ROOM
E. ADIABATIC EXPANSION OF AIR
F. AIR FLASK PRESSURE EQUAL b(1)
   (1) CAPACITY OF CAPTAINS AIR BANK EQUALS 96.5 CU. FT
   (2) CAPACITY OF THREE AIR BANKS EQUALS 308.5 CU. FT
G. MAXIMUM SPEED ATTAINED IS EIGHT KNOTS WITH HARD RISE ON STERN PLANES THEN SHIP COASTS AT THIS SPEED.

EXHIBIT (56) 1

2. CONDITIONS TO BE EXAMINED:

A. HOLE SIZE 2", 3", AND 4"
B. WITH THE CAPTAIN'S BANK, BLOW AFTER TANKS ONLY.
C. WITH THE CAPTAIN'S BANK, BLOW ALL TANKS.
D. WITH 3 BANKS, BLOW AFTER TANKS ONLY.
E. WITH 3 BANKS. BLOW ALL TANKS.
F. AT −15 SECONDS, ORDER FULL POWER AND HARD RISE.
G. AT ZERO TIME, GET RESPONSE REPORT ON UQC
H. AT + 15 SECONDS, START BLOW.
I. AT + 240 SECONDS, COLLAPSE.

3. MAXIMUM AMOUNT IN TONS OF SALT WATER THAT MAY BE BLOWN FROM THE MAIN BALLAST TANKS AT TEST DEPTH.

Exhibit (4) 2

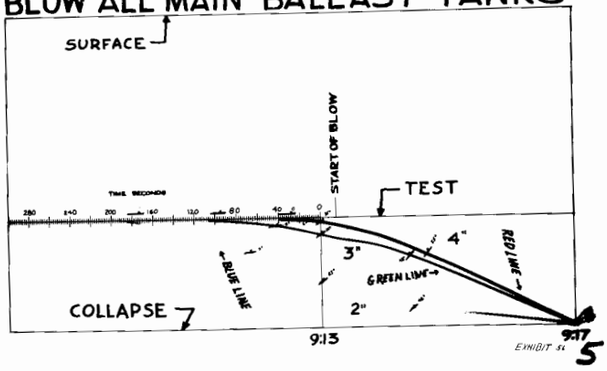
A. THREE AIR BANKS ON SERVICE
   (1) ADIABATIC = 32.5 TONS
   (2) ISOTHERMAL = 59.5 TONS
B. CAPTAINS AIR BANK
   (1) ADIABATIC = 9.2 TONS
   (2) ISOTHERMAL = 18.6 TONS

4. HALF LIFE. (ADIABATIC)

A. CAPTAINS AIR BANK EQUALS 20 SECONDS
B. THREE AIR BANKS EQUALS 80 SECONDS

EXHIBIT SL 3

CAPTAIN'S AIRBANK BLOW ALL MAIN BALLAST TANKS



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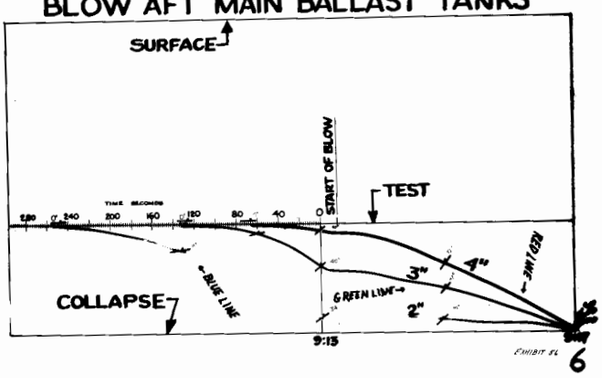
3 AIR BANKS BLOW AFT MAIN BALLAST TANKS



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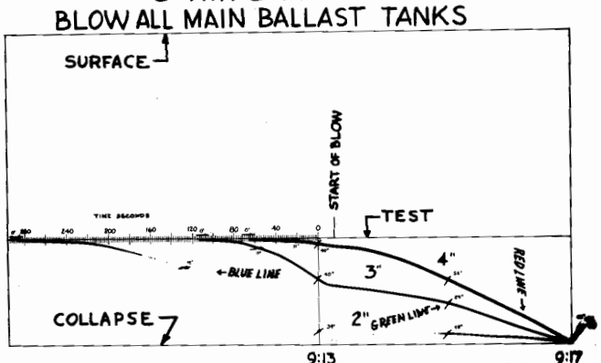
3 AIR BANKS BLOW ALL MAIN BALLAST TANKS



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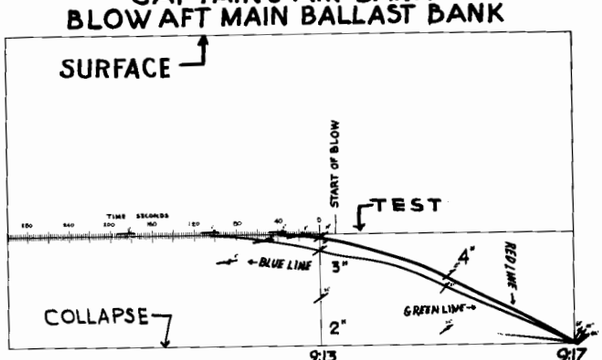
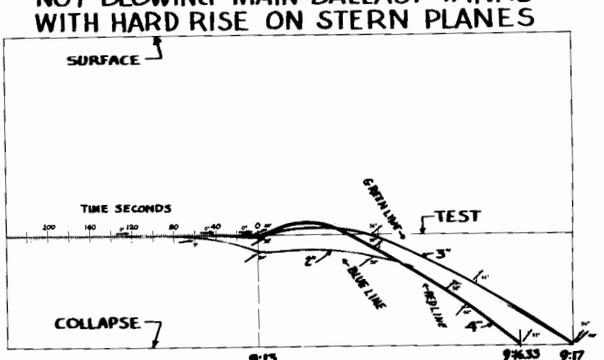
CAPTAIN'S AIR BANK BLOW AFT MAIN BALLAST BANK



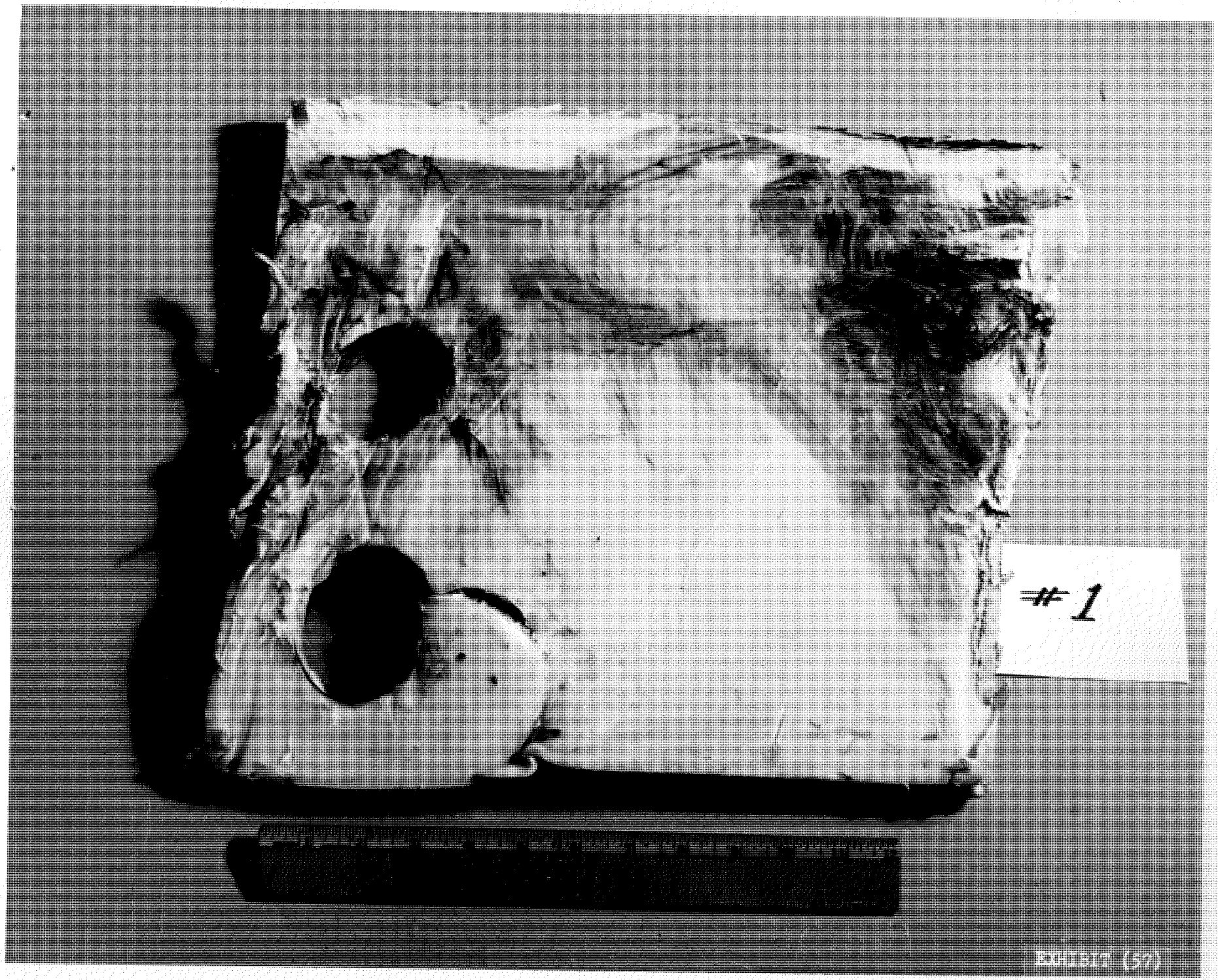
4

NOT BLOWING MAIN BALLAST TANKS WITH HARD RISE ON STERN PLANES



8

EXHIBIT 56


#1

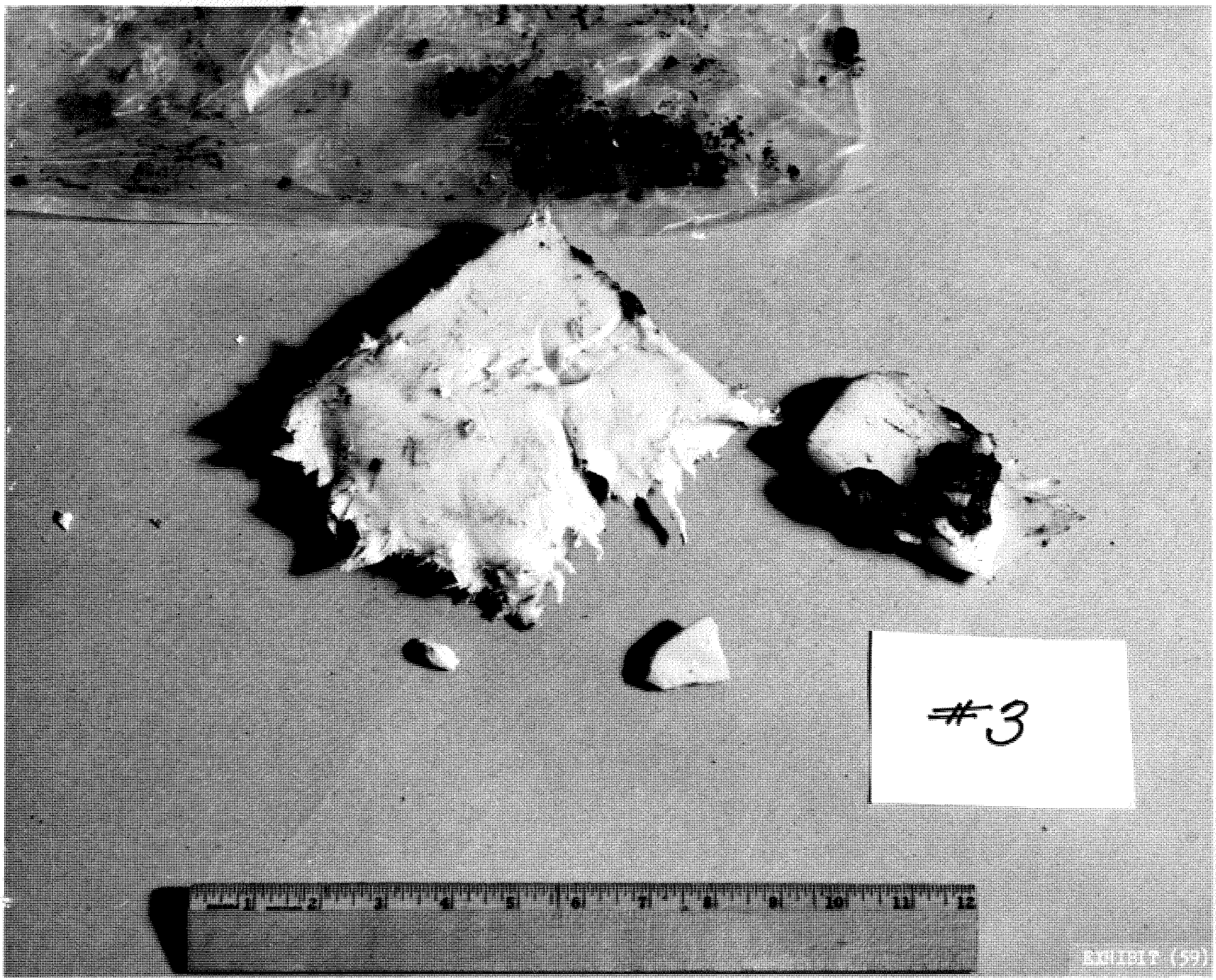
1272-63

ASB


#2
EXHIBIT (58)

NO. 1273-63

UNIT ASB


#3
EXHIBIT (59)

12 7 4 63

DATE

ASD

UNIT


#4
EXHIBIT (60)

NO. 1275-63

UNIT ASB

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, N. H.

RC

IN REPLY REFER TO
303C1/303C5
15 APR 1963

MEMORANDUM

From: Materials Testing Laboratory
To: President, Court of Inquiry

Subj: USS THRESHER (SS(N(593); third group of debris recovered from area of casualty; report on

1. The subject material consisting of four plastic bags of miscellaneous flotsam was delivered to the Materials Testing Laboratory in custody of (b) (6) EN2(SS) of USS SKATE (SS(N)578) at approximately Noon 4/13/62. Custody was assumed by (b) (6) , Code 240, this Shipyard, at that time.

2. These materials, after monitoring by RADCON personnel and photographing in as received condition were examined by the signatories and other Materials Testing Laboratory personnel for identification, etc.

3. Methods used in identifying and classifying individual objects were spectrographic analysis, pyrolysis and microscopic study unless otherwise indicated hereafter.

4. The detailed inventory of materials and Laboratory identifications thereof are as follows:

ITEM I

One large slab of yellow plastic material resembling borated polyethylene, irregular fractured edges and two circular openings for piping. Sample appears to have been heavily compressed. Identified as borated polyethylene. Additional check of carbon content of char on surface of this slab gave 68% carbon as compared to theoretical value of approximately 82.5% for borated polyethylene.

A number of clinging and imbedded particulate materials were removed from this slab and subjected to analysis as follows:

OBJECT	ANALYSIS
(a) Non-magnetic particle	Lead
(b) Non-magnetic particle	Sea salts
(c) Magnetic particle	Low Alloy Steel
(d) Embedded wire(magnetic)	Low Alloy Steel
(e) Organic fibers--continuous filament synthetic fiber,	apparently Nylon

Exhibit 61 - 3 pages

ITEM II. Many pieces of miscellaneous materials.

Specimen Designation	Analysis
(a) Yellow plastic	Borated polyethylene
(1) Char on surface	40% carbon + boron, iron, chromium, low nitrogen and salt
(b) White plastic	Virgin polyethylene
(c) Pale yellow plastic	Commercial polyethylene containing titanium but no boron
(d) Hard resinous material	Compounded epoxy resin (microporous)
(e) Off-color hard resin	High density foamed polyurethane
(1) Clinging yellow paint	Zinc chromate primer (contains Zn-Ti-Cr & Si)
(f) Red plastic cap	Polyethylene(commercial)
(g) Small piece yellow plastic	Borated polyethylene

ITEM III. Several miscellaneous items.

Specimen Designation	Analysis
(a) Yellow plastic	Borated polyethylene
(b) White plastic	Virgin polyethylene
(c) Piece of hard plastic	Compounded epoxy resin
(d) Piece of red-brown porous plastic (flat)	Syntactic foam-polyester-microballoons void filler material
*(e) Brown grease-like substance	Petrolatum type grease
*Solubility in various solvents and softening point	
(f) Small pieces of porous white plastic adhering to grease (e)	Low density polyurethane foam

Exhibit (C) 2

RC 303C1/303C5

ITEM IV. Two plastic covered buoyant cushions slightly stained orange-red.

This appeared to be buoyant elements from orange colored life jackets.

Fiber removed from one proved to be non-flammable continuous synthetic fiber, evidently Kapok.

(b) (6)

(b) (6) Head. Polymers Research Section

Head, Chemical Section

Examined & Concur:

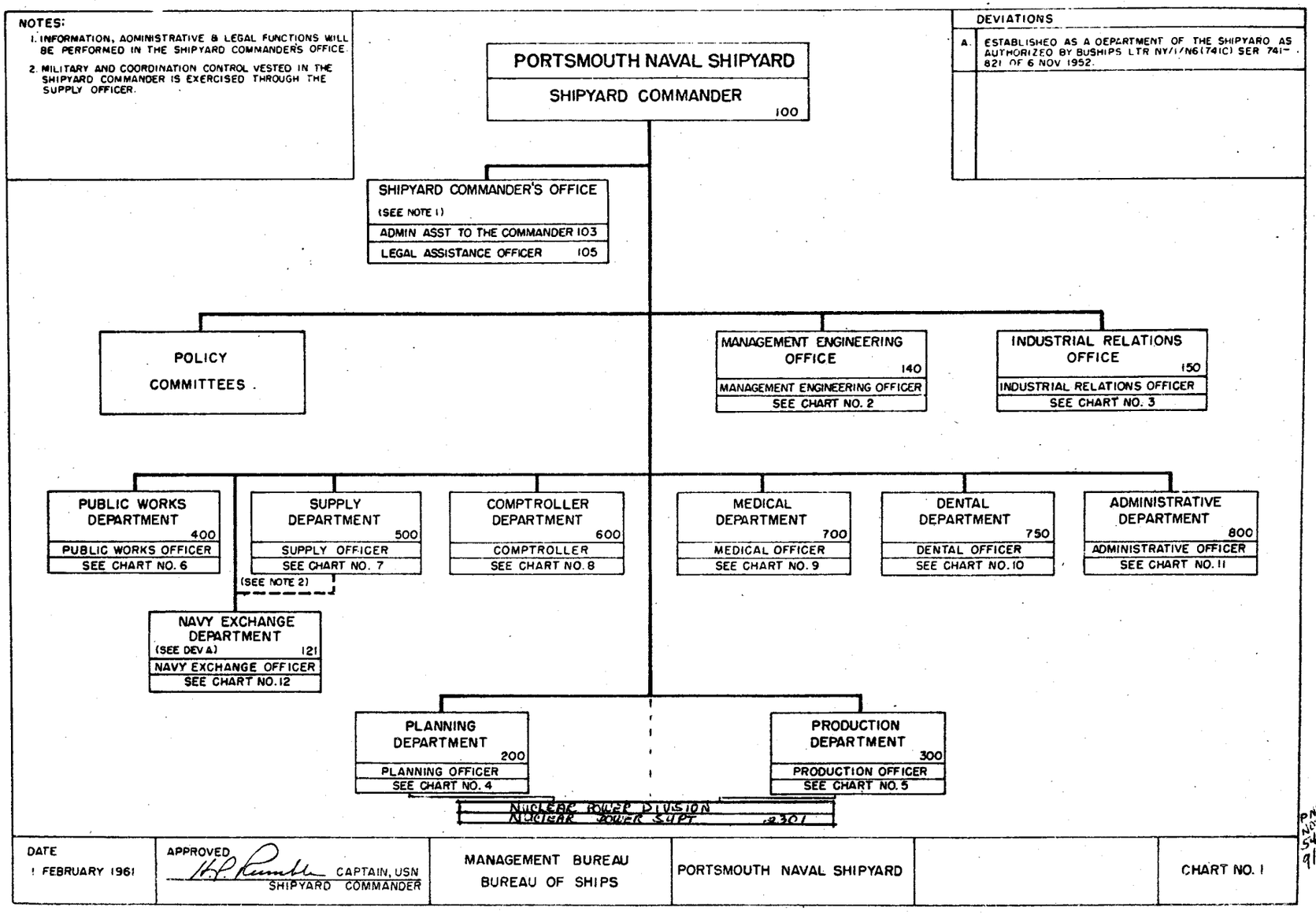
(b) (6) Chemist

(b) (6) Rubber Tech.

Copy to:
COMSUBLANT NORVA (1)
DEPCOMSUBLANT (1)

100 (1)
240(1)
303C-1 (1)
303C-5 (1)

Exhibit (G) 3



C-111

EXH 62 - (1)

PNS NOTE 54-30 9/20/61

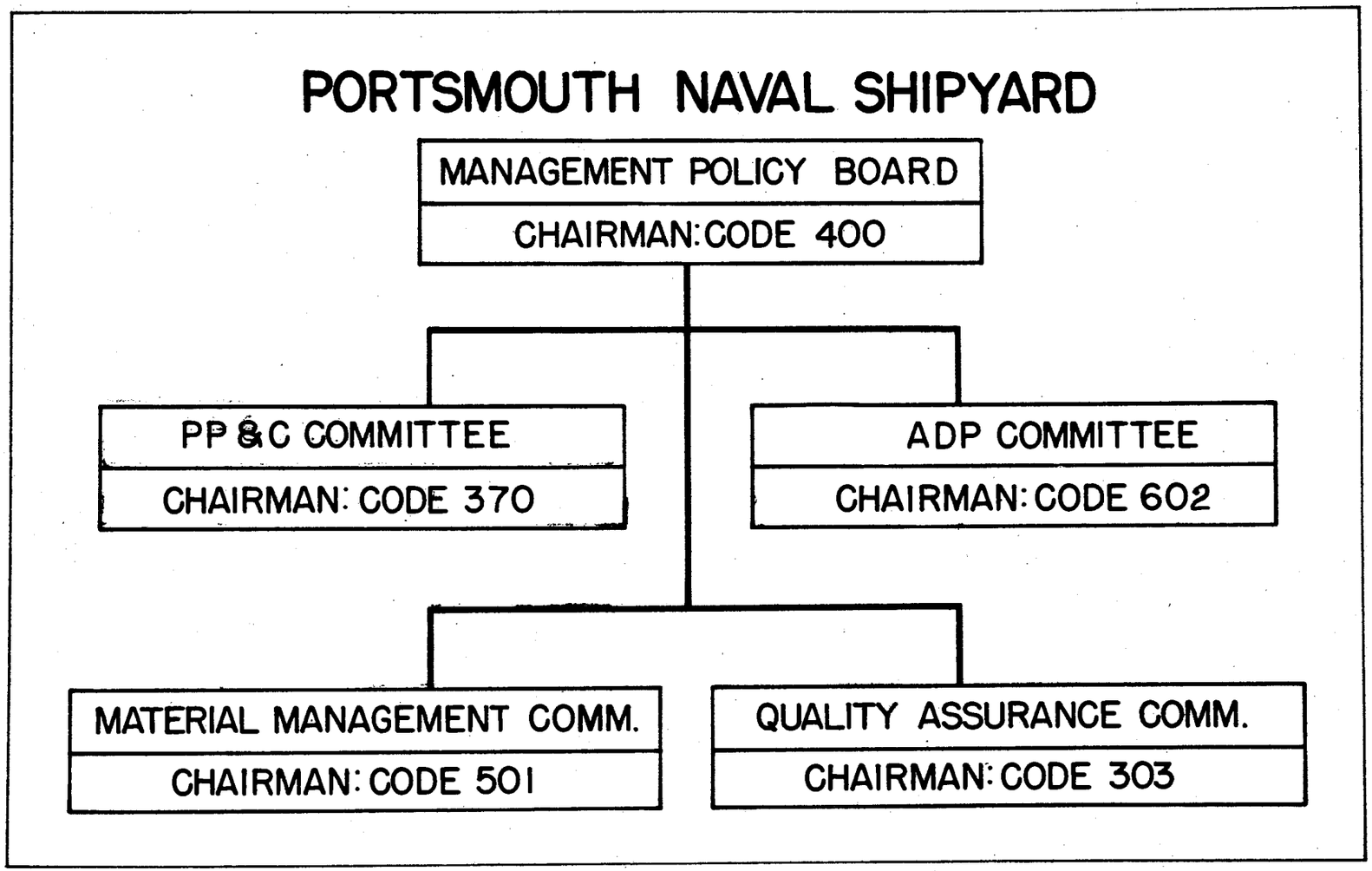

PORTSMOUTH NAVAL SHIPYARD
MANAGEMENT POLICY BOARD
CHAIRMAN: CODE 400
PP&C COMMITTEE
CHAIRMAN: CODE 370
ADP COMMITTEE
CHAIRMAN: CODE 602
MATERIAL MANAGEMENT COMM.
CHAIRMAN: CODE 501
QUALITY ASSURANCE COMM.
CHAIRMAN: CODE 303

Exhibit (62) - 2

EX63

WORK PLAN

FOR

COMMANDER, PORTSMOUTH NAVAL SHIPYARD

15 February 1962

DISTRIBUTION:
Heads of Departments and Offices
Codes 2301, 204, 106

Exhibit (3) 1

I. CONFERENCES AND MEETINGS

	When Held	Where Held	With Whom	Purpose
(1) Ship Work Conference	Daily at 1600* except Tues. and Wed. On Tues., combine with Dept. Head Conf. On Wed. at 0945* before conf. with CO's. *Time varies with type of work load.	Code 100 Office	200, 300, 2301 (on Wed.)	Discuss progress and problems on ship work.
(2) Department Head Conference	Weekly on Tues. (except last Tues. of month) at 1030	Code 100 Conf. Rm.	Dept. and Off. Hds.	Discuss management problems.
(3) Meeting with CO's of ships under availability to Shipyard	Weekly on Wed. at 1030	Code 100 Conf. Rm.	CO's of Ships; Selected Off & Civ Mangmt Officials	Receive and discuss comments by CO's on work being performed for their ships.
(4) Shipyard Management Conference	Monthly on last Tues. of each month at 1030	Auditorium Bldg. 22	Selected Off & Civ Mangmt Officials	Receive reports on operations from department heads. Review management programs. Discuss management problems. (PTSMH NAVSHIPYD INST 5050.4)
(5) Officers' Luncheon	Monthly on third Wed. at 1200	Off. Club Bldg. 22	All Officers	Meet with other officers not usually contacted in the normal course of business.

Exhibit 63(2)

	When Held	Where Held	With Whom	Purpose
(6) Visit with Master Mechanics and Foremen	Monthly on first Fri. at 1000	M.M.&F. Din. Rm. Bldg. 18	300, 400 Master Mechanics and Foremen	Discuss Production and Public Works Departments business and problems.
(7) Employees' Council	First Thurs. of each month at 1510	Rm. 2, 3d Floor Bldg. 20	160, 185 Dept. and Off. Hds., Employees' Council	Explain management policies affecting personnel and welfare of the Shipyard. Discuss problems brought up by Employees' Council.
(8) Briefing Conferences for ship's force of ships being overhauled by Shipyard or for fitting out crews	When specifically directed by Code 100	P&E Conf. Rm., 1st Floor, Bldg. 86	Ship's CO and personnel select. by him Selected Shipyd Off. and Civ.	Outline organization and methods of operation of the Shipyard, primarily to assist ship's force to know whom to contact and how to go about getting what they want.
(9) Management Luncheon	At 1145 on next to last Mon. of each month	Executive Din. Rm.	Members of Management Conference	Discuss management problems informally.
(10) Meeting with all employee groups	At 1400 on last Thurs. of the month	Rm. 2 3d Floor Bldg. 20	All recognized employee groups	To disseminate information on the business of the Shipyard and answer questions.

Exhibit (63) 3

II. MANAGEMENT REVIEW PROCEDURES

ITEM	METHOD OF REVIEW			
	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
A. General				
(1) Employment status	(a) Total Civilian Employment Status report issued weekly by Code 150 at Department Head Conference and Management Conference.			
	(b) Biweekly Employment Level Status Report issued by Code 600.			
	(c) Departmental ceilings established quarterly by Code 100 memo after receipt of employment spread from BUSHIPS. Code 140 prepare.			
(2) Operation of the Navy Industrial Fund	(a) Performance Report (Flash) issued monthly by Code 600. Contains data on cash balance, retained earnings, overtime, overhead, unallocated costs, and data comparing current and past performance.			
	(b) Financial and Operating Statements issued monthly by Code 600. Review and Analysis Section is pertinent.			
	(c) Summary of All-Yard Overhead Rates and Retained Earnings Balances. Issued monthly by Code 600. Compares actual and applied overhead rates for all shipyards.			
		(d) Monthly presentation by Code 600 at Management Conference on financial performance for previous month and for previous quarter at Conference in month following end of quarter. Weekly report at Heads of Departments Conference on overhead trends.		
	(e) Financial and Operating Budget submitted quarterly by Code 600 to Code 100 via Code 104 for approval. Covers operations under Military Support as well as NIF.			

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
A. General (Contd.)				
(3) Sick Leave	Monthly Sick Leave Report issued by Code 600.			
(4) Overtime	Covered in weekly Performance Report issued by Code 600.			
(5) Officer Personnel	(a) Officer Distribution Control Report.			
		(b) Officers luncheon - held monthly.		
(6) Master Shore Station Development Program			(a) Chairman of Shipyard Development Board brief Code 100 on Program and recommendations of Board.	
(7) Shore Station Development Projects			(a) Chairman of Shipyard Development Board brief Code 100 on proposed projects prior to submission to BUSHIPS for preliminary approval.	
(8) Facility Programs			(a) Chairman of Shipyard Development Board brief Code 100 prior to submission to BUSHIPS.	
(9) General housekeeping--waterfront, yard, shops, and other buildings and work areas				(a) Code 100 conduct periodic inspections of waterfront and yard with Codes 300 and 400, and with all department heads for shops, buildings, and work areas under their cognizance.

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
A. General (Contd.)				
(10) Communications	(a) Code 100 review all intelligence received from whatever source and of whatever nature to determine the necessity of communicating it to management officials, employee groups, higher authority, or the community for the purpose of keeping them informed to the end of insuring efficiency of operation or promoting better understanding. The media of communication will include directives, letters, conferences, briefings, Periscope articles, press releases, and personal contact.			
	(b) Code 100 hold department heads responsible for communicating pertinent matters to their departments, other department heads, and Code 100.			
(11) Programs (other than MCON and Facility) Review	(a) Code 140 prepare, maintain, and follow up on plans for review of management programs.			
	(b) Code 100 direct department heads or Management Committees to report on status of implementation of various programs either by written reports, at management conferences, or special briefings.			
(12) Organization	(a) Code 100 request Code 140 to make studies on case basis.			
		(b) Department heads keep Code 100 advised of desirable changes in course of management conferences or by special appointment or call.		
(13) Policies and Procedures	(a) Code 140 make studies as directed by Code 100.			
	(b) Code 100 assign specific tasks to Management Policy Board or its subordinate Committees.			
		(c) Department heads keep Code 100 advised of desirable changes in course of management conferences or by special appointment or call.		

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
A. General (Contd.)				
(14) Public Information	(a) PTSMH NAVSHIPYD INST 5720.5 refers. Public Information Assistant make reports to Code 100 as required therein.			
B. Management Engineering Office				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Office to carry out its duties, including but not limited to status of management engineering projects, organizational reviews, mobilization planning, officer billet structure, space control, and management program reviews.	(a) Code 140 prepare and maintain a Plan of Action and Status book for management programs for Code 100. Code 140 monitor progress, initiate follow-up action as necessary, and keep Code 100 advised.	(b) Code 140 keep Code 100 informed of current developments of importance in course of management conferences or by special appointment or call.	(c) Code 100 request periodic briefings as to general situation with respect to such matters.	(d) Annually - prior to Administrative Inspection.
C. Industrial Relations Office				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Office to carry out its duties, including but not limited to wage and classification developments, employee relations		(a) Code 150 keep Code 100 informed of current developments of importance in course of management conferences or by special appointment or call.	(b) Code 100 request periodic briefings as to general situation with respect to such matters.	

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
C. Industrial Relations Office (Contd.)				
problems, employment activity, training programs, safety, employee services, sick leave, incentive awards, and savings bond participation.		(c) Code 100 hold conference on each disabling work injury with line supervision and safety staff representation. (d) Code 100 review safety record at monthly management meetings.		(e) Annually - prior to Administrative Inspection.
D. Planning Department				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Department to carry out its duties, including but not limited to work assignments and availabilities, Bureau and Type Commander problems, advance planning, funding of work including fixed pricing, material procurement difficulties, major design projects and	(c) Design Division Forecast Prospective Work Load. (d) Report of Ships Under Overhaul or Repair at Naval Shipyards (OPNAV 4710-1). (e) Vessels Monthly Progress Report, etc. (NAVSHIPS 3952). (f) Schedule of Shipwork.	(a) Code 200 keep Code 100 informed in course of daily shipwork conference, department head conference, and monthly management conference, or in case of emergent items, through personal appointment or call.	(b) Code 100 request periodic briefings on general status of matters other than shipwork.	

Encl. (1) (3)

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
D. Planning Department (Contd.) design farm-out, value engineering, design work load, and cost of productive work in comparison with other shipyards.	(g) Bureau of Ships Production Progress Conference; information for (BUSHIPS 5050-1). (h) Alterations and Projects Status Report (NAVSHIPS 3622). (i) Production Officer's Monthly Progress Conference Report.			(j) Annually - prior to Administrative Inspection.
E. Production Department (1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Department to carry out its duties, including but not limited to progress on shipwork and custom fabrication, work load, production planning and control, industrial engineering, drydocking operations, ship movements, adequacy of equipment and floating equipment.	(c) Shop Work Load Charts. (d) Long Range Forecast - Prospective Ship Work Load. (e) Planned Work Load and Employment Report submitted monthly to BUSHIPS (NAVSHIPS 3570). (f) Selected Key Events for Ship Work, etc. (Weekly) (PNS 4850-23). (g) Weekly status reports on ships under availability other than new construction.	(a) Code 300 keep Code 100 informed in course of daily shipwork conference, weekly department head conference, and monthly management conference, or in case of emergent items, through personal appointment or call.	(b) Code 100 request periodic briefings on general status of matters other than shipwork.	

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
E. Production Department (Contd.)	(h) Production Officer's Monthly Progress Conference Report.			
		(i) Monthly meeting with Production Officer, Public Works Officer, and M.M.&F.		
				(j) Weekly to shops and ships.
F. Public Works Department				
(1) Matters relating to personnel, organization, directives, operations, buildings, and equipment affecting the ability of the Department to carry out its duties, including but not limited to status of construction projects, transportation and weight handling equipment and operations, utility systems, controlled maintenance program, floating equipment, and housing.		(a) Code 400 keep Code 100 informed of current developments in course of management conference or by special appointment or call.		
			(b) Code 100 request periodic briefings as to general situation with respect to such matters.	
				(c) Bimonthly - to view construction projects, outside areas under cognizance of Code 400 or a shop.
		(d) Monthly meeting with Public Works Officer, Production Officer, and M.M.&F.		
G. Supply Department				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of	(a) Production Officer's Monthly Progress Conference Report.			
		(b) Code 500 keep Code 100 informed of current developments in course of management conference or by special appointment or call.		

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
G. Supply Department (Contd.) the Department to carry out its duties, including but not limited to inventory, work load, work measurement, binning programs, material procurement and contracting problems, disposal, excess material, shop stores, Fleet replenishment, satellite responsibilities, funding problems, and Submarine Barracks mess.			(c) Code 100 request periodic briefings as to general situation with respect to these matters.	(d) Quarterly - primarily to look over outside storage areas with an occasional warehouse visit.
H. Comptroller Department				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Department to carry out its duties, including but not limited to the status of the Navy Industrial Fund, analysis of fiscal operations and the development and management of the computer and computer programs and their integration on a Shipyard-wide basis.		(a) Code 600 keep Code 100 informed of current developments in course of management conference or by special appointment or call. (b) See II A(2)(d). (c) See II A(2), (3), and (4).		(d) Annually - prior to Administrative Inspection.

Encl. (1) II A(3) 11

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
I. Medical Department				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Department to carry out its duties, including but not limited to industrial health hazards, industrial medicine programs, epidemic conditions, fatalities, and sanitary conditions.	(b) Quarterly Occupational Health Data Sheet.	(a) Code 700 keep Code 100 informed of current developments in course of management conference or by special appointment or call. At weekly department heads conference and monthly "Pass the Word" conference, give brief report on cases treated during preceding week, broken down into occupational and nonoccupational with any comments as to types of occupational injuries.		(c) Annually - prior to Administrative Inspection.
J. Administrative Department				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Department to carry out its duties, including but not limited to emergency plans, fire and police protection and security, communications, administrative services, service craft, naval personnel, special services, messes, and barracks.		(a) Code 800 keep Code 100 informed of current developments in the course of management conference or by special appointment or call.	(b) Code 100 request periodic briefings as to general situation with respect to these matters.	(c) Annually - prior to Administrative Inspection.

Exhibit (53) 12

ITEM	REPORTS	CONFERENCES	BRIEFINGS	INSPECTIONS
K. Nuclear Power Division				
(1) Matters relating to personnel, organization, directives, operations, buildings and equipment affecting the ability of the Shipyard to carry out its duties in the nuclear power field, including but not limited to the planning, engineering, construction, refueling, repairing, testing, quality control, safety, and personnel assignment and training in connection with nuclear reactor plants.	(a) In connection with paragraph 4b(1) of PTSMH NAVSHIPYD INST 5450.8B, Code 2301 keep Code 100 informed direct as to the ability of the Shipyard to carry out the requirements of Code 1500 BUSHIPS in connection with these matters.			
L. Combat Systems Division				
(1) Matters relating to personnel, organization, directives, operations, training, buildings and equipment affecting the ability of the Shipyard to carry out its duties in the combat systems field, including but not limited to the installation or overhaul, checkout, and test of electronics and weapons equipment and systems.	(a) Keep Code 100 informed as to the ability of the Shipyard to meet its requirements in the combat systems field.			

Encl (1) (63) 13

CH 7

HBC | PORTSMOUTH NAVAL SHIPYARD, PORTSMOUTH, NEW HAMPSHIRE | PRODEPT NOTE 4410(303A)

PRODEPT NOTICE 4410 — 28 March 1963

From: Production Officer
To: Distribution List

Subj: Production Department Directives; amendments to

Ref: (a) PRODEPT INST 4410.4
(b) PRODEPT INST 4410.7

1. Action. Amend references (a) and (b) as follows:

a. Reference (a)

(1) Paragraph 6.d. Add the following at end of the paragraph:

"Code 303B shall submit to Code 303A a list of those joints that leak. The joints to be identified by plan number, joint number, and pipe size."

(2) Enclosure (1), paragraph 3.b.(2)(b). Delete in its entirety.

(3) Enclosure (1), paragraphs 3.b.(2)(c), (d), and (e). Renumber paragraphs to read: 3.b.(2)(b), (c), and (d).

b. Reference (b)

(1) Paragraph 5.c.(2)(a). Add the following at end of paragraph:

"Code 303B shall submit to Code 303A a list of those joints that leak. The joints to be identified by plan number, joint number, and pipe size."

(2) Enclosure (1), paragraph 3.b.(2)(b). Delete in its entirety.

(3) Enclosure (1), paragraphs 3.b.(2)(c), (d), and (e). Renumber paragraphs to read: 3.b.(2)(b), (c), and (d).

2. Cancellation. Upon completion of above action and for record purposes on 30 April 1963.

(b) (6)

DISTRIBUTION:
A (Ship Supts)
C, D, G-1, G-2 (300 only)
H (303B, 303E, 926, 938, 956 only)
I (926, 956 only)
140, 200, 240, 260, 865

Exhibit (64) 46 pages

HBC

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
NOTE 4410 (301A)

PRODEPT NOTICE 4410

15 March 1963

From: Production Officer
To: Distribution List

Subj: Production Department Directives; amendments to

Ref: (a) PRODEPT INST 4410.7
(b) PRODEPT INST 4410.4 CH 5 (PRODEPT NOTE 4410 of 5 Mar 1963)

1. Action. Amend references (a) and (b) as follows:

a. Reference (a). Enclosure (1), page 3, in the Table under vertical column labeled "New Joint" wherever "60%" appears, change it to read "50%."

b. Reference (b). Enclosure (1), page 3, in the Table under vertical column labeled "New Joint", opposite AGSS569, change "60%" to read "50%."

2. Information. The 60% bond criteria has not been accepted by this Shipyard for any construction, conversion, or overhaul projects now on hand.

3. Cancellation. Upon completion of action and for record purposes on 1 April 1963.

(b) (6)

DISTRIBUTION:
A (Ship Supts)
C, D, G-1, G-2 (300 only)
H (303B, 303E, 926, 938, 956)
I (926, 956)
140
200
240
260
865

Exhibit (C4)
2

(1)

HBC | PORTSMOUTH NAVAL SHIPYARD, PORTSMOUTH, NEW HAMPSHIRE | PRODEPT NOTE 4410(301A)

PRODEPT NOTICE 4410 — 5 March 1963

CH 5

From: Production Officer
To: Distribution List

Subj: PRODEPT INST 4410.4 CH 5 (Subj: Instructions for Joint Certifications in Fabrication and Inspection of Non-Target Piping Systems)

Ref: (a) PRODEPT INST 4410.7

Encl: (1) Revised enclosure (1)
(2) Revised enclosure (2)

1. Action. Amend basic Instruction as follows:

a. Paragraph 2, line 3. Delete the following:

"in all new construction ships, and to piping system joints in alterations to ships under repair," and substitute in its place:

"in the SS(N)605, SS(N)606, SSB(N)620, and AGSS569 Phase IV,"

b. Paragraph 8.c. Delete in its entirety.

c. Remove enclosures (1) and (2) of basic Instruction and substitute enclosures (1) and (2) of this Notice.

2. Information. Reference (a) will apply to SSB(N)636, SS(N)646, AGSS555, and all subsequent new construction or overhaul contracts.

3. Cancellation. Upon completion of action above and for record purposes on 31 March 1963.

(b) (6)

DISTRIBUTION:
A (Ship Supts)
C, D, G-1, G-2 (300 only)
H (303B, 303E, 926, 938, 956 only)
I (926, 956 only)
140
200
240
260
865

Exhibit (64)
3

HBC Enclosure (1) PRODEPT
INST 4410.4 CH 5
5 March 1963
CH 5

SUPPLEMENTARY INSTRUCTIONS FOR SILVER-BRAZED JOINTS

Ref: (a) PROCESS INST 1003.9
(b) Welding Engineer's Sketch No. 872 - Sil-braze Pipe Joints - Induction Heating
(c) NAVSHIPS 250-648-8 (July 1962) - Inspection and Test of Silver-Brazed Piping Systems

1. General. All criteria of the basic Instruction for material control, fabrication, and inspection shall apply to sil-brazed joints.

2. Fabrication

a. Brazing will be performed only by qualified operators who have in their possession a serially numbered qualification card certifying to their qualification in accordance with reference (a). Instructors, supervisors, and inspectors shall examine qualification cards as necessary to assure themselves of operators' qualifications. The brazer's qualification number shall be stamped on the edge of the fitting.

b. The provisions of references (a) and (b) will be followed in the fabrication of silver-brazed piping systems. In amplification of reference (a), during the brazing operation on joint sizes 2 inches I.P.S. and larger which contain preinserted alloy rings, difficulty may be experienced in starting initial flow of the ring. On these occasions, priming of the flow by face feeding is permitted in a single spot on the circumference and shall not exceed 10% of the length of the circumference. Priming shall be accomplished by using a 1/16" diameter wire of the same grade alloy as the insert ring. This technique will be used only when directed in each case by shop instructors or supervisors.

c. Except as specified above, no joint with a preinserted alloy ring will have any supplemental face feeding applied to it until after the brazing process has drawn brazing alloy to the exposed junction of the pipe and fitting and the exposed brazing alloy extends more than 80% of the pipe circumference and, further, that remaining unexposed portions shall not exceed 10% of the circumference in any segment. Supplemental face feeding under these circumstances will be used only when directed on a case basis by instructors or supervisors.

d. There are 2 specific cases in sil-brazing in which face feeding of 100% of the joint circumference with a following mandatory ultrasonic test may be used. This procedure will be used only on fittings 2" I.P.S. and larger, and the added fillet should be kept as small as practicable. In both cases before proceeding with the 100% fillet addition and the following ultrasonic test, the Shop 56 Quarterman will obtain written permission from the Senior Ship Superintendent on a Joint Control (Certification) card.

The 2 cases are:

Case 1. If, prior to brazing, the Shop 56 Quarterman determines that a joint will be inaccessible for leakage repair when it has been installed in the ship and when a hydro is put on it, he may add a 100% fillet as part of the fabrication process, after completing the procedures of paragraphs c. and d. above. He will designate the completed joint "repair-ultrasonic" and request NDT prior to the joint becoming inaccessible.

Case 2. If, after the completion of brazing, the joint leaks when subjected to hydrostatic test, he may add a 100% fillet. He will in every case designate such a joint "repair-ultrasonic" and request NDT.

3. Inspection

a. The degree of material identification and workmanship inspection shall be in accordance with the basic Instruction. The criteria for visual inspection shall be in accordance with references (a) and (c) of this enclosure.

b. Nondestructive Test. As a minimum, a nondestructive test shall be performed on joints over 2" I.P.S. in those hazardous systems listed in paragraph 2.of the basic Instruction which are brazed in position on the ship. Code 303E shall furnish to Code 303B for record purposes the results of NDT on every joint thus inspected. If the joint is considered acceptable, this fact, together with the NDT records and the name of the inspector accepting the joint shall be made a part of the records of the Quality Assurance Division. If defective or rejected, the cognizant shop shall be notified and the joint shall be repaired or refabricated.

(1) If radiography reveals that the alloy ring has not been melted or that the space between the end of the pipe and bottom of the socket exceeds 1/16" at any point for joints under 2" and 1/8" at any point for joints 2" and over, the joint shall be marked defective by means of YELLOW tape.

(2) For ultrasonically tested brazed joints, the acceptable percentage of bond for all joints shall be as tabulated. A joint not meeting these requirements will be marked defective by means of YELLOW tape.

Exhibit (64)
5

Ship or Class of Ship		Old Joint	New Joint
SS(N)593) SS(N)605) SS(N)606) SSB(N)620)	Under present contract for new construction and Post-shakedown availability	40% Average 25% Min. each land	50% 25% each land
AGSS569		40% Average 25% Min. each land	~~60%~~ 50% *

*Separate limits for one land not required.

(a) If the number of consecutive "no bond" segments exceeds the following values for either land, the joint will be marked defective by means of YELLOW tape:

Pipe Size (I.P.S.)	No. of Consecutive 1-inch Segments
1 —— 1-1/2	2
2 —— 2-1/2	3
3 —— 3-1/2	4
4 —— 5	5

If there is an indeterminate segment between segments of no bond, this segment will also be considered unbonded. Exclude the indeterminate or inaccessible segments in a land when computing its average bond.

(b) Joints with an acceptable over-all level of bond, but with a possible flow path for leakage (areas of 20% or less bond on each land) will be marked defective by means of YELLOW tape.

(c) If more than half the segments in both lands are indeterminate or inaccessible, the joint will be referred to Code 374 for evaluation.

(d) Questionable joints not covered by the above criteria will be referred to Code 374 for resolution.

(e) Ultrasonic test data and results shall be recorded on Form 1ND-PNS-1773. Forms will be filed by ship number and drawing number. At completion of a ship, these forms will be stored in the Code 303 records library.

NOTE: At the present time ultrasonic standards have been developed for fittings having a minimum wall thickness of .250" and for pipe having a minimum wall thickness of .100". Anything less than the above cannot now be evaluated by ultrasonic test.

Exhibit (64)
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(3) Colored tape, a visual aid for joint status indication, shall be applied to sil-brazed joints requiring NDT as follows:

(a) BLACK - Joint waiting for NDT.
Applied by Code 303B

(b) BLACK & GREEN - Joint awaiting evaluation of NDT.
GREEN applied by Code 303E
BOTH removed by Codes 303E or 303B

(c) YELLOW - Joint defective, requires repair.
Applied by Codes 303E or 303B
Removed by Code 303B (when repaired)

(d) WHITE - Joint rejected, must be replaced.
Applied by Codes 303E or 303B
Removed by Shop 56 (when replaced)

(e) BROWN - Joint completed and accepted.
Applied by Codes 303E or 303B

4. Additional Information. Used, or used and reconditioned fittings shall not be re-used except when specifically directed by the Planning Department, or on an individual case basis by the Head of Shop 56. In either instance the supervisor shall make special note on a Joint Control (Certification) Card that a used or reconditioned fitting was utilized and shall request ultrasonic test of the joint.

Any brazed joint that has been repaired twice and is still unsatisfactory shall be rejected without further attempt to repair.

Exhibit (64)
7

SUPPLEMENTARY INSTRUCTIONS FOR WELDED JOINTS

Ref: (a) MIL-STD-22, Welded Joint Designs
(b) MIL-STD-248, Qualification Tests for Welders
(c) MIL-STD-123A, Identification of Covered Welding Electrodes
(d) MIL-STD-271A, Nondestructive Testing
(e) NAVSHIPS 250-692-2 (Jan 1961), SUPP 1 of Aug 1962

1. General. All material control, fabrication, and inspection procedures as stipulated in the basic Instruction shall apply to welded pipe joints. Each type of welded pipe joint shall be fabricated in accordance with a specific Welding Procedure dependent on material, size, and system pressure and temperature, as stated in a Welding Engineer's Sketch, Shipyard Process Instruction, or other work instruction.

2. Fabrication

a. Joint Preparation. The Welding Procedure for the particular type of joint shall be followed in detail. The procedure will be in accordance with reference (a) or local supplemental Instructions.

b. Welding. Welding technique, preheat and interpass temperatures, the welding process and equipment, the type and size of welding electrode, the consumable insert (when used), and tacking sequence shall all be specified in the Welding Procedure. When preheating is used, it shall be applied so that the joint is sufficiently and uniformly heated prior to the tack welding. The specified sequence of tack welding shall be used to minimize and misalignment of the joint.

3. Inspection. The degree of material identification and workmanship inspection shall be in accordance with the basic Instruction. The criteria for visual in-process and final inspection shall be in accordance with the following:

a. Material Inspection. In the process of chemically field testing the materials of the joint, care shall be exercised not to put chemicals on the area to be welded.

b. In-Process Inspection

(1) Shop 56 personnel (Supervisor, Instructor, or mechanic) are responsible for in-process inspection of welded joints up to the point of readiness for tack welding. In examining joints for proper preparation for

welding he shall inspect the following features, being guided by the dimensional specifications given in the applicable Welding Procedure:

(a) Depth of counterbore and taper

(b) Root face

(c) Groove angle

(d) Groove radius

(e) Depth of socket

(f) Squareness of end of pipe

(g) Cleanliness of area to be welded

(h) Drilling and deburring of welded bosses. (Not to be accomplished on a pipe after installed in the system.)

(2) The Shop 26 supervisor shall then:

(a) Satisfy himself that the joint is in all respects ready for welding and that the consumable insert, if used, conforms to specifications.

(b) Determine the welding process to be used as directed in the Welding Procedure.

(c) Assign the joint to a welder whose qualification is appropriate for the process, materials, and position of welding, and is qualified in accordance with reference (b).

(d) Determine that the proper welding equipment is on hand and that electrodes of the proper size and color coding by reference (c) are used.

The Shop 26 supervisor shall observe the welding of the joint to the extent that he can certify as to proper bead and segment sequence - proper preheat and interpass temperatures - cleaning of slag - width and thickness of weld bead - lack of undercutting - cratering - arc strikes - etc.

c. Workmanship Inspection. Completed joints shall be inspected by Code 303B during system installation inspection for surface appearance. The joint shall be free, within the criteria specified in applicable Welding Engineers' Sketches of: Undercutting - Slag - Spatter - Overlapping - Arc strikes - Gouging-hammer marks - etc.

Exhibit (64)
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d. Radiographic Inspection. When radiography is required by drawings or specifications, joints shall be radiographed in accordance with procedures of reference (d) and shall meet the acceptance standards of reference (e). Requests for radiography shall be initiated by the Shop 26 supervisor. Additional radiography may be requested at the discretion of the Shop 26 or Shop 56 supervisor, or by Code 303B. Radiographic results shall be entered by X-ray Laboratory personnel on Joint Control cards. When on a defective joint the repairs are complete, Shop 26 will initiate request for reradiography in the same manner as specified for original radiography.

e. Colored tape, for joint status indication, shall be applied to welded joints requiring radiography as follows:

(1) BLUE - Joint ready for final weld.
Applied by Code 303B

(2) BLACK - Joint waiting radiograph.
Applied by Code 303B

(3) BLACK & GREEN - Joint awaiting evaluation of radiograph.
GREEN applied by Code 303E
BOTH removed by Codes 303E or 303B

(4) YELLOW - Joint defective, requires repair.
Applied by Codes 303E or 303B
Removed by Code 303B (when repaired)

(5) WHITE - Joint rejected, must be replaced.
Applied by Codes 303E or 303B
Removed by Shop 56 (when replaced)

(6) BROWN - Joint completed and accepted.
Applied by Codes 303E or 303B

4. Additional Information. Repairs shall be undertaken under the direction of the Shop 26 supervisor, governed by established procedures (or special procedures requested for the case at hand) set forth in Welding Engineers' Sketches. The Welding Engineer shall be consulted on any repair that penetrates the wall thickness. Welded joint fabrication and inspection requirements are applicable to all such repair work, and the requirement for certifications by the supervisors of Shops 26 and 56 includes repair work.

(1)

HBC

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
NOTE 4410(303A1)

PRODEPT NOTICE 4410

14 December 1962
CH 4

From: Production Officer
To: Distribution List

Subj: PRODEPT INST 4410.4 CH 4 (Subj: Instructions for Joint Certification in Fabrication and Inspection of Non-TARGET Piping Systems)

1. Purpose. To insure the existence of a record of Sil-brazed joints over 2" IPS fabricated in place aboard ship in systems within the scope of the basic Instruction.

2. Action. Amend the basic Instruction as follows:

a. Paragraph 6.b.(1), add the following:

"Also, the Supervisor shall indicate on the EAM card for each joint over 2" IPS whether that joint was fabricated in place aboard ship."

b. Enclosure (4), page 3, after the last paragraph which reads.... "on the front faces of the #1 copy and the two #2 copies." add the following sentence:

"The Shop 56 Supervisor will write the words "in place" on the front face of the #1 copy and the two #2 cards for each joint fabricated in place aboard ship."

3. Cancellation. Upon completion of action above, and for record purposes on 31 December 1962.

(b) (6)

DISTRIBUTION:
A (Ship Supts)
C (300 only)
H, I, J (926, 938, 956)
140, 200, 210, 211, 212, 230, 232
240, 242, 260, 261, 263, 264, 303
303C, 340, 374, 375, 377, 380, 947
865

Exhibit (64)
11

CH 3

MEC

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
NOTE 4410 (310)

PRODEPT NOTICE 4410

14 May 1962

From: Production Officer
To: Distribution List

Subj: PRODEPT INST 4410.4, CH 3 (Instructions of Joint Certifications in Fabrication and Inspection of Non-Target Piping Systems)

Ref: (a) MARE ISLAND NAVSHIPYD Rpt of 20 Sep 1961, "Evaluation of Reliability of Ultrasonic Inspection of Silver-Brazed Joints"
(b) E.B. DIV R&D Rpt of 21 Jun 1961, "The Feasibility and Requirements for the Non-Destructive Inspection of Brazed Submarine Pipe Joints by Ultrasonics"

Encl: (1) Addition to paragraph 2.b. of enclosure (1), Supplementary Instructions for Sil-Brazed Joints, of PRODEPT INST 4410.4

(2) Addition to page 3 of enclosure (4), Joint Certification Card and Its Ultilization, of PRODEPT INST 4410.4

1. Purpose. To permit 100% fillet addition during the brazing process of certain sil-brazed joints of 2" IPS and greater. This procedure would be exercised on only those joints determined by the Shop 56 Quarterman as inaccessible for leakage repair after hydrostatic testing.

2. Background. References (a) and (b) have analyzed and confirmed the reliability of ultrasonic methods in the non-destructive testing of sil-brazed joints. To utilize reliable ultrasonic testing in aiding Shop 56 production, a recent change to Production Department Instruction 4410.4 authorized a special repair procedure for sil-brazed joints which leaked when subjected to a hydrostatic test. To preclude the necessity of expensive "ripout" action, this repair procedure will now become an in-process procedure for those joints which will become inaccessible for future repair after installation. The Shop 56 Quarterman will be the judge of this probable inaccessibility. The repair - or, now, in-process - procedure will always be followed by a mandatory ultrasonic test.

3. Action. Amend the basic Instruction by deleting all of paragraph 2.b., page 1 of enclosure (1), after the words "as specified hereafter in 'In Process Inspection'." Add enclosure (1) to paragraph 2.b., page 1 of enclosure (1) of the Instruction. Add enclosure (2) as a new paragraph to page 3 of enclosure (4) of the basic Instruction.

Exhibit (64)
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MEC

4. Cancellation. This Notice will be cancelled upon completion of the above action and for record purposes on 1 June 1962.

(b) (6)

DISTRIBUTION LIST:

200
210
211
212
230
232
240
242
260
261
263
264
300
303 (5)
303C
310
330S (10)
340
370
374
375
377
380
865 (2)
926 (100)
938 (10)
956 (100)
947

Exhibit (64)
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....., as specified hereafter in "In Process Inspection." There are two specific cases in sil-brazing in which face-feeding of 100% of the joint circumference with a following, mandatory ultrasonic test may be used. This procedure will be used only on fittings 2" IPS and greater, and the added fillet should be kept as small as practicable. The two cases are:

Case 1 - If, after the completion of brazing, the joint leaks when subjected to a hydrostatic test, the Shop 56 Quarterman may designate it a "repair-ultrasonic" joint. Before proceeding with the 100% fillet addition with a following ultrasonic test, he will obtain permission for each specific joint from the Senior Ship Superintendent.

Case 2 - If, prior to brazing, the Shop 56 Quarterman determines that a joint will be inaccessible for leakage repair when it has been installed in the ship and when a hydro is put on it, he may designate it an "inaccessible repair ultrasonic" joint. In this case, the 100% fillet addition becomes a part of the in-process procedure. However, before proceeding with the fillet addition and the following ultrasonic test, the Shop 56 Quarterman will obtain permission for each specific joint from the Senior Ship Superintendent.

In both cases of 100% fillet addition by face-feeding, a Code 303 Inspector will be on the scene when the procedure is executed.

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..... permanent part of the ships records.

The procedures of record keeping and joint certification card processing described above for the "repair ultrasonic" joint will be followed for the "inaccessible repair-ultrasonic" joint. However, the Shop 56 Project Team Quarterman will write the words "inaccessible repair-ultrasonic" vice "repair-ultrasonic" on the front faces of the #1 copy and the two #2 copies.

Exhibit (64)
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(1) File/SIL Braze Note Book F Cislak

MAR

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
NOTE 4410 (310)

CH 2

PRODEPT NOTICE 4410

30 March 1962

This is modified by 14 May memo

From: Production Officer
To: Distribution List

Subj: PRODEPT INST 4410.4 (Instructions for Joint Certifications in Fabrication and Inspection of Non-Target Piping Systems)

Encl: (1) Addition to paragraph 2b of Enclosure (1), Supplementary Instructions for Sil-Brazed Joints, of PRODEPT INST 4410.4 of 14 Aug 1961
(2) Page 3 of Enclosure (4), Joint Certification Card and Its Utilization, of PRODEPT INST 4410.4 of 14 Aug 1961

1. Purpose. To resolve the problem of slight leakage obtained on sil-brazed joints of 2 inch IPS and greater, when subjected to hydrostatic test.

2. Background. It has become necessary to amplify the existing instructions on sil-brazed joints with a special repair procedure combining 100% fillet addition with subsequent ultrasonic testing. This procedure will greatly benefit productive progress of Shop 56 at the critical outfitting time of construction and repair.

3. Action. Amend the basic Instruction by adding enclosure (1) to paragraph 2.b., page 1 of enclosure (1). Add enclosure (2)as the new page 3 of enclosure (4) of the basic Instruction. Change the current pages 3 and 4 to pages 4 and 5 respectively.

4. Cancellation. This Notice will be cancelled upon completion of the above action and for record purposes on 1 May 1962.

(b) (6)

Distribution List:

200	303C
210	310
211	330S (5)
212	331
230	340
232	370
240	374
242	375
260	377
261	380
263	865 (2)
264	947
300	956 (100)
303 (5)	938 (10)
	956 (100)

Exhibit (64)
16

....., as specified hereafter in "In Process Inspection." If, after completing the brazing as described above, the joint leaks when subjected to a hydrostatic test, a special repair procedure may be necessary. This repair procedure will combine face-feeding of 100% of the circumference with a following ultrasonic test to insure the strength of the joint. It will be accomplished only on fittings 2 inch IPS and greater. The added fillet should be kept as small as practicable. This type of joint will be designated a "repair untrasonic" joint, and permission to execute the repair must be obtained on a case by case basis from the Senior Ship Superintendent. A Code 303 inspector will be present on the scene when the 100% fillet repair is made.

PRODEPT
INST 4410.4
30 Mar 1962
CH 2

For brazed joints with fittings 2 inch IPS and greater which leak when subjected to hydrostatic pressure, the Shop 56 Project Team Quarterman will initiate a second copy of the #2 joint certification card and will write the words "repair-ultrasonic" on the front face of the #1 copy and the two #2 copies. These three cards will be forwarded to the Senior Ship Superintendent for approval or disapproval of face feeding of 100% of the circumference with a following ultrasonic test. The Senior Ship Superintendent will note this by writing "approved" or "disapproved" with his signature on the front face of the three cards. If disapproved, all three cards will be returned to the Project Team Quarterman. Shop 56 will then perform normal repairs or replacement of the joint in accordance with NAVSHIPS 250-637-2. If approved, the Senior Ship Superintendent will retain one of the #2 cards for his records. The other #2 copy and the #1 copy will be returned to the Shop 56 Project Team. Copy #2 is retained by Shop 56 to provide a record of joints designated "repair-ultrasonic." Shop 56 will initiate the mandatory ultrasonic test by forwarding copy #1 to Code 303B. Code 303B will maintain a record of joints designated "repair-ultrasonic." Copy #1 will then be forwarded to Code 303C by Code 303B for conducting the ultrasonic test. Code 303C will return copy #1 to Code 303B marked with ultrasonic data. After evaluation Code 303B will return #1 copy to Shop 56 and note completion of the ultrasonic test in its records. Shop 56 will compare the completed #1 copy with their #2 copy on record. Thus both Code 303B and Shop 56 will insure that an ultrasonic test and certification always follow a 100% face-fed repair.

Code 303C will use copy #4 for its permanent record of ultrasonic results. When copy #1 is received, Code 303C will ultrasonic the joint, record the results on copies #4 and #1, and return copy #1 to Code 303B for evaluation.

Code 303B will, upon completion of the ship, forward to the Commanding Officer a complete listing of those joints which have received 100% fillet repair. These listings will become a permanent part of the ship's records.

ENCLOSURE (K)

Exhibit (64)
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HBC

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
NOTE 5215 (301A)

PRODEPT NOTICE 5215

16 Feb 1962

From: Production Officer
To: Distribution List

Subj: PRODEPT INST 4410.4 (Subj: Instructions for Joint Certifications in Fabrication and Inspection of Non-TARGET Piping Systems.)

Encl: (1) Revised Enclosure (1) to basic Instruction

1. Purpose. To amend basic Instruction by furnishing revised enclosure (1).

2. Action. Remove enclosure (1) to the basic Instruction and insert in its place enclosure (1) of this Notice.

3. Cancellation. This Notice will be canceled upon completion of above action and for record purposes on 15 March 1962.

(b) (6)

DISTRIBUTION:

200	300
210	303 (5)
211	303C
212	2305
230	310
232	330S (5)
240	331
242	340
260	370
261	374
263	375
264	377
	865 (2)

Group Master, Outfitting
Foreman, Shop 26 (100)
Foreman, Shop 38 (10)
Foreman, Shop 56 (100)

Exhibit (64)
19

Supplementary Instructions for Sil-Brazed Joints

Ref: (a) PROCESS INST 1003.9
(b) NAVSHIPS 250-637-2
(c) 242 ltr 9480 of 4 Aug 1961
(d) NAVSHIPS 250-648-8
(e) PROCESS INST #508.1; Field Identification of Metals

1. General. All criteria of the basic Instruction for material control, fabrication, and inspection shall apply to sil-brazed joints.

2. Fabrication

a. Brazing will be performed only by qualified operators who have in their possession a serially numbered qualification card certifying to their qualification in accordance with reference (a). (Instructors, supervisors, and inspectors shall examine qualification cards as necessary to assure themselves of operators' qualifications.) A Shop 56 instructor or supervisor will observe the brazing process and will exercise control as specified hereafter.

b. The provisions of reference (b) will be followed in the fabrication of silver brazed piping systems. In amplification of reference (b), during the brazing operation on joint sizes over 2 inches containing preinserted alloy rings, difficulty may be experienced in starting initial flow of the ring. On these occasions, priming of the flow by face feeding may be permitted in a single spot on the circumference and shall not exceed 10% of the length of the circumference. Priming shall be accomplished by using small size wire of the same grade alloy as the insert ring. This technique will be used only when directed by shop instructors or supervisors as specified hereafter under "In-Process Inspection." Except as specified above, no joint with a preinserted alloy ring will have any supplemental face feeding applied to it unless the brazing process has drawn brazing alloy to the exposed junction of the pipe and fitting and the whole length of exposed brazing alloy at that circumference is greater than 80% of the circumference and, further, that remaining unbrazed portions shall not exceed 10% of the circumference in any segment. Supplemental face feeding shall be done while the fitting is still hot. Supplemental face feeding under these circumstances will be used only when directed by instructors or supervisors, on a case basis and, as specified hereafter in "In-Process Inspection."

c. Torch-brazed joints shall be of the sleeve or socket type, as shown on page 46 of MIL-STD-22A. Fittings for 1/2" outside diameter tubing and larger, except Freon Piping, shall be of the type having preinserted rings of silver brazing alloy. (Refer to Waiver, reference (c), permitting use of face-fed fittings on specified systems.)

Exhibit (64)
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3. Inspection

a. In-Process Inspection. In-Process inspection of assembly of all sil-brazed joints will be accomplished. The material employed, fitting, alignment, and support of every joint will be certified by the supervisor as specified in paragraph 6.b. of the basic Instruction and the brazing of every sil-brazed joint will be observed by a Shop 56 instructor or supervisor as a shop control and as a shop quality assurance measure. As noted above under "Fabrication", mechanics shall limit the use of face feeding to only those instances where the instructor or supervisor specifically authorizes face feeding and limits the extent in accordance with subparagraph 2.b. above. Codes 303B/2305 will, on a random basis, conduct in-process inspection of 25% of all joints, utilizing the same criteria as described for use of shop instructors and supervisors. Codes 303B/2305 shall not exercise the prerogative of the shop instructor or supervisor to authorize face feeding. The shop instructor, the first line supervisor, or Codes 303B/2305 shall reject on the basis of the in-process inspection, any joint which fails to meet prescribed criteria.

b. Inspection of Completed Joints. Supervisors shall inspect 100% of completed joints in accordance with the criteria of reference (b) and paragraph 2. above, and in accordance with the criteria for visual inspection set forth in reference (d) of this enclosure, namely:

(1) Misalignment (Fig. 3)

(2) Excessive Heat (Fig. 7)

(3) Excessive Fillet (Fig. 2)

(4) Incomplete Brazing (Fig. 4)

(5) Excessive Clearance (Same as Fig. 3)

(6) Excessive Repairs (Fig. 5)

(7) Cracking of Brazing or Fitting

(8) Indication of Filing or Grinding (Fig. 6)

(9) Leakage

(10) Proper Support

(11) Ideal Appearance of Properly Executed Sil-Brazed Joint (Fig. 1)

Exhibit (64)
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All joints over 2 inch IPS in submarine sea water systems brazed in position on the ship shall be radiographed. Joints shall be rejected if the alloy ring has not been melted or if the space between the end of the pipe and bottom of the socket exceeds 1/8" at any point. The Materials Testing Laboratory shall furnish to Codes 303B/2305 for record purposes the results of radiography on every joint thus inspected. If the joint is considered acceptable, this fact, together with the radiograph and the name of the inspector accepting the joint, shall be made a part of the records of the Quality Assurance Division. If rejected, the joint shall be refabricated in accordance with fabrication and inspection requirements stated herein.

4. Other Inspections. Joints which exhibit minor leaks under hydrostatic test may be repaired (under the direction of a supervisor) by face feeding and shall then be subjected to the full inspection as described above. In this case, supervisor or inspector shall make note of the repair on the #1 or #5 copy of certification cards respectively. Used, or used and reconditioned, fittings shall not be re-used except when specifically directed by the Planning Department, or, in a minimum number of instances, when directed on an individual case basis by a Shop 56 supervisor. In this latter instance the supervisor shall make special note on the Joint Certification Card that a used or reconditioned fitting was utilized.

5. Additional Information. Reference (d) provides criteria and supplemental information for visual inspection of sil-brazed fittings, criteria and supplemental information for radiographic inspection, information on material identification for distinguishing between copper-nickel alloy and stainless steel. Reference (a) provides process steps to be followed in the production of sil-brazed pipe joints and is suitable as a basis for the instruction of operators, supervisors, and inspectors. Reference (e) provides methods and techniques for field identification of material. Reference (a) also provides technical information suitable for educating operators, instructors, supervisors, and inspectors in characteristics of metals for material control purposes.

Exhibit (64)
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(1)

MWF

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
INST 4410.4(303)

14 Aug 61

PRODEPT INSTRUCTION 4410.4

From: Production Officer
To: Distribution List

Subj: Instructions for Joint Certifications in Fabrication and Inspection of Non-Target Piping Systems

Ref: (a) PTSMH NAVSHIPYD INST 4410.1
(b) NAVSHIPS 250-637-2
(c) General Specifications for Shipbuilding, USN, Sect S-9-1
(d) MIL-STD-22, Welded Joint Designs
(e) MIL-STD-248, Qualification Tests for Welders
(f) BUSHIPS Technical Manual, Chapter 48
(g) Process Instruction 508.1, Field Identification of Metals

Encl: (1) Supplementary Instructions for Silver Brazed Joints
(2) Supplementary Instructions for Welded Joints
(3) Supplementary Instructions for Mechanical Joints
(4) Joint Certification Card and Its Utilization
(5) Joint Identification System

1. Purpose. To provide a consolidated reference to currently effective directives for fabrication and inspection of all non-target pipe joints; to provide supplemental instructions for fabrication; to initiate positive control of fabrications and to specify in-process and final inspection procedures to be used in piping systems fabrication.

2. Scope. This Instruction is not applicable to piping system joints controlled by the TARGET system. Subject to the foregoing, this instruction is applicable to piping system joints in all new construction ships, and to piping system joints in alterations to ships under repair, wherein the piping is greater than 1/2" in O.D. in the following categories of piping systems:

a. All sea water systems; e.g., Trim, Drain, Main and Aux Service, Fuel transfer and compensating, Weapons systems, etc. (P1. and P3 piping).

b. All hydraulic systems; e.g., Main, Vital, External, and independent, etc. (P1 and P3 piping).

c. Air and compressed gas systems at pressures of 225 psi and above except refrigeration and air conditioning. (P1 and P3 piping with exceptions noted).

Exhibit (64)
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d. Flexible hoses which are integral with piping systems - including fabrication and installation. (Special categories of P1,P2 and P3 piping).

e. Propulsion, Auxiliary Machinery, and Ship Control Lube Systems. (Special categories of P1,P2,P3).

3. Cancel. Production Department INST 9480.4 of 31 March 1961.

4. Effective. 15 August 1961.

5. Background. It has become necessary to amplify existing instructions for the fabrication of piping systems; for control of material used in these systems; and to set forth the inspection requirements to be observed to assure the quality of the completed piping systems.

6. General Instructions:

a. Material Control. The provisions of reference (a) shall be followed explicitly in the control of material installed in piping systems. In addition, personnel of Shop 56 and Shop 38, when issued material for installation in piping systems, shall employ chemical or other suitable field material identification procedures to verify, to the extent field identification will permit, that material issued is, in fact, the material required by plan or specification. Upon verification of the identity of the material, the material shall be examined for proper marking corresponding to its identity. Improperly marked material shall be rejected. Immediately after material has been positively identified, it shall be marked, by etching, as to composition, (class) piece and plan number and hull number. When etching of small fittings is infeasible they may be tagged in lieu of etching and the same information as specified above shall be provided. Correct material identification markings shall be maintained and restored as necessary throughout the fabrication process to installation. In-process and final inspections, specified hereafter, will include the same field verification that commonly used material conforms to plan or specification. Reference (g) provides instructions for field identification of piping materials. Field identification shall be employed for commonly used materials for which identification methods are specified by reference (g). Unusual materials shall be identified by the Material Testing Laboratory upon request of the shop supervisor or inspector who required the information.

b. Fabrication

(1) Supervisors and/or Instructors of Shop 56 will examine every joint within the scope of this Instruction, prior to brazing, welding or mechanical joining, and the Supervisor will certify that the fabrication conforms to plan and specification with respect to size,

Exhibit (64)

material, fit, alignment, support, joint preparation and, depending on the type of joint, any additional inspection as stated in enclosures(1), (2) and (3) for brazed welded and mechanical pipe joints, respectively. A JOINT CERTIFICATION CARD, Figure 1 enclosure (4) shall be submitted by the Shop 56 supervisor to the Shop 56 Shop Planning Office as certification for each joint. (Shop 56 Shop Planning Office shall maintain files of such certifications until delivery of the vessel. At delivery, files shall be delivered to Qlty. Assur. Division for retention for two years.) On card form required above, supervisors shall, after their inspection of the completed joint, note the serial number of the brazer, welder, and/or pipefitter.

(2) Supervisors shall insure that only qualified mechanics are allowed to braze, weld, or make up joints. Brazers, welders, and mechanics making up bite type fittings, shall have in their possession currently valid qualification cards. Supervisors and inspectors shall examine qualification cards as necessary to assure themselves of the currency of the mechanics qualifications.

c. Inspection.

(1) Material Inspection. Chemical or other appropriate field tests for the identification of material shall be utilized at points of material issue as described in subparagraph a. above. Inspection for material identification shall be performed, at the time of issue to mechanics on 100 per cent of materials upon which they are working. Identity by prior marking, chemical, or other appropriate field tests by supervisors at the time of fit-up shall cover 100 per cent of installed material. Likewise, Code 303B/309 shall independently conduct random inspection by chemical or other appropriate field tests for material identity covering 10 per cent of material installed. In any case where identity of material is in doubt, the assistance of Material Test Laboratory should be utilized to provide positive identification. Improper or unidentified material shall, in every instance, be rejected.

(2) In-Process Inspection. In-process inspection of assembly of all joints within the scope of this Instruction will be accomplished. The Material employed and workmanship on every joint will be certified by the supervisor as specified in paragraph 6.b above. Code 303B/309 will, on a random basis, conduct in-process inspection of 25 per cent of all joints, utilizing the same criteria as described for use of Shop Instructors and Supervisors. Enclosures (1), (2) and (3) specify these criteria for different types of joints. The Shop Instructor, the First Line Supervisor or Code 303B/309 shall reject, on the basis of the in-process inspection, any joint which fails to meet prescribed criteria.

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NOTE: The fact that the in-process inspection will be accomplished by a second or third party in no way relieves individual mechanics of responsibility for acceptable quality of workmanship; and more specifically, it does not relieve the supervisor of his responsibility for inspection to insure the conformance of the mechanic's workmanship to specifications to criteria set forth herein and to undocumented criteria of good trade practice.

(3) Inspection of Completed Joints. Supervisors shall inspect 100 per cent of completed joints within the scope of this Instruction in accordance with enclosures (1), (2) or (3). Code 303B/309 shall inspect, in accordance with the same criteria, 10 per cent of all completed joints and shall maintain a record of those joints thus inspected and the name of the Inspector, in the files of the Quality Assurance Division. (Those joints inspected during the in-process inspection of 25 per cent of all joints shall not be included in the inspection of 10 per cent of completed joints.) Those joints designated suspect by supervisors or Code 303B/309 may either be immediately rejected and reworked or, if appropriate, and at the discretion of Code 303B/309, radiography of the joint may be requested from the Material Testing Laboratory and the final decision by Code 303B/309 for acceptance or rejection may be based upon the supplemental information made available by radiography. The Material Testing Laboratory shall furnish to Code 303B/309, for record purposes, the results of radiography on every joint thus inspected. If the joint is considered acceptable, this fact, together with the radiograph and the name of the 303B/309 Inspector accepting the joint, shall be made a part of the records of the Quality Assurance Division. If rejected, the joint shall be refabricated in accordance with fabrication and inspection requirements stated herein.

d. Other Inspections. Requirements for radiography of fittings for special purposes may be generated by the Planning Department and will be specified in work instructions. Other testing procedures, including hydrostatic strength and tightness testing, will continue to be conducted in accordance with current directives. In hydrostatic testing, Shop 56 and Code 303/309 shall make visual inspection of all joints under hydrostatic pressure, for leaks, notwithstanding the fact that these joints may have successfully passed all prior inspection.

7. Responsibilities. Procedures specified herein in no way relieve line supervision of full responsibility for the quality of workmanship and utilization of specified technique and materials. In process inspection by Instructors is a shop service to Supervisors for shop assurance of control of quality, and inspections by Code 303B/309 are service to the Production Officer for departmental quality assurance. In neither case does the service rendered relieve line supervision of any responsibility.

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8. Action.

a. Shop 56, Shop 26 and Code 303/309 shall immediately implement and make effective the measures prescribed by this Instruction through the preparation and issuance of appropriate supporting documents for instruction of mechanics and supervisory personnel and for the regulation of the operations of the shop or code. Copies of these documents shall be supplied to the Production Officer.

In addition, Heads of Shops and Codes shall immediately begin through the media of training programs, conferences, instruction periods, etc., indoctrination and instruction of mechanics and supervisory personnel in the intent and specific requirements of this Instruction, the references thereto, and the pertinent shop or code internal operating documents, current and new. The responsibilities and duties of first line Supervison shall be made the subject of special emphasis in this program.

b. The Material Testing Laboratory shall provide to Shop 56 and Code 303/309 materials and instructions for performance of field identification of materials in kit form, suitable for field use. In addition, the Laboratory shall, upon request from Shop 26, Shop 56, or Code 303B/309, provide prompt service to assist in materials identification.

When radiography is specified by plan or other work instruction and is requested by the supervisor responsible for the joint, or upon request from Code 303B/309, the Laboratory will radiograph joints and provide radiographic evaluation of silbrazed joints to Code 303B/309 and in the case of welded joints, provide evaluation data and a decision to accept or reject the joint to Shop 26 liaison office. Originators of requests for radiography shall, to facilitate location of joints by radiographers, tag each joint requiring, and ready for, radiography with joint number, J. O. and system designation.

c. For mutual convenience of shops and codes a visual aid for joint location and status indication, colored tape shall be applied to joints requiring radiography in accordance with the following code:

BLACK - "ready for radiography" - Applied by X56, X26, or 303B
Removed by 303C.

GREEN - "radiography accomplished but evaluation incomplete"
Applied by 303C
Removed by 303B

Exhibit (64)
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PRODEPT
INST 4410.4 (303)

MWF

YELLOW - "defect present" - Applied by 303B or 303C.
Removed by 303B or 303C, may be removed by Shops when repair is complete and then apply Black tape.

WHITE - "rejected"- Brazed joint: Applied by 303B
Welded joint: Applied by 303C
Removed by X56 in rip out of joint.

(NOTE: To permit uniformity of practice this color code is the same as that specified for TARGET systems by Process Instruction 200.27 however other provisions of Process Instruction 200.27 are not applicable to NON-Target piping)

(b) (6)

DISTRIBUTION:
200 300
210 303 (5)
211 303C
212 309
230 310
232 330S (5)
240 331
242 340
260 370
261 374
263 375
264 377
865 (2)
Group Master, Outfitting Group
Master, Shop 26 (100)
Foreman, Shop 38 (10)
Foreman, Shop 56 (100)

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Supplementary Instructions for Sil-Brazed Joints

References: (a) NAVSHIPS 250-637-2
(b) Brochure, "Silver Brazed Sea Water Systems in Submarines" dated 1 March 1961
(c) Welding Engineer Sketch #544
(d) Welding Engineer Sketch #628
(e) Welding Engineer Sketch #648A of 25 May 1961
(f) Process Inst #508.1; Field Identification of Metals

1. General. All criteria of the basic Instruction for material control, fabrication, and inspection shall apply to sil-brazed joints.

2. Fabrication

a. Brazing will be performed only by qualified operators who have in their possession a serially numbered qualification card certifying to their qualification in accordance with reference (e). (Instructors, supervisors and inspectors shall examine qualification cards as necessary to assure themselves of operators' qualifications.) A Shop 56 instructor or supervisor will observe the brazing process and will exercise control as specified hereafter.

b. The provisions of NAVSHIPS 250-637-2 will be followed in the fabrication of silver brazed piping systems. In amplification of NAVSHIPS 250-637-2, during the brazing operation on joints containing pre-inserted alloy rings, difficulty may be experienced in starting initial flow of the ring. On these occasions, priming of the flow by face feeding may be permitted in a single spot on the circumference and shall not exceed 10% of the length of the circumference. Priming shall be accomplished by using small size wire of the same grade alloy as the insert ring. This technique will be used only when directed by shop instructors or supervisors as specified hereafter under "In-Process Inspection." Except as specified above, no joint with a preinserted alloy ring will have any supplemental face feeding applied to it unless the brazing process has drawn brazing alloy to the exposed junction of the pipe and fitting and the whole length of exposed brazing alloy at that circumference is greater than 80% of the circumference and, further, that remaining unbrazed portions shall not exceed 10% of the circumference in any segment. Supplemental face feeding shall be done while the fitting is still hot. Supplemental face feeding under these circumstances will be used only when directed by instructors or supervisors, on a case basis and, as specified hereafter in "In-Process Inspection."

c. For submarine sea water systems with service pressures over 300 psi and for all other systems with service pressure of b(1) and higher, fittings larger than 1/2 inch IPS (.840) shall be of the type having pre-inserted rings of silver brazing alloy. For service pressures less than the above, the fittings may be either the pre-inserted alloy type or the face fed type as shown in MIL-Std-22.

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3. Inspection

a. In-Process Inspection. In-Process inspection of assembly of all sil-brazed joints will be accomplished. The material employed, fitting, alignment and support of every joint will be certified by the supervisor as specified in paragraph 6(b) of the basic Instruction and the brazing of every sil-brazed joint will be observed by a Shop 56 instructor or supervisor as a shop control and as a shop quality assurance measure. As noted above under "Fabrication", mechanics shall limit the use of face feeding to only those instances where the instructor or supervisor specifically authorizes face feeding and limits the extent in accordance with subparagraph 2.b. above. Code 303B/309 will, on a random basis, conduct in-process inspection of 25% of all joints, utilizing the same criteria as described for use of shop instructors and supervisors. Code 303B/309 shall not exercise the prerogative of the shop instructor or supervisor to authorize face feeding. The shop instructor, the first line supervisor, or Code 303B/309 shall reject on the basis of the in-process inspection, any joint which fails to meet prescribed criteria.

b. Inspection of Completed Joints. Supervisors shall inspect 100% of completed joints in accordance with the criteria of NAVSHIPS 250-637-2 and paragraph 2. above, and in accordance with the criteria for visual inspection set forth in reference (b) of this enclosure; namely:

(1) Misalignment (Fig. 11)

(2) Excessive Heat (Fig. 12)

(3) Excessive Fillet (Fig. 13)

(4) Incomplete Brazing (Fig. 14)

(5) Excessive Clearance (Same as Fig. 11)

(6) Excessive Repairs (Fig. 15)

(7) Cracking of Brazing or Fitting

(8) Indication of Filing or Grinding (Fig. 16)

(9) Leakage

(10) Proper Support

(11) Ideal Appearance of Properly Executed Sil-Brazed Joint (Fig. 17)

All joints over 3 inch IPS in submarine sea water systems with service pressures over b(1) brazed in position on the ship shall be radio-

graphed. Joints shall be rejected if the alloy ring has not been melted or if the space between the end of the pipe and bottom of the socket exceeds 1/8" at any point. The Material Test Laboratory shall furnish to Code 303B/309 for record purposes the results of radiography on every joint thus inspected. If the joint is considered acceptable, this fact, together with the radiograph and the name of the inspector accepting the joint, shall be made a part of the records of the Quality Assurance Division. If rejected, the joint shall be refabricated in accordance with fabrication and inspection requirements stated herein.

4. Other Inspections. Joints which exhibit minor leaks under hydrostatic test may be repaired (under the direction of a supervisor) by face feeding and shall then be subjected to the full inspection as described above. In this case, supervisor or inspector shall make note of the repair on the #1 or #5 copy of certification cards respectively. Used, or used and reconditioned fittings shall not be re-used except when specifically directed by the Planning Department or, in a minimum number of instances, when directed on an individual case basis by a Shop 56 supervisor. In this latter instance the supervisor shall make special note on the Joint Certification Card that a used or reconditioned fitting was utilized.

5. Additional Information. Reference (b), Part 2, provides criteria and supplemental information for visual inspection of sil-brazed fittings; Part 3 provides criteria and supplemental information for radiographic inspection of sil-brazed fittings; Part 4 provides information on material identification for distinguishing between copper-nickel alloy and stainless steel. Welding Engineer Sketch #544 provides process steps to be followed in the production of sil-brazed pipe joints and is suitable as a basis for the instruction of operators, supervisors and inspectors. Process Instruction 508.1 provides methods and techniques for field identification of material. Welding Engineer Sketch #628 also provides technical information suitable for educating operators, instructors, supervisors, and inspectors in characteristics of metals for material control purposes.

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SUPPLEMENTARY INSTRUCTIONS FOR WELDED JOINTS

References: (a) MIL-STD-22, Welded Joint Designs
(b) MIL-STD-248, Qualification Tests for Welders
(c) MIL-STD-123A, Identification of Covered Welding Electrodes
(d) MIL-STD-271, Non-Destructive Testing
(e) Shop 26 weekly Sheet of Welder Qualifications
(f) General Specifications for Shipbuilding, Sect S-9-1, Welding and Allied Processes

1. General. All material control, fabrication, and inspection procedures as stipulated in the basic Instruction shall apply to welded pipe joints. Each type of welded pipe joint shall be fabricated in accordance with a specific Welding Procedure dependent on material, size, and system pressure and temperature, as stated in a Welding Engineer's sketch, a Shipyard Process Instruction, or other work instruction.

2. Fabrication.

a. Joint Preparation. The Welding Procedure for the particular type of joint shall be followed in detail. The procedure will be in accord with the provisions of MIL-STD-22, Welded Joint Designs or local supplemental instructions.

b. Welding. Welding technique, preheat and interpass temperatures, the welding process and equipment, the type and size of welding electrode, the consumable insert (when used) and tacking sequence shall all be specified in the Welding Procedures. When preheating is used, it shall be applied so that the joint is sufficiently and uniformly heated prior to the tack welding. In tack welding the specified sequence of tacking shall be used to minimize any misalignment of the joint.

The pipe welder shall be qualified in accordance with MIL-STD-246 and NAVSHIP 250-1500-1 in areas not covered by MIL-STD-248. He shall be provided a card certifying his qualification. Cards shall be serially numbered and shall be dated. In addition, Shop 26 will provide to Shop 26 Supervisors and to Code 303B/309 a weekly tally of currently valid Welder Qualifications.

3. Inspection.

a. Material Inspection. In the process of chemically field testing the materials of the joint, care shall be exercised not to put chemicals on the area to be welded.

In addition to the joint materials inspection carried out by Shop 56 personnel, the Shop 26 Supervisor shall, for welded joints with consumable inserts, visually inspect the inserts for conformance

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with specifications and, for all joints, shall inspect the welding electrodes for proper size and color coding as provided in reference (c) to this enclosure. In addition, he shall insure that the proper welding equipment is on hand for the specific process to be used.

b. In-Process Inspection. The Shop 56 Supervisor is responsible for in-process inspection of welded joints up to the point of readiness for tack welding. In examining joints for proper preparation for welding he shall specifically inspect the following features, being guided by the dimensional specifications given in the applicable Welding Procedure.

(1) Depth of counterbore and taper thereto.

(2) Root face.

(3) Groove angle.

(4) Groove radius.

(5) Depth of socket.

(6) Squareness of end of pipe.

(7) Cleanliness of area to be welded.

After inspection and certification of the joint by the Shop 56 Supervisor, he shall deliver the Joint Certification Card to the Shop 26 Supervisor or Instructor, who shall conduct in-process inspection as follows:

(1) Satisfy himself that the joint is in all respects ready for welding.

(2) Ascertain that the welder's qualification is appropriate for the process, materials, and position of welding.

(3) Determine that the welding process to be used is as directed in the Welding Procedure.

(4) When preheating is specified determine by templ-stick that the proper temperature has been established prior to tack welding and that this temperature is uniform over the entire joint area.

(5) Observe the tack welding operation for proper technique and sequence.

(6) Observe and inspect the welding of the joint to such an extent that he can certify as to proper bead and segment sequence, proper preheat and interpass temperatures, cleaning of slag, width and thickness of weld bead, lack of undercutting, cratering, arc strikes, etc.

The Shop 26 or Shop 56 Supervisors or Instructor, as well as the Code 303B/309 Inspector shall, on the basis of in-process inspection, reject any joint which fails to meet prescribed criteria.

c. Inspection of Completed Joints. The Shop 26 Supervisor or Instructor shall inspect 100% of completed joints for the following:

(1) Surface appearance

(2) Undercutting

(3) Slag

(4) Spatter

(5) Overlapping

(6) Appearance of arc strikes

(7) Evidence of damage from gouging

(8) Slag hammer marks, etc.

(9) Liquid penetrant inspection.

d. Other Inspections. As a minimum requirement, joints shall be radiographed as required by General and Detailed Specifications. These minimum requirements are specified on the Joint Certification Card. Requests for radiography shall be initiated by Shop 26 Supervisors. Additional radiography may be requested at the discretion of the Shop 26 or Shop 56 Supervisor, or by Code 303B/309. In order to assist radiographic personnel in locating those joints requiring radiography, Shop 26 personnel shall tag these joints with joint number, job order, and system designation. Radiographic results shall be entered by X-ray Laboratory personnel on Joint Certification Cards (Shop 26 and Code 303-C4 copies), with defect data mark-sensed for use in the Quality Assurance Division. All welds containing defect, failing the standard, shall be repaired and re-radiographed. When repairs are complete, Shop 26 will initiate request for re-radiography in the same manner as specified for original radiography.

4. Additional Information. Minor repairs shall be undertaken under the direction of the Shop 26 Supervisor, governed by established procedures (or special procedures requested for the case at hand) set forth in Welding Engineer's Sketches. The Welding Engineer shall be consulted on major repairs to pipe joints. Welded joint fabrication and inspection requirements are applicable to all such repair work, and the requirement for certifications by the Supervisors of Shop 26 and Shop 56 includes repair work.

5. Shop 26 will deliver signed and dated certification cards for completed joints which have passed radiographic inspection to Shop 56 for inclusion in master file of #1 copies.

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SUPPLEMENTARY INSTRUCTIONS FOR MECHANICAL JOINTS

This instruction provides guidance and criteria for mandatary surveillance action by supervisors and inspectors for the assurance of adequate quality of workmanship through conformance to material and workmanship specifications and sound trade practices. This supplementary Instruction does not supersede or invalidate the requirements of Process Instructions, Job Order Instructions or other proper authority. Complete familiarity with this Instruction does not preclude need for appropriate special training, skill and understanding and compliance by mechanics, supervisors and inspectors with detailed instruction applicable to specific joints.

Certifications by the supervisors, in accordance with the requirements of the basic instruction, constitute a necessary record of the fact that adequate surveillance of work under his direction has been carried out.

Criteria for surveillance, by supervisors and inspector, of several categories of mechanical joints are set forth below.

1. Plain flange with asbestos gaskets and plain flange grooved for "0" rings; The supervisor or instructor shall:

a. Assure that flange faces are on a plane perpendicular to the longitudinal centerline of the pipe, tube, or fitting to which they are attached. They shall also be parallel with bolt holes in alignment, before the mechanic makes up a bolted joint.

b. Make certain that the mechanic who is to take up on the bolting, has the proper wrenches for the particular joint he is to make up. These wrenches shall be of a size which shall assure a tight joint but shall not be of a size great enough to allow the threaded fastenings to be overstressed. Thread lubricants shall be used where specified.

c. Verify that cold spring, where required, shall agree with the dimensions given on approved plans. Where no cold spring is required, the piping shall not be pulled or forced into place in such a manner as to impose any additional stress on connected piping, machinery, equipment and bolting materials.

d. Instruct the mechanic that the preliminary to any flange make up is the initial installation of nuts on bolts or studs to a finger tightness followed by setting up the proper gasket load by gradual tightening of the nuts with a wrench, in a regular sequence, on diagonal opposite bolts.

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2. Mechanical joints requiring Walseal or "O" ring gaskets.

a. Material

The Supervisor shall:

(1) Make certain that the mechanic installing any "O" ring has all the information and material needed in conformance with the plan and material sheet such as proper material identification, and material or proper date, size and hardness. Portsmouth Naval Shipyard Memo 264B SS(N)593/9020 of 25 May 1960 contains the latest available information on suitable seals, gaskets and packings for use in hydraulic and pneumatic systems for the SS(N)593 class submarines. Also included is the "O" ring sizes cross reference tables BUSHIPS Dwg. SS-516-1229768.

(a) "O" rings marked with an orange stripe are intended for use with safety (phosphate ester type)hydraulic fluid only. Only those rings so identified shall be used with this fluid.

(b) "O" rings must be compatible with the fluid in which they are used. "O" rings without the orange stripe will deteriorate in safety (phosphate ester) hydraulic fluid and conversely "O" rings with the orange stripe will deterioate in mineral base fluids although it should be noted that this type is compatible with salt water.

b. Installation

(1) The supervisor or instructor will personally observe that mechanical alignment and joint make up procedures are followed as per item 1 of this instruction.

(a) Where it is required that the "O" rings pass across holes, slots, and similar localized sharp edges, the supervisor or instructor shall check to make absolutely sure that all corners have been adequately rounded, burred or otherwise undercut. He shall also ascertain that the components are matched and the "O" ring or square walseal gasket groove is of the correct depth.

(b) Grit is the worst enemy of the "O" ring installation and scrupulous cleanliness must be maintained by the supervisor during all phases of the installation. All cloths used while cleaning must be lint free as one small piece of thread across the "O" ring will cause leakage that will require complete disassembly to correct.

c. Lubrication

(1) The supervisor shall thoroughly familiarize himself and instruct his mechanics on the use of "O" ring lubricants and shall insure compliance with these instructions.

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(a) For pneumatic systems subject to contamination with mineral base fluid silicone grease Special Mil-L-4343 Stock No. 9150-269-8255 is the preferred and recommended lubricant, however, if not available the following commercial products, listed in order of preference, may be substituted.

Dow Corning	DC 55 Compound
" "	DC 7 "
" "	DC 4 "
" "	DC 44 "

(b) For pneumatic systems subject to contamination with safety (phosphate ester) fluids, Dow Corning DC 7 Compound is the preferred and recommended lubricant, however, if not available Dow Corning DC 4 may be substituted.

(c) Systems containing mineral base oil - Spec. Mil-L-15017 and Mil-L-17331, need no lubrication to facilitate assembly other than a light film of the system fluid. Systems containing safety (phosphate ester) hydraulic fluid Spec-Mil-H-19457, also need no lubrication other than a light film of the system fluid to facilitate assembly.

3. Flareless (Bite-Type) Fittings.

a. Material.

The supervisor shall insure that all ferrules are corrosion resisting steel. These can be identified by the presence of a light knurl on the largest outside diameter. Identification of piping and fittings shall be accomplished in accordance with the basic instruction, and pipe shall have been subjected to 100% inspection to determine that the material is of the proper hardness before installation in the system.

b. Fabrication.

Supervisors shall insure that when assembling or reassembling flareless (bite-type) fittings, the requirements of Process Instruction 1004.4A are met. Tubing shall be cut off squarely by a mechanical cutter and must be concentric and free of burrs both inside and out. Presetting shall be accomplished only through the use of presetting tools. Piping shall be aligned without distortion or tension. In final assembly, the nut shall be turned approximately 1/6 turn (or one flat on the hex of the nut) beyond the preset point (sharp torque rise) to give the ferrule the additional slight bowing and spring which is necessary for resisting vibratory forces. Caution: Turning the nut beyond the preset point will damage the ferrule and result in a leaking joint.

c. Inspection

In process inspection of assembly of all flareless (bite-type) fittings will be accomplished by supervisors, instructors and inspectors in accordance with the basic instruction, the criteria stated herein and in Process Instruction 1004.4A.

The material employed, presetting, alignment, support, and assembly of every joint will be inspected by a Shop 56 supervisor or instructor and will be certified and dated by the supervisor. If a joint must be disassembled at a later time, the supervisor shall certify and date the reassembly on a supplementary Joint Certification Card.

4. Installation of Flexible Pipe Connections.

a. Supervisors shall insure that when installing flexible hoses and fittings, (only Aeroquip hoses and end fittings are approved at this time), the instructions contained in Process Instruction 1004.1A are met.

(1) The supervisor or instructor shall inspect, on the ship, the rigid template that has been targeted to the system arrangement making sure that there is no tension, compression or off-set in the configuration. He shall further inspect the completed assembly in the shop, to ensure that the assembly is identical to the template.

(2) The supervisor shall be thoroughly familiar with the assembly procedures contained in the process instruction and will assure himself of the correctness of workmanship and material.

(3) The following specific points shall be observed in the ship:

(a) The hose shall not be twisted. The printed layline on the hose, when the fittings are tightened down, is an indicator for this condition.

(b) Over-torquing of swivel nuts is a common error. Swivel nuts do not depend upon compression of the threads to seal and require less torque.

(c) A small error in the positioning of the elbow adapter can cause hose to hose or hose to equipment abrasion. It can also cause bends in the hose which promote failures.

(d) Adjustable or end wrenches shall be used for hose assembly installation. Pipe wrenches shall not be used as they mar fittings and damage plating and may be cause for rejection.

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(e) Solid pipe shall have a rigid rubber-lined hanger support close to the flexible connection. Flexible configurations shall have a resilient hanger support on the dogleg or elbow fitting. Hangers shall not be installed from the movable end of a flexible connection to the hull or to a solid structure. Hangers shall be in accordance with BUSHIPS drawing 5000-S4823-1385782.

b. In assembling and installing b(1) joints other than flexible hose assemblies the supervisor shall insure that the fabrication and installation conform to the applicable plan and specification. The two approved b(1) joints, known as "Portsmouth-Type" and "EB-Type", shall be installed in configurations consisting of three joints such that the axis of any two joints are at ninety degrees to each other in one plane with the axis of the third joint perpendicular to that plane. The supervisor shall insure that the testing procedure for this type joint is followed as outlined in Process Instruction 1004.1A.

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JOINT CERTIFICATION CARD AND ITS UTILIZATION

The principal purpose of the Joint Certification Card is to certify and date the surveillance of workmanship and material in piping systems. Secondarily, the Joint Certification Card is utilized for radiograph requests, quality assurance data, defining the work package, and progress and status reporting. The Design Division will prepare cards for every non-target joint within the scope of this Instruction aboard new construction ships and for those joints on repair ships that are included in repairs or alterations being made. These cards will have ship, system, plan, joint number, joint location, type of joint, material, pipe size and radiographic specifications pre-printed on the front (see Figure 1). In addition, the following information will be pre-punched on the card for machine processing of quality assurance and progress data: ship, system, plan, joint identification, and radiographic specifications. Radiographic results will be mark sensed on the card. The distribution of the Joint Certification Cards will be as follows (see Figure 2):

a. Shop 56 - two copies for each joint

b. Shop 26 - two copy for each welded joint

c. 303B - one copy for each joint

d. 303E - one copy for each brazed or welded joint

Blank cards will be provided to Shop 26, Shop 56 and X-ray Laboratory to supplement the pre-printed cards.

Shop 56 will give copies #1 and 2 to the Leadingman responsible for the joint. The Shop 56 Leadingman will have the joint prepared and will certify the workmanship and material of the joint on the #1 copy. If the joint is to be welded, the Shop 56 Leadingman will deliver the #1 copy to the Shop 26 Leadingman who will have the welding accomplished and will certify the workmanship and materials of the weld. The Shop 26 Leadingman will initiate radiography of the joint by forwarding the #1 copy of the card to Shop 26 Liaison Office. This office retains #1 and forwards #3 to 303E as notification that radiography is required and joint is ready. When radiography is complete 303E records radiography data and returns #3 copy to Shop 26 Liaison Office. If the joint is accepted the Liaison Office enters the radiography data and forwards #1 card to Shop 56. If repairs are indicated the Liaison Officer will initiate a new card which will be attached to the original and delivered to the Shop 26 Leadingman who will initiate repairs. Upon completion of repairs the Shop 26 Leadingman re-initiates the procedure described above by certifying and dating the repair. Copy number 2 is retained by Shop 56, to provide a record of joints in process at the work site or other control point. For brazed joints, Shop 56 will initiate radiography by forwarding #1 copy to Code 303E. Likewise 303B may also initiate radiography by forwarding copy #5 to 303E. 303E will return these cards to 303B marked with radiographic data. After evaluation 303B will return #1 copy to Shop 56.

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The X-ray Laboratory will use copy #4 for its permanent record of radiographic results. When copy #1, #3, or #5 is received, the X-ray Laboratory will radiograph the joint, record the results on copies #4 and #1, #3 or #5, and return copy #1, #3 or #5 to the originator. A radiographic summary report indicating the results of all pipe joint radiography for the preceding 24 hours will be prepared prior to 0730 each day by the X-ray Laboratory Supervisor and forwarded at 0730 to Shop 26, Shop 56, Code 303B and Code 374 for their records. The daily summary report will provide Shop 26, Shop 56, Code 303B and Code 374 with complete radiographic results for all pipe joints and provide the means of maintaining work status and program information. Telephone calls to the X-ray Laboratory for radiographic information will be restricted to urgent cases in order to eliminate interference with processing operations.

Copy #5 will be utilized by Code 303B for recording in-process and completion inspection results. The back of the card provides a space for the inspector's signature and date of these inspections. If a joint is regarded a suspect joint, copy #5 will be used as a radiograph request from Code 303B.

After the ship is completed or at the end of its availability, Shop 56 will forward copy #1's to Code 303B for retention for two years.

A flow diagram depicting the utilization of the Joint Identification card is attached as Figure (2)

In addition to the card forms discussed above, shops and codes will be provided complete run-offs of joints, by ship and system, for work status, program, verification of card files and like purposes.

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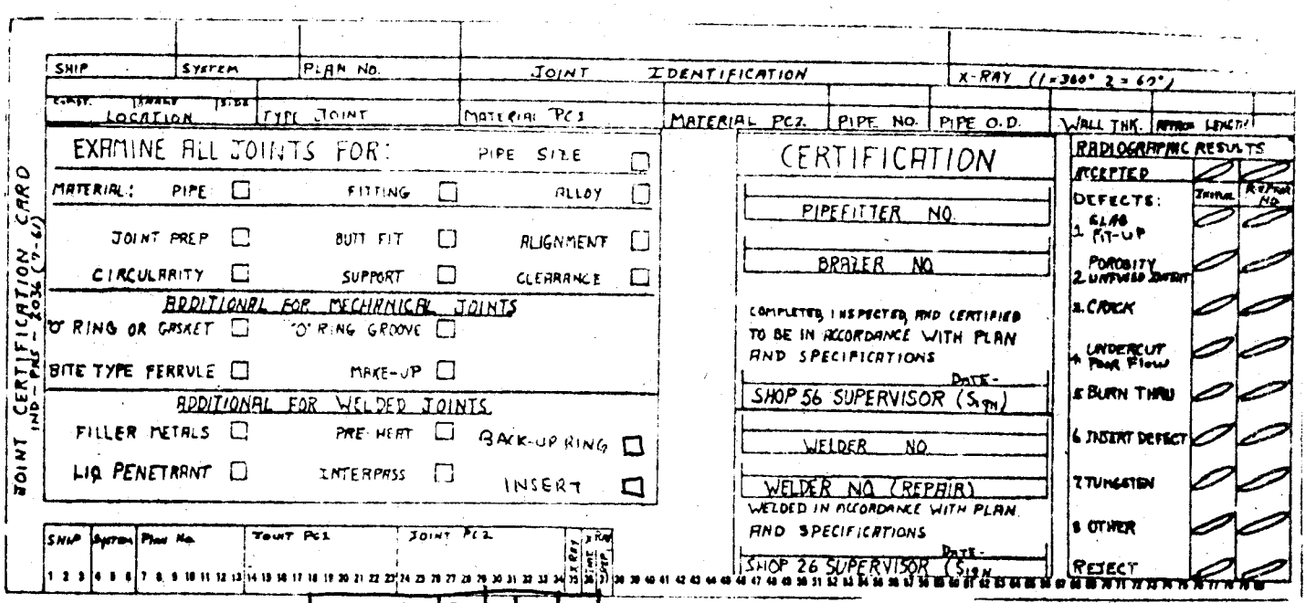
For brazed joints with fittings 2 inch IPS and greater which leak when subjected to hydrostatic pressure, the Shop 56 Project Team Quarterman will initiate a second copy of the #2 joint certification card and will write the words "repair-ultrasonic" on the front face of the #1 copy and the two #2 copies. These three cards will be forwarded to the Senior Ship Superintendent for approval or disapproval of face feeding of 100% of the circumference with a following ultrasonic test. The Senior Ship Superintendent will note this by writing "approved" or "disapproved" with his signature on the front face of the three cards. If disapproved, all three cards will be returned to the Project Team Quarterman. Shop 56 will then perform normal repairs or replacement of the joint in accordance with NAVSHIPS 250-637-2. If approved, the Senior Ship Superintendent will retain one of the #2 cards for his records. The other #2 copy and the #1 copy will be returned to the Shop 56 Project Team. Copy #2 is retained by Shop 56 to provide a record of joints designated "repair-ultrasonic." Shop 56 will initiate the mandatory ultrasonic test by forwarding copy #1 to Code 303B. Code 303B will maintain a record of joints designated "repair-ultrasonic." Copy #1 will then be forwarded to Code 303C by Code 303B for conducting the ultrasonic test. Code 303C will return copy #1 to Code 303B marked with ultrasonic data. After evaluation Code 303B will return #1 copy to Shop 56 and note completion of the ultrasonic test in its records. Shop 56 will compare the completed #1 copy with their #2 copy on record. Thus both Code 303B and Shop 56 will insure that an ultrasonic test and certification always follow a 100% face-fed repair.

Code 303C will use copy #4 for its permanent record of ultrasonic results. When copy #1 is received, Code 303C will ultrasonic the joint, record the results on copies #4 and #1, and return copy #1 to Code 303B for evaluation.

Code 303B will, upon completion of the ship, forward to the Commanding Officer a complete listing of those joints which have received 100% fillet repair. These listings will become a permanent part of the ship's records.

The procedures of record keeping and joint certification card processing described above for the "repair ultrasonic" joint will be followed for the "inaccessible repair-ultrasonic" joint. However, the Shop 56 Project Team Quarterman will write the words "inaccessible repair-ultrasonic" vice "repair-ultrasonic" on the front faces of the #1 copy and the two #2 copies. The X56 supervisor will write the words "in place" on the front face of the No. 1 and No. 2 cards for all joints fabricated in place aboard ship that are over 2" ips and are in hazardous systems.



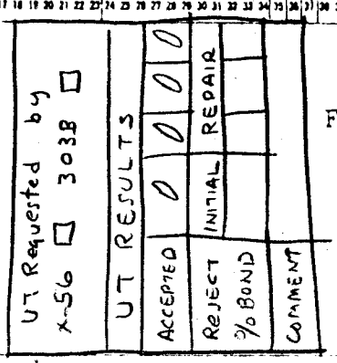


Figure 1

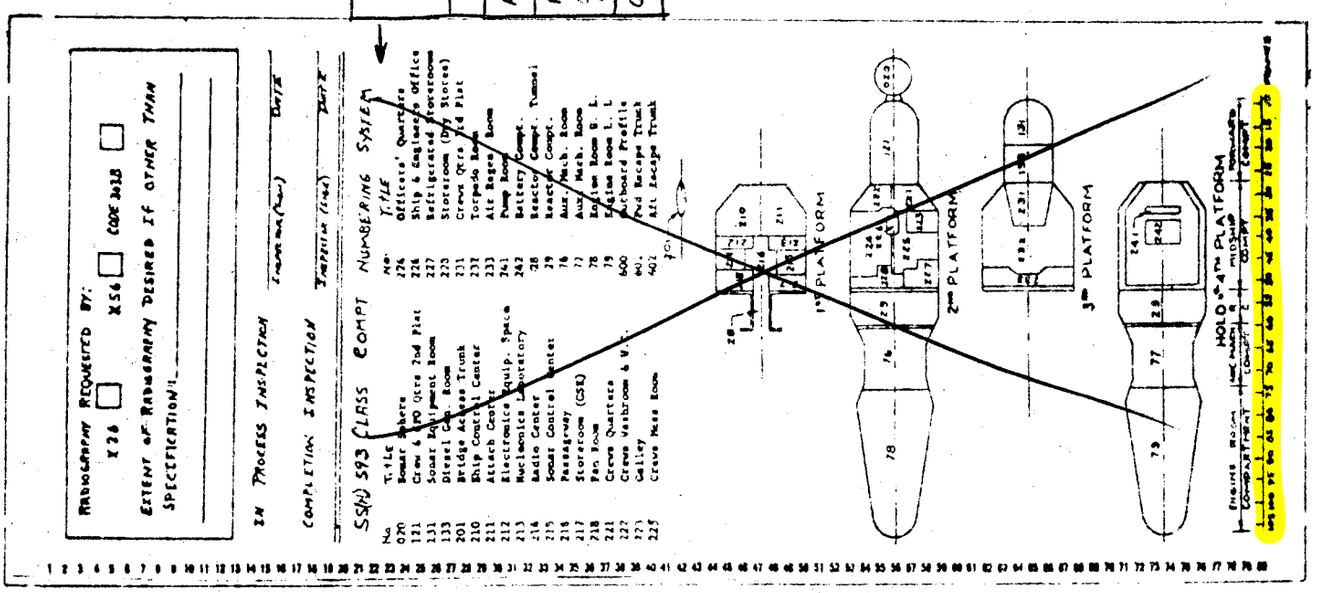


Figure 2

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Enclosure (4)

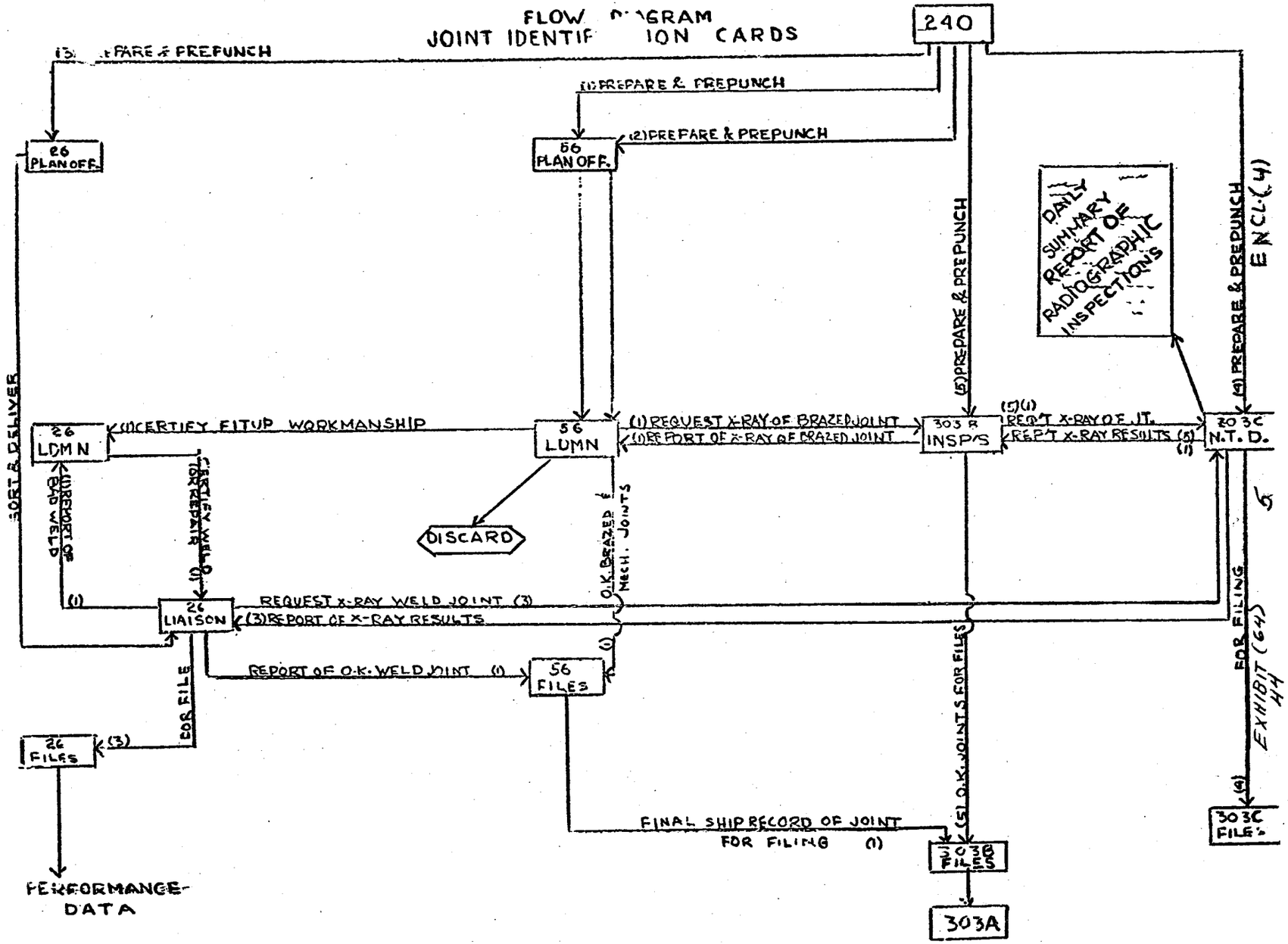

FLOW DIAGRAM
JOINT IDENTIFICATION CARDS
240
(3) PREPARE & PREPUNCH
(1) PREPARE & PREPUNCH
(2) PREPARE & PREPUNCH
26 PLAN OFF.
56 PLAN OFF.
(5) PREPARE & PRE PUNCH
DAILY SUMMARY REPORT OF RADIOGRAPHIC INSPECTIONS
(4) PREPARE & PREPUNCH ENCL. (4)
SORT & DELIVER
(1) CERTIFY FITUP WORKMANSHIP
26 LDMN
56 LUMN
(1) REQUEST X-RAY OF BRAZED JOINT
(1) REPORT OF X-RAY OF BRAZED JOINT
303 B INSPS
(5)(6) REP'T X-RAY OF E. JT.
REP'T X-RAY RESULTS (5)
20 3C N.T.D.
(1) CURRENT OR WELD
(1) CERTIFY FITUP
DISCARD
O.K. BRAZED & MECH. JOINTS
(1)
REQUEST X-RAY WELD JOINT (3)
(3) REPORT OF X-RAY RESULTS
26 LIAISON
FOR FILING
EXHIBIT (64)
REPORT OF O.K. WELD JOINT (1)
56 FILES
FOR FILE
26 FILES
(3)
(4)
30 3C FILES
(5) O.K. JOINTS FOR FILES
FINAL SHIP RECORD OF JOINT FOR FILING (1)
FILE 303B FILES
303A
PERFORMANCE-DATA

FIGURE 2

Copy-IFP

PRODEPT
INST 4410.4 (303)

PIPE JOINT IDENTIFICATION SYSTEM

Reference : (a) Design Division Instruction Sheet 3-61 of 7 June 61

(b) Process Instruction 200.6

1. Recent experience with piping systems aboard submarines has demonstrated the need for a method of unique identification for each joint. Design Procedures which will result in that identification are described in reference (a). This document furnishes a general review of the information which reference (a) furnishes in considerable detail.

2. An effective method of pipe joint identification is described in reference (b). However, that method requires the assignment of arbitary identifying numbers to each joint and also involves the preparation of weld identification drawings. The method of joint identification described herein is intended to supplant the method of reference (b) for those systems designated in paragraph 2 of the basic instruction and is considered to be more effective and useful. It operates by assigning joint numbers directly correlated with piping arrangement drawings. The latter method will gradually replace the former as piping drawings are issued in the required format.

3. Some modification to piping drawings is necessary for utilization of this system. The principal modification is the assignment of individual serial numbers for each fitting, flange, and similar component delineated in the body of the drawing. This serialization is accomplished by apending a serial number to the existing identifications. For example, each individual application of a fitting is numbered so that fittings appear as "F1-1, "F1-2", "F1-3, etc. This method of numbering has previously been utilized for pipe lines so that sections of pipe already appear as "P99-1", "P99-2, "P99-3", etc. "P" numbers are being assigned to all pipe nipples unless those nipples have already been assigned "F" numbers. Wherever such "F" numbers have been assigned, they are not changed.

4. The pipe joint is then identified by listing the two parts which the joint connects in the following fashion: "P99-3/F2-2", "P99-1/F16-1", "F16-1/F15-1". See Figure 1 for examples.

5. When the ship and piping drawing numbers are known, this pipe joint number provides unique identification since only one combination of fittings will be found to fulfill the identification. Further, these joint identification numbers can immediately be correlated with the component identification numbers which appear in the body of the piping drawings.

EXHIBIT (64)
45

JOINT IDENTIFICATION SYSTEM

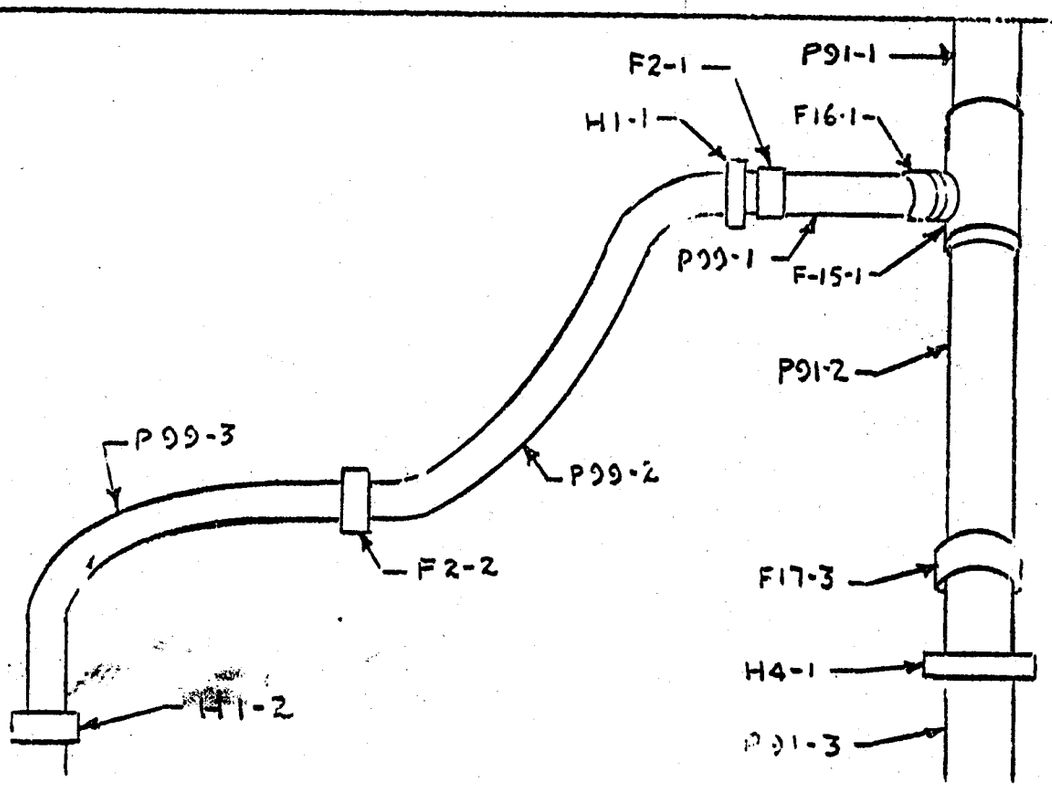


Figure (1)

NOTES: (1) Design Division will mark piping pieces and fittings using notations similar to those in the drawing above.

(2) The joint shall be designated by denoting "FITTING FITTING". For example, the joint between piece P99-3 and F2-2 shall be designated joint "P99-3/F2-2".

Exhibit(65)

JOINT CERTIFICATION CARD
IND-PNS-2036 (7-61)

SHIP	SYSTEM	PLAN NO.	JOINT IDENTIFICATION	X-RAY (1=360° 2=60°)

COMPT. / LOCATION	FRAME / SIDE	TYPE JOINT	MATERIAL PC1	MATERIAL PC2	PIPE NO.	PIPE O.D.	WALL THK.	APPROX LENGTH

EXAMINE ALL JOINTS FOR:

PIPE SIZE ☐

MATERIAL: PIPE ☐ FITTING ☐ ALLOY ☐

JOINT PREP. ☐ BUTT FIT ☐ ALIGNMENT ☐

CIRCULARITY ☐ SUPPORT ☐ CLEARANCE ☐

ADDITIONAL FOR MECHANICAL JOINTS

"O" RING OR GASKET ☐ "O" RING GROOVE ☐

BITE TYPE FERRULE ☐ MAKE-UP ☐

ADDITIONAL FOR WELDED JOINTS

FILLER METALS ☐ PRE-HEAT ☐

LIQ. PENETRANT ☐ INTERPASS ☐

CERTIFICATION

PIPEFITTER NO.

BRAZER NO.

COMPLETED, INSPECTED, AND CERTIFIED TO BE IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE –

SHOP 56 SUPERVISOR (Sign)

WELDER NO.

WELDER NO. (REPAIR)

WELDED IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE –

SHOP 26 SUPERVISOR (Sign)

ACCEPTED		
DEFECTS:	INITIAL	REPAIR NO.
1. SLAG FIT-UP		
2. POROSITY UNFUSED INSERT		
3. CRACK		
4. UNDERCUT POOR FLOW		
5. BURN THRU		
6. INSERT DEFECT		
7. TUNGSTEN		
8. OTHER		
REJECT		
RADIOGRAPHIC RESULTS		

SHIP	SYSTEM	PLAN NO.	JOINT PC1	JOINT PC2	X-RAY	X-RAY INIT.	X-RAY REP.
1 2 3	4 5 6	7 8 9 10 11 12 13	14 15 16 17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32 33 34	35	36	37

38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

MORLEY 18244

MORLEY 18243 *

RADIOGRAPHY REQUESTED BY:

X 26 ☐ X 56 ☐ CODE 303 B ☐

EXTENT OF RADIOGRAPHY DESIRED IF OTHER THAN SPECIFICATION: _____

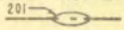
IN-PROCESS INSPECTION _____ INSPECTOR(SIGN) DATE

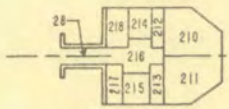
COMPLETION INSPECTION _____ INSPECTOR(SIGN) DATE

SS(N) 593 CLASS COMPT. NUMBERING SYSTEM

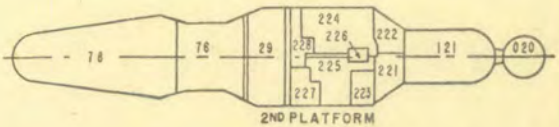
NO.	TITLE
020	Sonar Sphere
121	Crew & CPO Qtrs 2nd Plat
131	Sonar Equipment Room
133	Diesel Gen. Room
201	Bridge Access Trunk
210	Ship Control Center
211	Attack Center
212	Electronics Equip. Space
213	Nucleonics Laboratory
214	Radio Center
215	Sonar Control Center
216	Passageway
217	Storeroom (GSK)
218	Fan Room
221	Crews Quarters
222	Crews Washroom & W.C.
223	Galley
225	Crews Mess Room

NO.	TITLE
224	Officers' Quarters
226	Ship & Engineers Office
227	Refrigerated Storerooms
228	Storeroom (Dry Stores)
231	Crews Qtrs 3rd Plat
232	Torpedo Room
233	Air Regen. Room
241	Pump Room
242	Battery Compt.
28	Reactor Compt. Tunnel
29	Reactor Compt.
76	Aux. Mach. Room
77	Aux. Mach. Room
78	Engine Room U.L.
79	Engine Room L.L.
600	Outboard Profile
601	Fwd Escape Trunk
602	Aft Escape Trunk

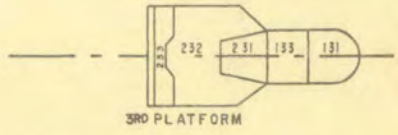




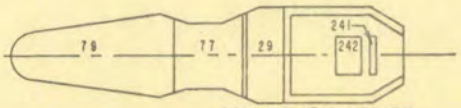
1ST PLATFORM



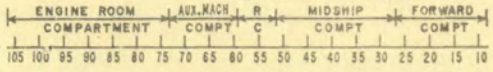
2ND PLATFORM



3RD PLATFORM



HOLD OR 4TH PLATFORM



JOINT CERTIFICATION CARD
IND-FNS-2039 (7-61)

SHIP	SYSTEM	PLAN NO.	JOINT IDENTIFICATION	X-RAY (I=360° 2=60°)

COMPT.	FRAME LOCATION	SIDE	TYPE JOINT	MATERIAL PC1	MATERIAL PC2	PIPE NO.	PIPE O.D.	WALL THK.	APPROX. LENGTH

EXAMINE ALL JOINTS FOR:

PIPE SIZE ☐

MATERIAL: PIPE ☐ FITTING ☐ ALLOY ☐

JOINT PREP ☐ BUTT FIT ☐ ALIGNMENT ☐

CIRCULARITY ☐ SUPPORT ☐ CLEARANCE ☐

ADDITIONAL FOR MECHANICAL JOINTS

"O" RING OR GASKET ☐ "O" RING GROOVE ☐

BITE TYPE FERRULE ☐ MAKE-UP ☐

ADDITIONAL FOR WELDED JOINTS

FILLER METALS ☐ PRE-HEAT ☐

LIQ. PENETRANT ☐ INTERPASS ☐

CERTIFICATION

PIPEFITTER NO.

BRAZER NO.

COMPLETED, INSPECTED, AND CERTIFIED TO BE IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE –

SHOP 56 SUPERVISOR (Sign)

WELDER NO.

WELDER NO. (REPAIR)

WELDED IN ACCORDANCE WITH PLAN AND SPECIFICATIONS DATE –

SHOP 26 SUPERVISOR (Sign)

ACCEPTED	INITIAL	REPAIR NO.
DEFECTS:		
1. SLAG FIT-UP		
2. POROSITY UNFUSED INSERT		
3. CRACK		
4. UNDERCUT POOR FLOW		
5. BURN THRU		
6. INSERT DEFECT		
7. TUNGSTEN		
8. OTHER		
REJECT		

RADIOGRAPHIC RESULTS

SHIP	SYSTEM	PLAN NO.	JOINT PC1	JOINT PC2	X-RAY	
					I-RAY	
					2-RAY	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

MORLEY 18244

RADIOGRAPHY REQUESTED BY:

X 26 ☐ X 56 ☐ CODE 303 B ☐

EXTENT OF RADIOGRAPHY DESIRED IF OTHER THAN SPECIFICATION: _____

IN-PROCESS INSPECTION _____ INSPECTOR(SIGN) DATE

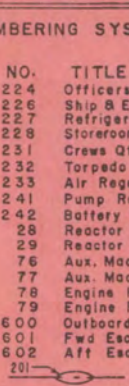
COMPLETION INSPECTION _____ INSPECTOR(SIGN) DATE

MORLEY 18243*

SS(N) 593 CLASS COMPT. NUMBERING SYSTEM

NO.	TITLE
020	Sonar Sphere
121	Crew & CPO Qtrs 2nd Plat
131	Sonar Equipment Room
133	Diesel Gen. Room
201	Bridge Access Trunk
210	Ship Control Center
211	Attach Center
212	Electronics Equip. Space
213	Nucleonics Laboratory
214	Radio Center
215	Sonar Control Center
216	Passageway
217	Storeroom (GSK)
218	Fan Room
221	Crews Quarters
222	Crews Washroom & W.C.
223	Galley
225	Crews Mess Room

NO.	TITLE
224	Officers' Quarters
226	Ship & Engineers Office
227	Refrigerated Storerooms
228	Storeroom (Dry Stores)
231	Crews Qtrs 3rd Plat
232	Torpedo Room
233	Air Regen. Room
241	Pump Room
242	Battery Compt.
28	Reactor Compt. Tunnel
29	Reactor Compt.
76	Aux. Mach. Room
77	Aux. Mach. Room
78	Engine Room U.L.
79	Engine Room L.L.
600	Outboard Profile
601	Fwd Escape Trunk
602	Aft Escape Trunk



JOINT CERTIFICATION CARD
IND-PNS-2036(7-61)

SHIP	SYSTEM	PLAN NO.	JOINT IDENTIFICATION	X-RAY (I= 360° 2=60°)

COMPT.	FRAME LOCATION	SIDE	TYPE JOINT	MATERIAL PC1	MATERIAL PC2	PIPE NO.	PIPE O.D.	WALL THK.	APPROX. LENGTH

EXAMINE ALL JOINTS FOR:

MATERIAL: PIPE ☐ FITTING ☐ ALLOY ☐ PIPE SIZE ☐

JOINT PREP. ☐ BUTT FIT ☐ ALIGNMENT ☐

CIRCULARITY ☐ SUPPORT ☐ CLEARANCE ☐

ADDITIONAL FOR MECHANICAL JOINTS

"O" RING OR GASKET ☐ "O" RING GROOVE ☐

BITE TYPE FERRULE ☐ MAKE-UP ☐

ADDITIONAL FOR WELDED JOINTS

FILLER METALS ☐ PRE-HEAT ☐

LIQ. PENETRANT ☐ INTERPASS ☐

CERTIFICATION

PIPEFITTER NO.

BRAZER NO.

COMPLETED, INSPECTED, AND CERTIFIED TO BE IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE-

SHOP 56 SUPERVISOR (Sign)

WELDER NO.

WELDER NO. (REPAIR)

WELDED IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE-

SHOP 26 SUPERVISOR (Sign)

ACCEPTED	INITIAL	REPAIR NO.
DEFECTS:		
1. SLAG FIT-UP		
2. POROSITY UNFUSED INSERT		
3. CRACK		
4. UNDERCUT POOR FLOW		
5. BURN THRU		
6. INSERT DEFECT		
7. TUNGSTEN		
8. OTHER		
REJECT		

RADIOGRAPHIC RESULTS

SHIP	SYSTEM	PLAN NO.	JOINT PC1	JOINT PC2	X-RAY	X RAY INT.	X RAY REP.
1 2 3	4 5 6	7 8 9 10 11 12 13	14 15 16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34	35	36	37

38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

TABCO TRADE MARK 664035-0

TABCO TRADE MARK 664023-0

RADIOGRAPHY REQUESTED BY:

X 26 ☐ X 56 ☐ CODE 303 B ☐

EXTENT OF RADIOGRAPHY DESIRED IF OTHER THAN SPECIFICATION: _____

IN-PROCESS INSPECTION _____ INSPECTOR(SIGN) _____ DATE

COMPLETION INSPECTION _____ INSPECTOR(SIGN) _____ DATE

SS(N) 593 CLASS COMPT. NUMBERING SYSTEM

NO.	TITLE
020	Sonar Sphere
121	Crew & CPO Qtrs 2nd Plat
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133	Diesel Gen. Room
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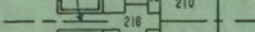
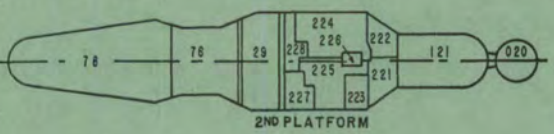
211	Attach Center
212	Electronics Equip. Space
213	Nucleonics Laboratory
214	Radio Center
215	Sonar Control Center
216	Passageway
217	Storeroom (GSK)
218	Fan Room
221	Crews Quarters
222	Crews Washroom & W.C.
223	Galley
225	Crews Mess Room

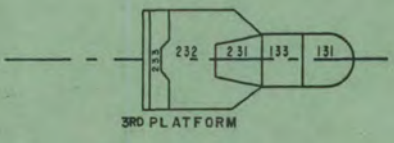
NO.	TITLE
224	Officers' Quarters
226	Ship & Engineers Office
227	Refrigerated Storerooms
228	Storeroom (Dry Stores)
231	Crews Qtrs 3rd Plat
232	Torpedo Room
233	Air Regen. Room
241	Pump Room
242	Battery Compt.
28	Reactor Compt. Tunnel
29	Reactor Compt.
76	Aux. Mach. Room
77	Aux. Mach. Room
78	Engine Room U.L.
79	Engine Room L.L.
600	Outboard Profile
601	Fwd Escape Trunk
602	Aft Escape Trunk



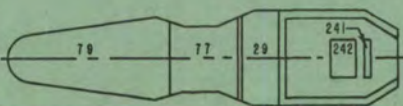
1ST PLATFORM



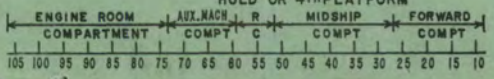
2ND PLATFORM



3RD PLATFORM



HOLD OR 4TH PLATFORM



SHIP	SYSTEM	PLAN NO.	JOINT IDENTIFICATION	X-RAY (I= 360° 2=60°)

COMPT.	FRAME LOCATION	SIDE	TYPE JOINT	MATERIAL PC1	MATERIAL PC2	PIPE NO.	PIPE O.D.	WALL THK.	APPROX. LENGTH

JOINT CERTIFICATION CARD
IND-PNS-2036(7-61)

EXAMINE ALL JOINTS FOR:

PIPE SIZE ☐

MATERIAL: PIPE ☐ FITTING ☐ ALLOY ☐

JOINT PREP. ☐ BUTT FIT ☐ ALIGNMENT ☐

CIRCULARITY ☐ SUPPORT ☐ CLEARANCE ☐

ADDITIONAL FOR MECHANICAL JOINTS

"O" RING OR GASKET ☐ "O" RING GROOVE ☐

BITE TYPE FERRULE ☐ MAKE-UP ☐

ADDITIONAL FOR WELDED JOINTS

FILLER METALS ☐ PRE-HEAT ☐

LIQ. PENETRANT ☐ INTERPASS ☐

CERTIFICATION

PIPEFITTER NO.

BRAZER NO.

COMPLETED, INSPECTED, AND CERTIFIED TO BE IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE-

SHOP 56 SUPERVISOR (Sign)

WELDER NO.

WELDER NO. (REPAIR)

WELDED IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE-

SHOP 26 SUPERVISOR (Sign)

ACCEPTED	INITIAL	REPAIR NO.
DEFECTS:		
1. SLAG FIT-UP		
2. POROSITY UNFUSED INSERT		
3. CRACK		
4. UNDERCUT POOR FLOW		
5. BURN THRU		
6. INSERT DEFECT		
7. TUNGSTEN		
8. OTHER		
REJECT		

RADIOGRAPHIC RESULTS

SHIP	SYSTEM	PLAN NO.	JOINT PC1	JOINT PC2	X-RAY	X RAY INIT.	X RAY REP.
1 2 3	4 5 6	7 8 9 10 11 12 13	14 15 16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34	35	36	37

38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

TABCO TRADE MARK 664036-0

TABCO TRADE MARK 664023-0

RADIOGRAPHY REQUESTED BY:

X 26 ☐ X 56 ☐ CODE 303 B ☐

EXTENT OF RADIOGRAPHY DESIRED IF OTHER THAN SPECIFICATION: _____

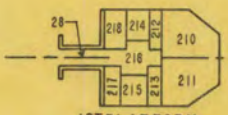
_____

IN-PROCESS INSPECTION _____ INSPECTOR(SIGN) DATE

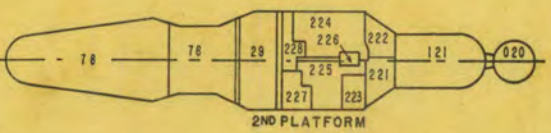
COMPLETION INSPECTION _____ INSPECTOR(SIGN) DATE

SS(N) 593 CLASS COMPT. NUMBERING SYSTEM

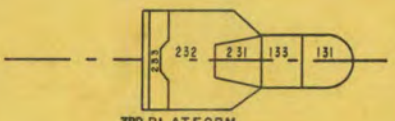
NO.	TITLE	NO.	TITLE
020	Sonar Sphere	224	Officers' Quarters
121	Crew & CPO Qtrs. 2nd Plat	226	Ship & Engineers Office
131	Sonar Equipment Room	227	Refrigerated Storerooms
133	Diesel Gen. Room	228	Storeroom (Dry Stores)
201	Bridge Access Trunk	231	Crews Qtrs 3rd Plat
210	Ship Control Center	232	Torpedo Room
211	Attach Center	233	Air Regen. Room
212	Electronics Equip. Space	241	Pump Room
213	Nucleonics Laboratory	242	Battery Compt.
214	Radio Center	28	Reactor Compt. Tunnel
215	Sonar Control Center	29	Reactor Compt.
216	Passageway	76	Aux. Mach. Room
217	Storeroom (GSK)	77	Aux. Mach. Room
218	Fan Room	78	Engine Room U.L.
221	Crews Quarters	79	Engine Room L.L.
222	Crews Washroom & W.C.	600	Outboard Profile
223	Galley	601	Fwd Escape Trunk
225	Crews Mess Room	602	Aft Escape Trunk



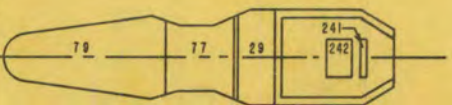
1ST PLATFORM



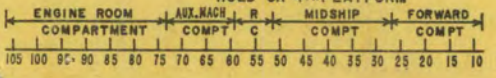
2ND PLATFORM



3RD PLATFORM



HOLD OR 4TH PLATFORM



SHIP	SYSTEM	PLAN NO.	JOINT IDENTIFICATION	X-RAY (I= 360° 2=60°)

COMPT.	FRAME LOCATION	SIDE	TYPE JOINT	MATERIAL PC1	MATERIAL PC2	PIPE NO.	PIPE O.D.	WALL THK.	APPROX. LENGTH

JOINT CERTIFICATION CARD
IND-PNS-2036(7-61)

EXAMINE ALL JOINTS FOR:

PIPE SIZE ☐

MATERIAL: PIPE ☐ FITTING ☐ ALLOY ☐

JOINT PREP. ☐ BUTT FIT ☐ ALIGNMENT ☐

CIRCULARITY ☐ SUPPORT ☐ CLEARANCE ☐

ADDITIONAL FOR MECHANICAL JOINTS

"O" RING OR GASKET ☐ "O" RING GROOVE ☐

BITE TYPE FERRULE ☐ MAKE-UP ☐

ADDITIONAL FOR WELDED JOINTS

FILLER METALS ☐ PRE-HEAT ☐

LIQ. PENETRANT ☐ INTERPASS ☐

CERTIFICATION

PIPEFITTER NO.

BRAZER NO.

COMPLETED, INSPECTED, AND CERTIFIED TO BE IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE-

SHOP 56 SUPERVISOR (Sign)

WELDER NO.

WELDER NO. (REPAIR)

WELDED IN ACCORDANCE WITH PLAN AND SPECIFICATIONS

DATE-

SHOP 26 SUPERVISOR (Sign)

ACCEPTED	INITIAL	REPAIR NO.
DEFECTS:		
1. SLAG FIT-UP		
2. POROSITY UNFUSED INSERT		
3. CRACK		
4. UNDERCUT POOR FLOW		
5. BURN THRU		
6. INSERT DEFECT		
7. TUNGSTEN		
8. OTHER		
REJECT		

RADIOGRAPHIC RESULTS

SHIP	SYSTEM	PLAN NO.	JOINT PC1	JOINT PC2	X-RAY	X RAY INIT.	X RAY REP.
1 2 3	4 5 6	7 8 9 10 11 12 13	14 15 16 17 18 19 20 21 22 23	24 25 26 27 28 29 30 31 32 33 34	35	36	37

38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

TABCO TRADE MARK 664037-0

RADIOGRAPHY REQUESTED BY:

X 26 ☐ X 56 ☐ CODE 303 B ☐

EXTENT OF RADIOGRAPHY DESIRED IF OTHER THAN SPECIFICATION: _____

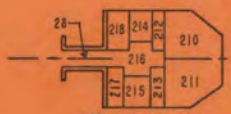
IN-PROCESS INSPECTION _____ INSPECTOR(SIGN) DATE

COMPLETION INSPECTION _____ INSPECTOR(SIGN) DATE

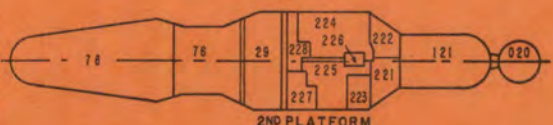
SS(N) 593 CLASS COMPT. NUMBERING SYSTEM

NO.	TITLE
020	Sonar Sphere
121	Crew & CPO Qtrs 2nd Plat
131	Sonar Equipment Room
133	Diesel Gen. Room
201	Bridge Access Trunk
210	Ship Control Center
211	Attach Center
212	Electronics Equip. Space
213	Nucleonics Laboratory
214	Radio Center
215	Sonar Control Center
216	Passageway
217	Storeroom (GSK)
218	Fan Room
221	Crews Quarters
222	Crews Washroom & W.C.
223	Galley
225	Crews Mess Room

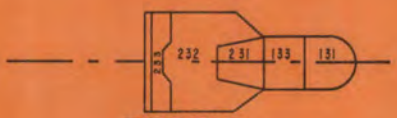
NO.	TITLE
224	Officers' Quarters
226	Ship & Engineers Office
227	Refrigerated Storerooms
228	Storeroom (Dry Stores)
231	Crews Qtrs 3rd Plat
232	Torpedo Room
233	Air Regen. Room
241	Pump Room
242	Battery Compt.
28	Reactor Compt. Tunnel
29	Reactor Compt.
76	Aux. Mach. Room
77	Aux. Mach. Room
78	Engine Room U.L.
79	Engine Room L.L.
600	Outboard Profile
601	Fwd Escape Trunk
602	Aft Escape Trunk



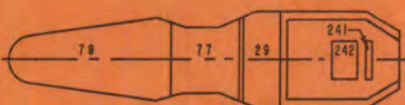
1ST PLATFORM



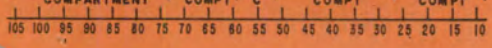
2ND PLATFORM



3RD PLATFORM



HOLD OR 4TH PLATFORM



(b) (6)

(1)

19 April 1962

MEMORANDUM

From: Foreman, Shop 56
To: All Supervisors

Subj: Extension of Integrated Joint Control to include Butt Welded Joints

Ref: (a) Memorandum from Foreman, Shop 56 of 10 Jan 1962

1. Effective May 1, 1962 all Shop 56 personnel will use Joint Identification Card NAVSHIPS 2056 (7-61) when presenting a butt joint to be welded.

2. In those instances where a pre-punched card is not available, cards #1 and #2 will be filled out by Shop 56 personnel as delineated in Ref. (a).

3. #1 card will be presented to the welder upon tacking and retained by Shop 56 until completion of joint, including radiography evaluation. #2 copy retained by cross quartermost.

4. Upon completion of joint, #1 card will be returned to initiating Shop 56 supervisor who will file with #2 copy and return to project quartermost.

5. This operating procedure will be applicable only to SS(N)665 and SSN(N)629 and does not include hatch systems.

(b) (6)

Exhibit (66)-1

(1)

10 January 1962

593
605
620
606
636

MEMORANDUM

From: Foreman, Shop 56
To: All Supervisors (SS(N)605)

Subj: Radiography of field brazed joints and control of all silbrazed joints

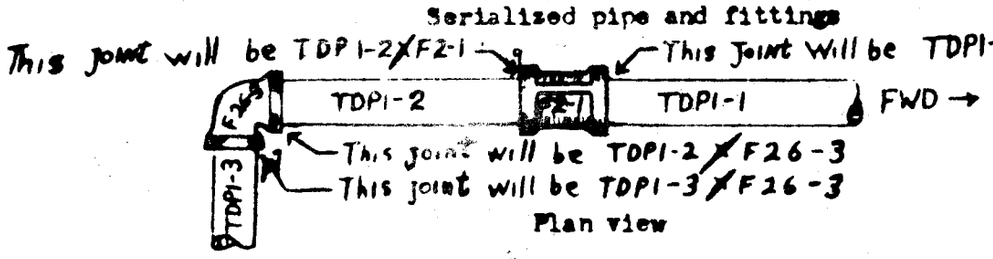
1. All Shop 56 supervisors on SS(N)605 will take immediate steps to make use of Joint Identification Card IND-PNB 2036 (7-61). This card will be used to request radiography of all field brazed joints 2.5" or larger on all systems which are or may be subjected to sea pressure (i.e., trim and drain, comp. water, fuel oil trans., etc.)

Supervisors will fill in #1 and #2 copies of this form and turn into field office. Shop [redacted] will maintain file of #2 copies, by plan number, and forward #1 copy to Code 303C. PRODEPT INST 4410.4 states Code 303 will return #1 copy to shop for filing purposes. #1 copy will not be filed until forwarded to Mr. A. S. Howard for initials of instigating supervisor; this will insure that supervisors are aware that joint has been accepted and that #2 copy will be removed from the active file.

All off shift supervisors will leave their cards on Mr. Howard's desk for filing and forwarding.

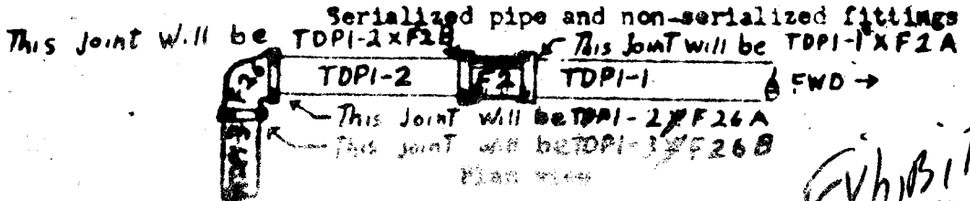
In order that we will have a uniform method of identification all supervisors will number joints on Joint Identification Card as indicated below. Where pipe is serialized and fittings are serialized identification presents no problem. Where pipe is serialized and fittings not or where neither is serialized we will use method illustrated. Fittings not serialized will use A end to B end.
A will indicate FWD, UP and STBD.
B will indicate AFT, DOWN and PORT.

Serialized pipe and fittings



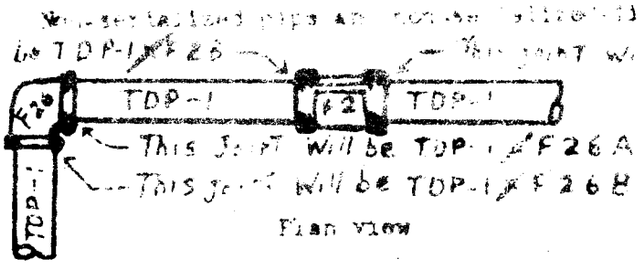
Plan view

Serialized pipe and non-serialized fittings



Plan view

EXHIBIT (64)



Even though we end up with the same joint number, the location indicated on the identification card will serve as further identification. This is, after all, only an inverin system.

All supervisors will attach a white tag, with appropriate number, next to joint. Black tape as indicated in M-10.4 will be used. This tag will assist X-ray and Code 303 in locating joint to be evaluated.

2. All Shop 56 supervisors will take immediate action to use Joint Identification Cards IND-PMS 2036 (7-61) in lieu of IND-PMS 123 (4-61) now in use. The same method of identification will be used as noted above for field braze joints. It will only be necessary to use #1 card for braze joints not requiring X-ray. #1 copy when completed will be sent to Mr. Howard for filing purposes.

Effective date 1/15/62.

This will be cancelled as Joint Identification Cards become available.

(b) (6)

EXHIBIT (56)3

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

MEB

303B-2
SS(N)593/9480
17 Apr 1963

MEMORANDUM

From: 303B-2
To: 303

Subj: USS THRESHER (SS(N)593); Sea Water Systems Sil-Brazed Joints, Inspection of

Ref: (a) J. O. 15-930-90393
(b) BUSHIPS Ltr SS(N)593 C1/593 Ser 525-0232 of 28 Aug 1962
(c) COMSUBLANT Ltr 9480/SS(N)593 Ser; Dep 402/N6544 of 7 Sep 1962
(d) Code 303B-2 Memo 303B-2-SS(N)593/9480 of 29 Nov 1962
(e) Code 213X/SS(N)593/9480 of 4 Dec 1962

1. A visual and ultrasonic inspection was accomplished on the subject systems in accordance with reference (a), (b) and (c). The results of this survey were submitted to Code 213 on 29 November 1962, reference (d).

2. Code 213X answer to reference (d), reference (e), stated no further inspection was to be accomplished.

3. A detailed summary of the inspection accomplished shown in table below.

Plan	System	Joints Accepted U.T. Insp	** Visual Insp	Joints Rejected By U.T.	New Joints Installed
1862606	ASW Fwd	12	8	1	22
1862775	T & D	14	0	3	*6
1862776	T & D	17	0	4	11
1862780	T & D	21	0	2	5
1862782	T & D	28	11	4	10
1862892	8000 GPD Still	33	26	6	13
	Totals	125	45	20	67

* Five (5) of these replaced joints were changed to electric welded joints.

** Joints listed as visually inspected were found satisfactory according to NAVSHIPS 250-648-8. An attempt to ultrasonically inspect these joints was unsuccessful due to inaccessibility of the joints.

Exhibit 67(1)

4. Plan 1862776 shows one sil-braze flange, FL-2 on tank side of hull valve TD.21, and five sil-braze fittings between hull valve TD 21 and Back-up valves TD 19 and TD 20.

5. Plan 1862782 shows welded fittings in drain pump suction line, P-54. A visual inspection of P-54 from strainer, FTD-1 to the suction side of drain pump revealed these fittings to be sil-brazed.

6. An air sealing test on MBT 3A, prior to undocking revealed 4 sil-brazed joints in fuel filling line P-39, Plan 1862805 and 2 sil-brazed joints on L.O. filling line P-1, Plan 1862638, were leaking. These six joints were replaced, then ultrasonically tested and hydrostatically tested.

(b) (6)

Copy to:
303B-2

Exhibit 67

SHIPBOARD TEST MEMORANDUM
NSD-PSD-5200 (Rev. 1-61)

PORTSMOUTH NAVAL SHIPYARD

TEST PHASE DOCKSIDE TEST NO. SS(N)593-S01 10 005 REV. A

VESSEL (S)	USS THRESHER (SS(N)593)

TITLE

FLEXIBLE CONNECTIONS - POST INSTALLATION INSPECTION

PREPARED BY	FUNC. DEPT.	ORIGINATING ACTIVITY (Name and Code)	DATE
JWS	(b) (6)		10-28-62
CHECKED BY	TECHNICAL REVIEW	DESIGN ORGN. (Name and Code)	
	(b) (6)	(b) (6)	

REV. STUBS

REV.	REVISION	APPROVED	DATE	DEL.	REVISION	APPROVED	DATE
A	TO AGREE WITH REV A OF SELECTED RECORD PLAN	JFL RCH.	2/6/63				

ISSUE RECORDS

REV.	SE							DoE	303B	260F	CO593	245S3	CNASN	MARE	EB DN	NYSB	INSNY	340A	3T7B	313	244B	2302T	J. O. NUMBER	ESTIMATOR	DATE
	12	4	6					2	6	6	2	✓	✓	✓	✓	✓	✓	1	2	2	1 MM 5	2	16-930-20925	288	10-24-62
A	12	4	6					2	6	6	2	✓	✓	✓	✓	✓	✓	1	2	2	1 MM 5	2	16-930-20925	288	2-11-63

TEST PERFORMANCE

FUNCTION	ASSIGNMENT	COMPLETION	
		SIGNATURE	DATE
TEST PREPARATION & [illegible] READINESS REV BOP			
[illegible] BOARDS			

REMARKS

Proofread by JJ - 4/12/63

EXHIBIT (68)
1 sheet w/ 36 pages

For additional copies of navy standard forms see [illegible] Publication 409

SS(N)593-001 10 005 A

FLEXIBLE CONNECTIONS - POST INSTALLATION INSPECTION

1. REFERENCES

1.1 PTSMH NAVSHIPYD Process Instruction 1004.5 Selection, Assembly and Inspection (Shop) of Rubber Hose-type Flexible Connections

1.2 PTSMH NAVSHIPYD Process Instruction 1004.6 Installing Resilient Mounts and Flexible Hose Connections

BACKGROUND

There are many types of flexible piping connections installed on nuclear submarines, the most common being rubber hose. Metallic hose, teflon hose, EB and PMS type joints and coiled pipe are also used as flexible pipe connections. The increasing number of flexible connection applications has made it necessary to issue a Flexible Connection Selected Record Plan (for SS(N)593 and subsequent ships) listing all connections on board. This test memorandum has been generated from the data compiled in the selected record drawing. Item numbers in the test memorandum correspond to the item numbers in the selected record plan.

2. PURPOSE

The purpose of these tests is to assure satisfactory installation by checking each flexible piping connection and associated documents for the following:

2.1 Certification

2.2 Properly Tagged

2.3 Sufficient Shock Clearance

2.4 Proper Support

2.5 Proper Alignment

2.6 Proper Bend Radius and Length

2.7 Proper Lay Line

2.8 General Condition Satisfactory

EXHIBIT (68)
2

3. EQUIPMENT

3.1 Steel Scale graduated in 1/64"

3.2 Outside calipers

3.3 Telescoping gages

3.4 Micrometer

4. TESTS

Satisfactory completion of each of the following inspections shall be indicated by a check mark (✓) or "OK" and certified by the Inspector's dated signature in the appropriate column of the Data Sheet. *

4.1 Assembly Certification

The majority of flexible piping connections are assembled by the Shipyard at Shop 56 or 31, depending upon the style. Each hose assembly made at Shop 56 should have a HOSE ASSEMBLY RECORD CARD. Record the number of this card in the column on the Data Sheet headed CERTIFICATION, to indicate that this card has been checked for proper entries and certification by signature. Vendor and E. B. supplied assemblies will not have these ASSEMBLY RECORD cards. However, the CERTIFICATION column of the data sheets shall be checked to indicate that the proper material has been provided for such assemblies.

4.2 Tagging

Each hose-type flexible connection shall have an identification tag as specified in paragraph 3.b(1)(g) of reference 1.1.

4.3 Shock Clearance

Determine by visual inspection that sufficient clearance exists to prevent the connection assembly from striking the ship's structure or any other fixed equipment, during maximum shock deflection. The ends of connections attached to resilient mounted equipment, should have at least the same amount of clearance as that of the mounted equipment itself.

4.4 Support

Determine that each flexible piping connection assembly is properly supported with resilient mount hangers as specified on applicable working drawings.

4.5 Alignment

Determine that each flexible connection assembly has been properly aligned as outlined in paragraph 4.g(2) of reference 1.2.

* Notify Code 2305 for inspection of Items 654, 655, 658, 659, 662, 663, 664, and 665.

EXHIBIT (18)
3

591-001 10 005 A

4.6 Bend Radius and Length (for Hose Assemblies only)
Determine, by actual measurement as necessary, that the minimum bend radius and minimum free length of the hose are not less than that specified in Table I of reference 1.1.

4.7 Lay Line (for Hose Assemblies Only)
Determine that the hose has not been twisted during installation by using the lay line as a guide (see Figure 9 of reference 1.1).

4.8 General Overall Condition
Determine by an overall visual inspection that the general condition of each assembly is satisfactory. There shall be no evidence of cuts, bruises or other marks of abuse that might jeopardize the integrity of the assembly. No assemblies shall be deliberately painted. A few drops of splashed paint shall not be cause for replacement nor shall any attempt be made to clean off dried paint from any hose.

* ITEMS INDICATE PAINT

C-3

TECHNICAL INFORMATION BULLETIN
NAVAIR 4-1 (Rev 3-58) MATERIALS TEST AND LABORATORY

AEROQUIP HOSE on be(B)593) *	J-101	19 Mar 1963
- - -	CAPT (b) (6)	310
- - -	- - -	

* examine hose installations which have been painted, obtain paint samples for identification, and determine if the paint is deleterious to the hose installations.

310	LT (b) (6) (2)						3930-1 File

Illegible Copy Provided

1. Aeroquip hose installations in various systems aboard AS(N)593 were inspected by Messrs. Felps and Thomas, Rubber Technicians, accompanied by Mr. E. Pate of Code 3930-1. Many of the installations observed had been subjected to paint overspray and were only partially coated in spotty fashion. A few hose installations were almost completely paint coated and several charred Teflon hoses were heavily caked.

2. It is [illegible] Illegible Copy Provided the paint could [illegible] possibly affect performance of the hose [illegible] Illegible Copy Provided

3. [illegible] paint [illegible] from various hose installations for analysis. Upon [illegible] observations, paint were negative. By [illegible] it is concluded that the paint coating is POR-15. The Master Painters [illegible]

4. The Laboratory's experience is that POR-15 paint is fully compatible with synthetic rubber and should have no weakening or deteriorative effects on them except in the case of [illegible] where heavy paint installations may produce [illegible]

5. It is the Laboratory's conclusion that the paint coatings on Aeroquip hoses aboard [illegible] will have no harmful effects.

(b) (6)

Head, Polymers Research Section

EXHIBIT (42)
4

SYSTEM INDEX

SYMBOL	DESCRIPTION	STARTING ITEM NO.
ABT	Ballast Tank Blow System	169
AHP	High Pressure Air System	164
AHPC	High Pressure Air Comp Cooling	574
ALP	Low Pressure Air System	153 & 204
AS	Auxiliary Steam System	636
ASW	Auxiliary Sea Water System	038
C	Condensate System	493
CG	Capacity Gage System	167
COS	CO_2 Scrubber System	771
CW	Air Conditioning Chilled Water System	001
DINST	Diesel Instrumentation	378
D.O.	Diesel Fuel Oil	400
EB	Emergency Breathing System	146
EC	Electronic Cooling System	668
FWDC	Fresh Water Drain & Collecting System	538
GREAS	Greasing System	610
GS	Gland Seal & Exhaust System	639
HE	External Hydraulic System	364
HMV	Main & Vital Hydraulic System	233
HPAC	HP Air Compressor Instrumentation	618
HPSD	High Pressure Steam Drain System	645

EXHIBIT (69)

SYMBOL	DESCRIPTION	STARTING ITEM NO.
HSD	Steering & Diving Hydraulic System	175
LB	Lithium Bromide System	133
L.O.	L.O. Purification & Trans	407
LOS	Main Lube Oil System	418
MGLO	MG Lube Oil System	475
MS	Main Steam System	631
O	Oxygen System	170
PINST	Propulsion Instrumentation	557
RAC	Freon Refrigeration & Air Conditioning	117
RC	Reactor Fresh Water Cooling System	654
SD	Steam Distiller System	581
SGF	Feed Water System	662
SLO	Shaft Lube Oil System	444
SNKIM	Snorkel Induction System	112
SSLO	SSTG Lube Oil System	452
TD	Trim and Drain System	781
VD	Vapor Compression Distiller System	600

REVISION LEGEND

A — Alteration shown herein as indicated by underscore
A — No underscoring - new item added
Ⓐ — Alteration shown on Selected Record Plan only
Ⓐ — Alteration shown herein as indicated by underscore plus information shown on Selected Record Plan only.

EXHIBIT (68)
6

IND-PNS-1895 (REV 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

SS(N)593-Sol 10 005
TEST NO ..... REV. A
PAGE.. 6 .....

SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PHS / OTHER	DASH SIZE | LGTH-INCH SIZE IPS / SIZE	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
A	001	CW	1862713	F84-1	CW TO NO 2 RECIP PLANT CHILLER	80S	150901	-64 30	✓	✓	✓	✓	✓	✓	–	–	B. Wentworth 5-13
A	002	CW	1862713	F85-1	CW TO NO 1 RECIP PLANT CHILLER	80S	150901	-64 30									
✓	003	CW	1862713	F86-1	CW FROM NO 1&2 RECIP PLANTS	77S	2758	-80 36									
✓	004	CW	1062713	F87-1	CW PUMP SUCT LI-BR PLANT	77P	2758	-80 36									
✓	005	CW	1865713	F88-1	CW PUMP DISCH LI-BR PLANT	76P	2758	-80 36									
✓	006	CW	1862713	F89-1	CW TO PURGE TK COOL LI-BR PLT	78P	2651	-16 24									
✓	007	CW	1862713	F89-2	CW FROM PURGE TK COOL LIBR PLT	78P	2651	-16 24									
✓	008	CW	1862713	F90-1	CW CONT VENTS 1&2 RECIP PLANTS	78S	2651	- 8 18									
✓	009	CW	1862713	F91-1	CW PUMP SUCT GAGE NO 1 PLANT	77S	2651	- 8 18									
✓	010	CW	1862713	F91-2	CW PUMP SUCT GAGE NO 2 PLANT	77S	2651	- 8 18									
✓	011	CW	1862713	F91-3	CW PUMP DISCH GAGE NO 1 PLANT	77S	2651	- 8 18									
✓	012	CW	1862713	F91-4	CW PUMP DISCH GAGE NO 2 PLANT	77S	2651	- 8 18									
	013																
	014																
	015																
A	016	CW	1862714	F52-1	CW TO PHOTO DOSIMETRIC UNIT	40P	2651	- 8 12									INACCESSIBLE
A	017	CW	1862714	F52-2	CW FROM PHOTO DOSIMETRIC UNIT	40P	2651	- 8 12									
✓	018	CW	1862714	F52-3	CW TO RADIO CTR SCUT BUTT CLR	44P	2651	- 8 12									
✓	019	CW	1862714	F52-4	CW FR RADIO CTR SCUT BUTT CLR	44P	2651	- 8 12									
✓	020	CW	1862714	F54-1	CW TO HYDRO BURN UPPER COIL	47P	2651	-16 24	✓	✓	✓	✓	✓	–	–	–	E.J.C. 3-14
✓	021	CW	1862714	F54-2	CW TO HYDRO BURN LOWER COIL	47P	2651	-16 24	✓	✓	✓	✓	✓	–	–	✓	
✓	022	CW	1862714	F54-3	CW FROM HYDRO BURN UPPER COIL	47P	2651	-16 24	✓	✓	✓	✓	–	–	–	*	
✓	023	CW	1862714	F54-4	CW FROM HYDRO BURN LOWER COIL	47P	2651	-16 24	✓	✓	✓	✓	✓	–	–	–	
✓	024	CW	1862714	F55-1	CW TO CREWS MESS SCUT BUTT CLR	39P	2651	- 8 24	✓	✓	✓	✓	✓	✓	✓	✓	INACCESSIBLE
✓	025	CW	1862714	F55-2	CW FR CREWS MESS SCUT BUTT CLR	39P	2651	- 8 24	✓	✓	✓	✓	✓	✓	✓	✓	INACCESSIBLE
	026	CW	1862714	F56-1	PUMP DISCH PHOTO DOSOMETRIC UT	40S	2651	- 8 18	✓	✓	✓	–	–	–	–	–	EJC. 3-14

EXHIBIT 7 (68)

IND-PNS-1895 (NEW 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

SSN 593-501 10005
TEST NO .....REV.....
PAGE. 7

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / SIZE IPS / SIZE	LGTH. INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	027									✓	✓	✓	✓	✓	—	✓	—	EJC. 3-15
✓	028 ✓									✓	✓	✓	✓	✓	✓	✓	—	
✓	029 ✓									✓	✓	✓	—	✓	—	—	—	
	030																	
	031																	
	032																	
✓	033									✓	✓	✓	✓	✓	—	—	—	EJC. 3-16
✓	034									✓	✓	—	✓	—	—	—	—	
	035																	
	036																	
	037																	
✓	038									✓	✓	✓	✓	✓	—	—	—	B. Wentworth 3-10
✓	039									✓	✓	✓	✓	✓	—	—	—	
✓	040									✓	—	—	—	—	—	—	—	
✓	041									✓	—	—	/	—	—	—	—	
✓	042									✓	—	—	—	—	—	/	/	
✓	043									✓	—	—	—	—	—	—	—	
	044																	
	045																	
	046																	
	047																	
	048																	
	049																	
	050																	
✓	051									✓	✓	✓	✓	—	—	—	—	EJC 3-19
✓	052									—	—	—	—	—	—	—	—	

b(3) 10 USC 130

EXHIBIT (68)

IND-PNS-1895 (NEW 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR F/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / SIZE IPS / SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LATH PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	053	b(3) 10 USC 130								✓	✓	✓	✓	✓	✓	✓	✓	C. White 3-4
✓	054									✓	✓	✓	✓	✓	✓	✓	✓	
✓	055									✓	✓	✓	✓	✓	✓	✓	✓	EJC 3-18
✓	056									✓	✓	✓	✓	✓	✓	✓	✓	C White
(A) ✓	057									✓	✓	✓	✓	✓	✓	✓	✓	3-4
(A) ✓	058									✓	✓	✓	✓	✓	✓	✓	✓	
	059									✓	✓	✓	✓	✓	✓	✓	✓	EJC 3-18
	060									✓	✓	✓	✓	✓	✓	✓	✓	
	061									✓	✓	✓	✓	✓	✓	✓	✓	
	062									✓	✓	✓	✓	✓	✓	✓	✓	
	063																	
	064																	
	065																	
	066									✓	✓	✓	✓	✓	✓	✓	✓	EJC Cato 3-19
	067									✓	✓	✓	✓	✓	✓	✓	✓	
	068									✓	✓	✓	✓	✓	✓	✓	✓	
	069									✓	✓	✓	✓	✓	✓	✓	✓	
✓	070									✓	✓	✓	✓	✓	✓	✓	✓	
✓	071									✓	✓	✓	✓	✓	✓	✓	✓	
✓	072									✓	✓	✓	✓	✓	✓	✓	✓	
✓	073									✓	✓	✓	✓	✓	✓	✓	✓	
✓	074									✓	✓	✓	✓	✓	✓	✓	✓	
✓	075									✓	✓	✓	✓	✓	✓	✓	✓	
✓	076									✓	✓	✓	✓	✓	✓	✓	✓	JFM 3-19
✓	077									✓	✓	✓	✓	✓	✓	✓	✓	Kalef 3-15
✓	078									✓	✓	✓	✓	✓	✓	✓	✓	JFM 3-19

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FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER: ES/PNS / OTHER	DASH SIZE: SIZE IPS / SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1	TAGGING PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. BND. R LGTH PAR. 4.6	LAY LINE PAR. 4.7	CORROSION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	079	b(3) 10 USC 130								✓	✓	✓	✓	✓	C	C	C	OPNAV
	080																	
	081																	
	082																	
✓	083									✓	✓	✓	✓	✓	—	—	—	Kahn 3-15
✓	084									✓	✓	✓	✓	✓	—	—	—	Brook 3-15
✓	085									✓	✓	✓	✓	✓	—	—	—	Cote 3-15
✓	086									✓	✓	✓	✓	✓	✓	✓	✓	Kahn 3-15
	087																	
✓	088									✓	✓		✓	✓	✓	✓	✓	JK 3-12
✓	089									✓	✓	✓	✓	✓	✓	✓	✓	↓
✓	090									✓	✓	✓	✓	✓	✓	✓	*	
✓	091									✓	✓	✓	✓	✓	✓	✓	*	
✓	092									✓	✓	✓	✓	✓	✓	✓	*	
✓	093									✓	✓	✓	✓	✓	✓	✓	✓	J.K 3-12
	094									✓	✓	✓	✓	✓	✓	✓	✓	↓
✓	095									✓	✓	✓	✓	✓	✓	✓	✓	
	096									✓	✓	✓	✓	✓	✓	✓	✓	EJC 3-15
	097									✓	✓	✓	✓	✓	✓	✓	✓	↓
	098									✓	✓	✓	✓	✓	✓	✓	✓	
	099									✓	✓	✓	✓	✓	✓	✓	✓	
	100																	
	101																	
	102																	
	103																	
	104																	

IND-PNS-1895 (NEW 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

SS(N)593-501 10 005
TEST NO .....REV..A....
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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS / OTHER	DASH SIZE / LGTH. INCH SIZE IPS / SIZE	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	105																
	106																
	107																
	108																
	109																
	110																
	111																
(A)	112	SNKLM	1863326		INDUCTION HEAD VALVE AIR-OPEN	-28C	R HOSE	DASH10	✓	✓	✓	—	—	—	—	—	Eye 3-31
(A)	113	SNKLM	1863326		INDUCTION HEAD VALVE AIR-SHUT	-28C	R HOSE	DASH10	✓	—	—	—	—	—	—	—	
	114																
	115																
	116																
	117	RAC	1862726	F2-1	NO 1 COMPRESSOR SUCT /HORIZ/	63S	M-HOSE	13/80D	✓	✓	✓	✓	✓	—	—	—	
	118	RAC	1862726	F2-2	NO 1 COMPRESSOR SUCT /VERT/	63S	M-HOSE	13/80D		✓	—	—	—	—	—	—	Eye 3-19
	119	RAC	1862726	F2-3	NO 2 COMPRESSOR SUCT /HORIZ/	64P	M-HOSE	13/80D	✓	✓	✓						
	120	RAC	1862726	F2-4	NO 2 COMPRESSOR SUCT /VERT/	64P	M-HOSE	13/80D		✓	—	—	—	—	—		LAGGED
	121	RAC	1862726	F15-1	NO 1 COMPRESSOR DISCH /HORIZ/	63S	M-HOSE	11/80D			—	—	—	—	—	—	
	122	RAC	1862726	F15-2	NO 1 COMPRESSOR DISCH /VERT/	63S	M-HOSE	11/80D			—	—	—	—	—	—	
	123	RAC	1862726	F15-3	NO 2 COMPRESSOR DISCH /VERT/	64P	M-HOSE	11/80D	✓	✓	✓	✓	✓	—	—	*	
	124	RAC	1862726	F15-4	NO 2 COMPRESSOR DISCH /HORIZ/	64P	M-HOSE	11/80D	✓	✓	✓	✓	✓	—	—	*	
	125	RAC	1862727	F60-1	GAS SUCTION MAIN FROM COOL RM	47S	M-HOSE	11/41N	✓	✓	—	—	—	—	—	—	Eye 3-15
	126	RAC	1862727	F61-1	DEFROST MAIN FROM COOL RM	47S	M-HOSE	3/41N	—	—	—	—	—	—	—	—	
	127	RAC	1862727	F62-1	LIQUID MAIN FROM COOL RM	47S	M-HOSE	1/21N	—	—	—	—	—	—	—	—	
	128	RAC	1862727	F63-1	LIQUID TO ICE CUBER	37S	M-HOSE	3/80D									INACCESSIBLE
	129	RAC	1862727	F64-1	GAS SUCT FROM ICE CUBER	37S	M-HOSE	5/80D									
	130																

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SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE / LGTH. INCH SIZE IPS SIZE	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	131																
	132																
A	133	LB	16N14119	PC 9	PURGE TK DISCH TO PURGE FILTER	78P	R-HOSE	DASH20									
A	134	LB	16N14119	PC 12	ABSORBER PUMP SUCT	77P	R-HOSE	DASH48	✓	✓	✓	✓	✓	✓	✓	✓	E&C 3-19
A	135	LB	16N14119	PC 13	ABSORBER PUMP DISCH	77P	R-HOSE	DASH32	✓	✓	✓	✓	✓	✓	✓	✓	
A	136	LB	16N14119	PC 14	GENERATOR PUMP SUCT	75P	R-HOSE	DASH48	✓	✓	✓	✓	✓	✓	✓	✓	
A	137	LB	16N14119	PC 15	GENERATOR PUMP DISCH	75P	R-HOSE	DASH24	✓	✓	✓	✓	✓	✓	✓	✓	
A	138	LB	16N14119	PC 16	REFRIGERANT PUMP SUCT	77P	R-HOSE	DASH64	✓	✓	✓	✓	✓	✓	✓	✓	
A	139	LB	16N14119	PC 17	REFRIGERANT PUMP DISCH	77P	R-HOSE	DASH40	✓	✓	✓	✓	✓	✓	✓	✓	
A	140	LB	16N14119	PC 18	PURGE PUMP SUCT	77P	R-HOSE	DASH32	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ	141	LB	16N14119	PC 19	PURGE PUMP DISCH	77P	R-HOSE	DASH24	✓	✓	✓	✓	✓	✓	✓	✓	
A	142	LB	16N14119	PC 20	SEAL WATER PUMP SUCT	75P	R-HOSE	DASH24	✓	✓	To Be Replaced By W246-8						
A	143	LB	16N14119	PC 21	SEAL WATER PUMP DISCH	75P	R-HOSE	DASH16	✓	✓	✓	✓	✓	✓	✓	✓	E&C 3-19
A	144	LB	16N14119	PC 22	GENERATOR PUMP SEAL WATER DISC	76P	R-HOSE	DASH16	✓	✓	✓	✓	✓	✓	✓	✓	
A	145	LB	16N14119	PC 60	JET EXHAUSTER SUCT	78P	M-HOSE	11/2IN		To Be Replaced By							Vendor
	146	EB	2103364	F29	EMER BREATHING AIR TO CR QTRS	38-40S	1508	-16 36		NOT			INSPECTED				
✓	147	EB	2103364	F29	EMER BREATHING AIR TO CR QTRS	45-46P	1508	-16 36		1			4				
A	148	EB	1862816	F218	EMER BREATHING FWD CREWS QTRS	18-19P	1508	-16 22	✓	✓	✓	✓	✓	✓	✓	*	REF. 3-17
A	149	EB	1862816	F218	EMER BREATHING FWD CREWS QTRS	21-22S	1508	-16 22	Not	Inspected							
A	150	EB	2103376	F66	EB AIR TO RADIO & SONAR CTRS	43-45P	1508	-16 26	✓	✓	✓	✓	✓	✓	✓	✓	J.K. 3-16
A	151	EB	2103376	F66	EB AIR PASS RADIO & SONAR CTRS	44-45S	1508	-16 26	✓	✓	✓	✓	✓	✓	✓	✓	↓
A	152	EB	2103376	F68	EB AIR PASS RADIO & SONAR CTRS	43-44P	1508	-12 20									INACCESSIBLE
✓	153	ALP	2103364	F29	b(1)												[redacted] Portable Hose
✓	154	ALP	2103364	F50					✓	✓	✓	✓	✓	✓	✓	✓	SDM 3-17
* A	155	ALP	1862815	F221					✓	✓	✓	✓	✓	✓	✓	✓	T.B 3-18
A	156	ALP	1862816	F-45	250LB START AIR AUX DIESEL ENG	23-24P	1529	-20 24	✓	✓	✓	✓	✓	✓	✓	✓	J.K -3-17

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER FSG/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH PAR. 4.6	LAY LINE PAR. 4.7	CORROSION PAR. 4.8	INSPECTORS SIGNATURE & DATE
A	157	ALP	1862816	F179	250LB START AIR AUX DIESEL ENG	23-24P	1529	-20	24	✓	✓	✓	✓	–	–	–	–	JK- 3-14
A ✓	158	ALP	1862816	F218	b(1)					✓	✓	✓	✓	–	–	–	*	R&L 3-13
A ✓	159	ALP	2103376	F66	100LB AIR SNRK HD VLV OPER AIR	37-38P	1508	-16	26	✓	✓	NOT	INSPECTED					NOT Complete
A	160	ALP	2103376	F66	350LB AIR SNRK HD VLV CONT VLV	37-38P	1508	-16	26	✓	✓			✓	–	–		NOT Complete
A	161	ALP	2103376	F66	AIR EMER TRANS HYD SHIPS CONT	32P	1508	-16	26	✓	✓	✓	✓	✓	✓	✓	✓	Brooks 3-13
A	162	ALP	2103376	F66	AIR EMER TRANS HYD SHIPS CONT	30-31P	1508	-16	26	✓	✓	✓	✓	–	–	–	–	
A	163	ALP	1862821	F75	AIR EMER TRANS HYD SHIPS CONT	99-100	1508	-16	26	✓	✓	✓	✓	✓	✓	✓	*	PAINTED
	164	b(3) 10 USC 130								✓	✓	✓	✓	✓	✓	–	–	OK 3-14
A	165									✓	✓	✓	✓	✓	✓	✓	✓	Brooks 3-20
A ✓	166	b(1)								✓	✓	✓	–	–	–	–	–	Brooks 3/20
A	167	CG	2103376	F68	GAGE LINE DEPTH TO KEEP SHALLO	31-32P	1508	-12	20	✓	✓	–	–	–	–	–	✓	
A	168	CG	2103376	F68	GAGE LINE DEPTH TO KEEP MAX	32P	1508	-12	20	✓	✓	✓	✓	✓	✓	✓	✓	J.K 3-15
	169	ABT	1862816	F3	DISCHARGE LP BLOWER	23-24S	R-HOSE	6	INCH	✓	✓	✓	✓	✓	✓	✓	✓	
	170	O	1862661	P3	FROM BANK TO REPLENISH. PNL	19P	PIPE	1/2	IN	✓	✓	✓	✓	✓	✓	✓	✓	Ralph 3-15
A ✓	171	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 1	13-14S	1508	-12	18	Inaccessable								Ralph 3-20 OK
A ✓	172	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 2	61-62P	1508	-12	18									
A ✓	173	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 2	61-62S	1508	-12	18									
A ✓	174	ALP	2103227	F65	AIR TO AN/BQG-2POSITION NO 3	112S	1508	-12	18									
A	175	HSD	2103362	F136	FAIRWTR PL NORM PRESS TO DIVE	30-31S	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	R&L 3-20
A	176	HSD	2103362	F136	FAIRWTR PL NORM PRESS TO RISE	30-21S	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	
	177	HSD	2103362	F136	FRWTR PLN CONST PRESS SERV VLV	29-30S	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	
	178	HSD	2103362	F136	FRWTR PLN CONST PRESS SERV VLV	30-31S	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	
	179																	
	180																	
A ✓	181	HSD	2103362	F137	FRWTR PLN RETURN FROM SERV VLV	29-31S	1509	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	OK 3-12
A	182	HSD	2103362	F137	FRWTR PLN RETURN FROM SERV VLV	29-30S	1509	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH. INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
A	183	HSD	2103362	F138	SERVO VLV DRAIN	30-31S	1509	- 8	12	✓	✓	✓	✓	✓	✓	✓	✓	CJC 3-25
	184	HSD	2103362	F138	SERVO VLV DRAIN	30-31S	1509	- 8	12	✓	✓	✓	✓	✓	✓	✓	✓	
✓	185	HSD	2103362	F138	FRWTR PLN DRAIN & RET TO V & R	29-30S	1509	- 8	12	✓	✓	✓	✓	✓	✓	✓	✓	
A ✓	186	HSD	2103362	F138	FRWTR PLN DRAIN & RET TO V & R	29-30S	1509	- 8	12	✓	✓	✓	✓	✓	✓	✓	✓	
(A) ✓	187	HSD	2103362	F139	FRWTR PLN PILOT PRESS SERV VLV	30-31S	1509	- 8	12	✓	✓	✓	✓	✓	✓	✓	✓	
(A) ✓	188	HSD	2103362	F139	FRWTR PLN PILOT PRESS SERV VLV	30-31S	1509	- 8	12	✓	✓	✓	✓	✓	✓	✓	✓	
	189																	
	190	HSD	2103362	F142	STEER EMER PRESS TO RIGHT RUDD	31P	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	CJC 3-12
	191	HSD	2103362	F142	STEER EMER PRESS TO LEFT RUDD	31P	2755	-25	31	✓	✓	✓	✓	✓	✓	✓	✓	
	192	HSD	2103362	F142	STERN DIV EMERG PRESS TO DIVE	31-32P	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	
	193	HSD	2103362	F142	STERN DIV EMERG PRESS TO RISE	31-32P	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	
A	194	HSD	2103362	F142	STEER & DIVING VITAL PRESS	30-31P	2755	-24	31	✓	✓	✓	✓	✓	✓	✓	✓	
A	195	HSD	2103362	F143	FRWTR PLN DC ELEC PRESS CONT V	28-29S	1508	-12	26	✓	✓	✓	✓	✓	✓	✓	✓	
A	196	HSD	2103362	F144	FRWTR PLANES PRESS TO DIVE	30-31P	1508	-12	13	✓	✓	✓	✓	✓	✓	✓	✓	
A	197	HSD	2103362	F144	FRWTR PLANES PRESS TO RISE	30-31P	1508	-12	13	✓	✓	✓	✓	✓	✓	✓	✓	
A	198	HSD	2103362	F144	FRWTR PLN DC ELEC PRES TO RISE	30-31S	1508	-12	13	✓	✓	✓	✓	✓	✓	✓	✓	
	199	HSD	2103362	F144	FRWTR PLN DC ELEC PRES TO DIVE	29-30S	1508	-12	13	✓	✓	✓	✓	✓	✓	✓	✓	
(A) ✓	200	HSD	2103362	F145	FRWTR PLN DC ELEC PUMP SUCTION	28-30S	1508	-12	26	✓	✓	✓	✓	✓	✓	✓	✓	
(A) ✓	201	HSD	2103362	F149	FRWTR PLN DC ELEC PUMP SUCTION	28-29S	1508	-12	13	✓	✓	✓	✓	✓	✓	✓	✓	
	202	HSD	2103362	F150	STEER & DIVING VITAL RETURN	29-31P	1509	-32	35	✓	✓	✓	✓	✓	✓	✓	✓	
	203																	
A ✓	204	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 1	13-14P	1508	-12	18	Inaccessable						GWB	360F OK	
A ✓	205	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 2	61-62P	1508	-12	18			✓						
A ✓	206	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 2	61-62S	1508	-12	18									
A ✓	207	ALP	2103227	F65	AIR TO AN/BQG-2 POSITION NO 3	112P	1508	-12	18			✓				✓		
	208																	

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FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

S(SA) 593-348 10 005
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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS / OTHER	DASH SIZE / SIZE IPS / SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
V	209	HSD	1862913	F181	STEER PLT RET FR HSD-48-HSD-50	98-99P	1509	- 8	13	✓	✓	✓	✓	✓	✓	✓	✓	3-13
V	210	HSD	1862913	F181	STERN PLN PLT PRES TO SERV VLV	102P	1509	- 8	13									
V	211	HSD	1862913	F181	STEER PLT PRESS TO SERVO VLV	96-97P	1509	- 8	13									
	212	HSD	1862913	F181	STERN PLN PLT RET FROM SERVO V	102P	1509	- 8	13									
A V	213	HSD	1862913	F182	STEER CONST PRESS TO HSD 48&50	99P	2755	-24	31									
A V	214	HSD	1862913	F182	STEER PRESS TO LEFT RUDDER	96-98P	2755	-24	31									
A V	215	HSD	1862913	F182	STERN PLN PRESS TO DIV NORMAL	103P	2755	-24	31									
A V	216	HSD	1862913	F182	STEER NORM PRESS TO HSD-48-50	96-97P	2755	-24	31									
A V	217	HSD	1862913	F182	STERN PLN CONST PRES TO HSD-87	103P	2755	-24	31									
A V	218	HSD	1862913	F182	STERN PLN PRESS TO RISE NORMAL	102P	2755	-24	31									
A V	219	HSD	1862913	F182	STEER PRESS TO RIGHT RUDDER	96-98P	2755	-24	31									
A V	220	HSD	1862913	F182	ST PLS NORM PRESS SERV V-HSD87	100P	2755	-24	31									
V	221	HSD	1862913	F183	STEER RET FROM HSD-48 & 50	96-97P	1509	-32	29									
V	222	HSD	1862913	F183	STERN PLN RETURN FROM SERVO	100P	1509	-32	29									
(A) V	223	HSD	1862913	F184	STEER DC ELEC PUMP SUCTION	98P	1508	-12	26									
V	224	HSD	1862913	F184	STEER DC ELEC PRESS TO CONT V	98P	1508	-12	26									
(A) V	225	HSD	1862913	F184	STERN DIV D C ELEC PUMP SUCT	99P	1508	-12	26									
V	226	HSD	1862913	F184	STERN DIV D C ELEC PRES CONT V	99P	1508	-12	26									
	227																	
	228																	
	229																	
	230																	
	231																	
	232																	

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / SIZE IPS / SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	233	b(3) 10 USC 130								✓	✓	—	—	—	—	—	—	EJC 3-13
	234									✓	✓	✓	✓	—	—	—	✓	
Ⓐ ✓	235									✓	✓	✓	✓	—	—	—	✓	
Ⓐ ✓	236									✓	✓	✓	✓	—	—	—	✓	
✓	237									✓	✓	✓	✓	—	—	—	*	
✓	238									✓	✓	—	—	—	—	—	—	EJC 3-13
✓	239									✓	✓	✓	✓	✓	✓	✓	✓	
	240									✓	✓	✓	✓	✓	✓	✓	✓	
✓	24163									✓	✓	✓	✓	✓	✓	✓	✓	
✓	242									✓	✓	✓	✓	✓	✓	—	✓	
	243									✓	✓	✓	✓	✓	✓	✓	✓	
	244									✓	—	—	—	—	—	—	—	
✓	245									✓	✓	✓	✓	✓	✓	—	*	
✓	246									-	-	-	-	-	-	-	-	EJC 3-13
✓	247									—	—	—	—	—	—	—	—	
✓	248									—	—	—	—	—	—	—	—	
✓	249									—	—	—	—	—	—	—	—	
✓	250									✓	✓	—	✓	✓	✓	—	—	
Ⓐ	251									✓	✓	✓	—	—	—	—	*	
Ⓐ	252									✓	—	—	—	—	—	—	—	
Ⓐ	253									—	—	—	—	—	—	—	—	
Ⓐ ✓	254									✓	—	—	—	—	—	—	—	
✓	255									✓	—	—	—	—	—	—	—	
✓	256									✓	—	—	—	—	—	—	—	
✓	257									✓	—	—	—	—	—	—	—	
✓	258									—	—	—	—	—	—	—	—	

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH. INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	259	b(3) 10 USC 130								✓	–	–	–	–	–	–	–	EJC 3-17
✓	260									–	–	–	–	–	–	–	–	
✓	261									✓	–	–	–	–	–	–	*	
	262									✓	✓	–	–	–	–	–	–	EJC 3-17
	263									–	–	–	–	–	–	–	–	
	264																	
	265									–	–	–	–	–	–	–	–	EJC 3-13
✓	266									–	–	–	–	–	–	–	–	
	267																	
	268																	
	269																	
	270																	
	271																	
A	272									✓	✓	✓	✓	–	–	–	–	EJC-3-12
A ✓	273									✓	✓	✓		✓	*	✓	✓	
A ✓	274									✓	✓	✓	–	–	–	–	–	
Ⓐ ✓	275									✓	✓	✓	✓	✓	–	–	–	
Ⓐ ✓	276											✓		✓	✓	✓	✓	
Ⓐ	277									✓	✓	✓	–	–	–	–	–	
Ⓐ	278									✓	✓	✓	✓	✓	✓	✓	✓	
	279																	
	280																	
	281																	
	282																	
	283																	
	[redacted]																	

SHD-PHS-3895 (REV 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

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SELECTED RECORD DRAWING NO. SS/N/593-845-2105292

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR PR P/S	NOSE PART NUMBER EB/PHS	NOSE PART NUMBER OTHER	DASH-LGTH-SIZE INCH SIZE EB/PHS	DASH-LGTH-SIZE INCH SIZE OTHER	IDENTIFICATION PAR. 4.1	TORQUE PAR. 4.2	BORE CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. BND. R LGTH PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	285										✓	✓	✓	✓	✓	✓	✓	✓	EJE 3-14
	286										✓	✓	✓	✓	✓	✓	✓	✓	
	287										✓	✓	✓	—	—	—	—	—	
	288										✓	—	—	—	—	—	—	—	
	289										/	—	—	—	—	—	—	—	
	290										/	—	—	—	—	—	—	—	
	291										/	—	—	—	—	—	—	—	
	292										/	—	—	—	—	—	—	—	
	293										/	—	—	—	—	—	—	—	
	294										/	—	—	—	—	—	—	—	
	295										/	—	—	—	—	—	—	—	
	296										/	—	—	—	—	—	—	—	
	297										/	—	—	—	—	—	—	—	
	298										/	—	—	—	—	—	—	—	
	299										/	—	—	—	—	—	—	—	
	300										/	—	—	—	—	—	—	—	
	301										/	—	—	—	—	—	—	—	
	302										/	—	—	—	—	—	—	—	
(A)	303										✓	✓	✓	✓	✓	✓	✓	—	EJE 3-14
(A)	304										✓	✓	✓	✓	✓	✓	✓	—	
A	~~305~~										—	—	—	—	—	—	—	—	
A	~~306~~										—	—	—	—	—	—	—	—	
(A)	307										✓	✓	✓	✓	✓	✓	✓	✓	EJE 3-15
(A)	308										✓	✓	✓	✓	✓	✓	✓	✓	
A	~~309~~										—	—	—	—	—	—	—	—	
A	~~310~~										—	—	—	—	—	—	—	—	

b(3) 10 USC 130

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

b(3) 10 USC 130

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / SIZE IPS / SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	338																	
	339																	
(A)	340																	
(A)	341																	
A	342																	
A	343																	
	344																	
	345																	
	346																	
	347																	
	348																	
(A)	349									✓	✓	✓	✓	✓	✓	✓	✓	Eja 3-14
(A)	350									✓	✓	✓	✓	✓	✓	✓	✓	
(A)	351									✓	✓	✓	✓	✓	✓	✓	✓	
(A)	352									✓	✓	✓	✓	✓	✓	✓	✓	
A	353									✓	✓	✓	✓	✓	✓	✓	✓	
A	354																	
	355																	
	356																	
A	357																	
A	358																	
	359																	
✓	360									✓	✓						✓	PORTABLE Eja 3-16
	361																	
A	362																	
	363																	

b(3) 10 USC 130

Not required for 264 Eja

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SELECTED RECORD DRAWING NO. SS/N 593-845-2103292

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EXHIBIT 21 (68)

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH. INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
Ⓐ	364	HE	1862884	F147	EXTERNAL MAST HOIST PRESS	34-36P	1508	-12	26	✓	✓	✓	✓	✓	–	–	–	Eje 3-13
Ⓐ	365	HE	1862884	F147	EXT MAST NORMAL PUMP SUCTION	34-36P	1508	-12	26	✓	✓	–	–	–	–	–	–	
	366	HE	1862884	F148	EXT MAST HOISTS NORM PUMP DRN	34-35P	1509	- 8	13	✓	✓	✓	✓	✓	✓	✓	✓	
	367	HE	1862884	F148	EXT MAST HOISTS NORM PUMP DRN	34-35P	1509	- 8	13	✓	–	–	✓	✓	✓	✓	✓	
	368	HE	1862884	F149	RESERVE OIL SUP TK FILL LINE	35-36S	1508	-12	13	PORTABLE HOSE								
	369																	
	370																	
A ✓	371	HE	2013918	F63	HEL ANT RAISE HE 148 FROM 149	43-44P	1508	-12	33	✓	✓	✓	✓	–	✓	✓	✓	Eje 3-13
A ✓	372	HE	2013918	F60	HEL ANT P TO LWR -TRANS	43-44P	1508	-12	28	✓	–	✓	✓	✓	✓	✓	✓	
A	373	HE	2013918	F62	HEL ANT PRESS TO MAN V HE-149	43-44P	1508	-12	31	✓	–	✓	✓	✓	✓	✓	✓	
A	374	HE	2013918	F61	HEL ANT RET FROM MAN V HE 149	43-44P	1508	-12	29	✓	–	✓	✓	✓	✓	✓	✓	
	375																	
	376																	
	377																	
✓	378	DINST	1862521	G-1	ENG SEA WATER PUMP SUCTION	22-24	2651	- 4	120	✓	✓	✓	–	–	–	–	*	Eje 4-5
✓	379	DINST	1862521	G-2	ENG SEA WATER PUMP DISCH	22-24	2651	- 4	120	✓	✓	✓	✓	✓	✓	✓	✓	Eje - 3-16
✓	380	DINST	1862521	G-3	ENG VITAL HYD	22-24	1509	- 4	120	✓	✓	✓	✓	✓	✓	✓	✓	
✓	381	DINST	1862521	G-4	ENG SNORKEL EXHAUST	21-24	2556	- 4	120	✓	✓	✓	✓	✓	✓	✓	✓	
✓	382	DINST	1862521	G-5	ENG SCAV AIR	21-24	2556	- 4	120	✓	✓	✓	✓	✓	✓	✓	✓	
✓	383	DINST	1862521	G-6	ENG F O TRANS PUMP SUCT	22-28	2556	- 4	240	✓	✓	✓	✓	✓	✓	✓	*	
✓	384	DINST	1862521	G-7	ENG F O TO FILTER	22-28	2556	- 4	240	✓	✓	✓	✓	✓	✓	✓	✓	Eje - 3-16
✓	385	DINST	1862521	G-8	ENG L O TO STRAINER	22-24	2556	- 4	96	✓	✓	✓	✓	✓	✓	✓	*	
✓	386	DINST	1862521	G-9	ENG L O PUMP DISCH	22-24	2556	- 4	96	✓	✓	✓	✓	✓	✓	✓	✓	Eje - 3-16
✓	387	DINST	1862521	G-10	ENG STARTING AIR	22-24	1509	- 4	72	✓	✓	✓	✓	✓	✓	✓	✓	
✓	388	DINST	1862521	G-11	ENG F W PUMP DISCH	22-24	2556	- 4	96	✓	✓	✓	✓	✓	✓	✓	✓	
✓	389	DINST	1862521	G-12	ENG F O TRANS PUMP DISCH	22-28	2556	- 4	240	✓	✓	✓	✓	✓	✓	✓	✓	

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH. INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	390	DINST	1862521	G-13	ENG F O LEAVING FILTER	22-28	2556	- 4240		✓	✓	—	—	—	—	—	—	EJC 3-16
✓	391	DINST	1862521	G-14	ENG L O LEAVING STRAINER	22-24	2556	- 4 96		✓	✓	✓	✓	✓	✓	✓	✓	↓
✓	392	DINST	1862521	G-15	ENG L O AT HEADER	22-24S	2556	- 4 72		✓	✓	✓	—	—	—	—	—	
✓	393	DINST	1862521	G-16	ENG SCAV AIR CO SW BACK PRESS	22-24S	2556	- 4 48		✓	✓	—	—	—	—	—	—	J.K. 3-13
✓	394	DINST	1862521	G-20	ENG CRANKCASE MANOMETER GAUGE	21-24	2556	- 4 72		✓	✓	✓	—	—	—	—	*	↓
—	~~395~~	~~DINST~~	~~1862521~~	~~G-22~~	~~L O TO FILTER~~	~~22-24S~~	~~2556~~	~~- 4 96~~		Cancelled								EJC 3-6F
—	~~396~~	~~DINST~~	~~1862521~~	~~G-23~~	~~L O FROM FILTER~~	~~22-24S~~	~~2556~~	~~- 4 96~~		Cancelled								EJC 3-6F
	397																	
	398																	
	399																	
A ✓	400 ✓	DO	1862621	F71	TRANS PUMP SUCT SWING CONN	28S	2651	-20 30		✓	✓	—	—	—	—	—	—	EJC 3-6
✓	401	DO	1862621	F71	TRANS PUMP DISCH SWING CONN	28S	2651	-20 24		—	—	—	—	—	—	—	—	EJC ↓
	402																	
	403																	
	404																	
	405																	
	406																	
✓	407	LO	1862628	F29	SUCT LINE LO TRANS PUMP	83-84S	2651	-32 26		✓	—	—	—	—	—	—	—	J.K 3-13
✓	408	LO	1862628	F69	DISCH LO TRANS PUMP TO SUCT MN	83-84S	2651	-32 44		—	—	—	—	—	—	—	—	
✓	409	LO	1862628	F74	1&2 LO PURIF TO TRANS HEADER	96P	2651	-24 27		✓	—	—	—	—	—	—	—	
✓	410	LO	1862628	F75	LO PURIF ATT PUMP DISCH TO HTR	96-97P	2651	-20 27		—	—	—	—	—	—	—	—	
✓	411	LO	1862628	F77	CONTAM TO DRAIN SYS	95-97P	2651	-32 28		—	—	—	—	—	—	—	—	
✓	412	LO	1862628	F80	1&2 LO PURIF ATT PUMP SUCT	96P	2651	-24 25		—	—	—	—	—	—	—	—	
✓	413	LO	1862628	F83	DISCH TO HEATER	96-97P	2651	-20 25		—	—	—	—	—	—	—	—	
✓	414	LO	1862628	F90	1&2 LO PURIF DRAIN TO BILGE	95-96P	2651	-32 15		—	—	—	—	—	—	—	—	↓
	415																	

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FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

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SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

EXHIBIT 23 (60)

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS / OTHER	DASH SIZE / LGTH. INCH SIZE IPS / SIZE	CERTIFICATION PAR. 4.4.1	TAGGED PAR. 4.4.2	SHOCK CLEARANCE PAR. 4.4.3	SUPPORTS PAR. 4.4.4	ALIGNMENT PAR. 4.4.5	MIN. RAD. & LGTH PAR. 4.4.6	LAY LINE PAR. 4.4.7	CONDITION PAR. 4.4.8	INSPECTORS SIGNATURE & DATE
	416																
	417																
✓	418				b(3) 10 USC 130				✓	✓	✓	—	—	—	—	—	ejc 3-12
✓	419								✓	✓	✓	✓	✓	✓	✓	✓	
✓	420								✓	✓	✓	✓	✓	✓	✓	✓	
✓	421								✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	422								✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	423								✓	✓	✓	✓	✓	✓	✓	✓	
✓	424								✓	✓	✓	✓	✓	✓	✓	✓	
✓	425								✓	✓	✓	✓	✓	✓	✓	✓	ejc 3-12
✓	426								✓	✓	✓	✓	✓	✓	✓	✓	
✓	427								✓	✓	✓	✓	✓	✓	✓	✓	
✓	428								✓	✓	✓	✓	✓	✓	✓	✓	
✓	429								✓	✓	✓	✓	✓	✓	✓	✓	
✓	430								✓	✓	✓	✓	✓	✓	✓	✓	
✓	431								✓	✓	✓	✓	✓	✓	✓	✓	
✓	432								✓	✓	✓	✓	✓	✓	✓	✓	
✓	433								✓	✓	✓	✓	✓	✓	✓	✓	
✓	434								✓	✓	✓	✓	✓	✓	✓	✓	
✓	435								✓	✓	✓	✓	✓	✓	✓	✓	
✓	436								✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	437								✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	438								✓	✓	✓	✓	✓	✓	✓	✓	
*	439								✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	440								✓	✓	✓	✓	✓	✓	✓	✓	
	441																

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	442																
	443																
A	444	SLO	1862634	F44	LO PUMP 1 SUCTION	95-96P	150901	-48 27	✓	✓	–	–	–	–	–	–	EJC 3-14
A	445	SLO	1862634	F45	LO PUMP 2 SUCTION	95-96P	150901	-48 28	✓	✓	–	–	–	L	L	–	JKmm-15
A	446	SLO	1862634	F63	LO PUMP 1 DISCH TO STRAINER	95-96P	150901	-48 27	✓	✓	–	✓	✓	L	L	–	
A	447	SLO	1862634	F65	LO PUMP 2 DISCH TO STRAINER	95-96P	150901	-48 27	✓	✓	✓	✓	✓	L	–	–	
	448	SLO	1862634	F86	LO PUMP PRIMING	95-96P	2651	- 8 24	✓	–	–	✓	✓	–	–	–	EJC-3-14
	449																
	450																
	451																
A	452								✓	✓	✓	✓	✓	–	–	✓	J.K 3-14
A	453																
A	454																
A	455																EJC 3-17
A	456																
A	457																
A	458																
A	459																
A	460																
A	461																
A	462																
	463																
	464																
	465																
	466																
A	467																

b(3) 10 USC 130

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A	468									✓	✓	–	–	–	–	–	–	C.w.Litz 3-19
A	469									–	✓	✓	✓	✓	✓	✓	–	↓
A	470									✓	✓	✓	✓	✓	✓	✓	✓	↓
A	471									–	–	✓	✓	✓	✓	✓	✓	↓
	472																	
A	473									✓	✓	✓	✓	✓	–	–	–	E.J.L. 3-19
A	474									✓	✓	✓	✓	✓	✓	✓	✓	↓
✓	475									✓	✓	✓	✓	–	–	–	–	↓
✓	476									✓	–	✓	✓	✓	✓	–	*	↓
✓	477									–	–	✓	–	–	–	–	–	E.J.L. 3-19
✓	478									–	–	✓	–	–	–	–	–	↓
✓	479									–	–	✓	–	–	–	–	–	↓
✓	480									–	–	✓	–	–	–	–	–	↓
✓	481									–	–	✓	–	–	–	–	–	↓
✓	482									–	–	✓	–	–	–	–	–	↓
✓	483									–	–	✓	✓	✓	–	–	*	↓
✓	484									–	–	–	✓	✓	✓	–	*	↓
✓	485									–	–	–	✓	✓	–	✓	*	↓
✓	486									–	–	✓	✓	✓	–	–	*	↓
✓	487									–	–	✓	–	–	–	–	–	E.J.L. 3-19
✓	488									•	✓	✓	✓	✓	✓	–	*	↓
✓	489									✓	✓	✓	✓	✓	✓	✓	*	↓
✓	490									✓	✓	✓	–	–	–	–	–	E.J.L. 3-19
A	491									–	–	✓	✓	✓	✓	✓	*	↓
A	492									–	–	–	–	–	–	–	–	E.J.L. 3-14
✓	493									–	–	–	–	–	–	–	–	↓

b(3) 10 USC 130

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✓	494											✓	—	—	—	—	—	—	—	EJC-3-16
A	~~495~~																			
A	~~496~~																			
✓	497											✓	—	—	—	—	—	—	—	EJC-3-14
✓	498											—	✓	✓	—	—	—	—	—	
A ✓	499											—	✓	—	—	—	—	—	—	
A ✓	500											—	✓	—	—	—	—	—	—	
✓	501											✓	✓	—	—	—	—	—	—	
(A) ✓	502											—	✓	—	—	—	—	—	—	
✓	503											—	✓	—	—	—	—	—	—	
(A) ✓	504											—	✓	—	—	—	—	—	—	
(A) ✓	505											—	✓	—	—	—	—	—	—	
(A) ✓	506											—	✓	—	—	—	—	—	—	
(A) ✓	507											—	✓	—	—	—	—	—	—	
(A) ✓	508											—	✓	—	—	—	—	—	—	
✓	509											—	✓	—	—	—	—	—	—	
✓	510											—	✓	—	—	—	—	—	—	
✓	511											—	✓	—	—	—	—	—	—	
✓	512											—	✓	—	—	—	—	—	—	
✓	513											—	✓	—	—	—	—	—	—	
✓	514											—	✓	—	—	—	—	—	—	
A	~~515~~																			
A	~~516~~																			
✓	517											✓	—	—	—	—	—	—	—	EJC-3-14
✓	518											✓	—	—	—	—	—	—	—	
	519																			NOT INSTALLED

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / SIZE IPS / SIZE	LGTH-INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	520	b(3) 10 USC 130								✓	✓	✓	✓	✓	✓	✓	✓	EJK 3-24
✓	521									✓	✓	✓	✓	✓	✓	✓	✓	"
	522									Deleted on 593								
	523																	
✓	524									✓	✓	—	—	—	—	—	—	EJK 3-16
✓	525									✓	—	—	—	—	—	—	—	
✓	526									✓	—	✓	—	—	—	—	✓	
✓	527									✓	—	—	—	—	—	—	✓	
✓	528									✓	—	—	✓	—	—	—	✓	
✓	529									✓	—	—	—	—	—	—	✓	
	530									NOT INSTALLED								
	531									NOT INSTALLED								
Ⓐ ✓	532									✓	✓	—	—	—	—	—	✓	J.M. 3-15
Ⓐ ✓	533									✓	✓	✓	—	—	—	—	✓	
	534									✓	✓	✓	—	—	—	—	✓	
	535									✓	✓	—	—	—	—	—	—	EJK 3-15
✓	536									✓	✓	—	—	—	—	—	—	
✓	537									✓	✓	✓	✓	—	—	—	—	
	538	FWDC	1862852	F5	b(3) 10 USC 130					✓	✓	✓	✓	✓	✓	✓	✓	DRM 3-16
	539	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	JRM
	540	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	JRM
	541	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	DRM
	542	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	EJK 3-15
	543	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	DRM 3-16
	544	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	DRM
	545	FWDC	1862852	F5						✓	✓	✓	✓	✓	✓	✓	✓	JRM

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / LGTH. INCH / SIZE IPS / SIZE	CERTIFICATION PAR. 4.4.1	TAGGED PAR. 4.4.2	SIGN PAR. 4.4.3	SUPPORT PAR. 4.4.4	ALIGNMENT PAR. 4.4.5	MIN. RAD. & LGTH PAR. 4.4.6	LAY LINE PAR. 4.4.7	CONDITION PAR. 4.4.8	INSPECTORS SIGNATURE & DATE
	546	FWDC	1862852	F5	b(3) 10 USC 130				✓	✓	✓	✓	✓	✓	✓	✓	JFM Otm 3-20
	547	FWDC	1862852	F5					✓	—	—	—	—	—	—	—	Eje 3-18
	548	FWDC	1862852	F5					—	—	—	—	—	—	—	—	↓
	549	FWDC	1862852	F5					✓	✓	✓	—	—	—	~	~	JFM Otm 3-20
	550	FWDC	1862852	F5					✓	—	✓	—	—	—	—	—	Eje 3-17
	551	FWDC	1862852	F5					✓	—	✓	—	—	—	—	—	↓
	552	FWDC	1862852	F5					✓	—	✓	—	—	—	—	—	↓
	553	FWDC	1862852	F5					✓	—	✓	—	✓	—	✓	—	JFM 3-20
	554																
	555																
	556																
✓	557				b(3) 10 USC 130				✓	✓	✓	✓	✓	✓	✓	*	[illegible] 12/10
✓	558								✓	✓	✓	✓	✓	✓	✓	✓	T. Brook 3/20
✓	559								[illegible]								[illegible] 2/6/71
✓	~~560~~																
✓	~~561~~																
	~~562~~																
✓	~~563~~																
(A) ✓	564								✓	✓	✓	✓	✓	✓	✓	✓	T. Brook 3/20
(A) ✓	565								✓	✓	✓	✓	✓	✓	✓	✓	↓
(A) ✓	566								✓	✓	✓	✓	✓	✓	✓	✓	↓
(A) ✓	567								✓	✓	✓	✓	✓	✓	✓	✓	↓
(A) ✓	568								✓	—	—	—	—	—	—	—	Brook 3-18
(A) ✓	569								—	—	—	—	—	—	—	—	↓
(A) ✓	570								—	—	—	—	—	—	—	—	↓
(A) ✓	571								—	—	—	—	—	—	—	—	↓

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A	572	b(3) 10 USC 130							✓	–	✓	✓	✓	✓	✓	✓	JA 4-1
A	573								✓	✓	✓		✓	✓	✓	✓	
* A	574	AHPC	1862744	F1-1	NO.1 HP AIR COMP COOL PU DISCH	49-50S	2651	-24 38	✓	✓	✓	✓	✓	✓	✓	✓	
A	575	AHPC	1862744	F1-2	NO.1 HP AIR COMP COOL PU SUCT	49-50S	2651	-24 38	✓	✓	✓	✓	✓	✓	✓	✓	
A	576	AHPC	1862744	F1-3	NO.2 HP AIR COMP COOL PU SUCT	49-50S	2651	-24 38	✓	✓	–	–	✓	✓	✓	✓	
A	577	AHPC	1862744	F1-4	NO.2 HP AIR COMP COOL PU DISCH	49-50S	2651	-24 38	✓	✓	–	✓	✓	✓	✓	✓	
	578																
	579																
	580																
	581	SD	1862892	F22	L.P. BRINE PUMP DISCHARGE	74-78P	2652	-48 26	✓	✓	✓	✓	✓	✓	✓	✓	JM 3-30
	582	SD	1862892	F22	H.P. BRINE PUMP SUCTION	75-76P	2652	-48 26	✓	✓	✓	✓	✓	✓	✓	✓	JM
	583	SD	1862892	F38	L.P.BRINE PUMP DISCH GAGE LINE	77-80P	2556	- 4 13	NOT INSTALLED								
	584	SD	1862892	F38	DISTILLATE PUMP DISCH TO BILGE	79-80P	2556	- 4 13	✓	✓	✓	✓	✓	✓	✓	✓	JM 3-30
	585	SD	1862892	F68	ACID CLEAN LP BRINE PUMP DISCH	77-78P	2651	-32 9	✓	✓	TEMP CONN.						JM
✓	586	SD	1862892	F75	FEED TREATMENT PUMP DISCH	77-80P	2651	-10 14	✓	✓	✓	–	–	–	–	–	J.K 3.13
✓	587	SD	1862892	F75	FEED TREATMENT PUMP SUCT	77-78P	2651	-10 14	✓	✓	✓	✓	✓	✓	✓	✓	
✓	588	SD	1862892	F75	FEED TREATMENT PUMP DISCH	77-78P	2651	-10 14	✓	✓	✓	✓	✓	✓	✓	✓	
✓	589	SD	1862892	F144	100LB AIR TO COND LVL CONT PLT	79-80P	2651	- 8 16	✓	✓	✓	✓	✓	✓	✓	✓	
	590	SD	1862892	F7	S.W. TO DIST CONDENSER	77-80P	EB -TY	21/21IN	✓	✓	✓	✓	✓	✓	✓	✓	JM 3-17
	591	SD	1862892	F7	H.P.BRINE PUMP DISCH TO CONT V	75-76P	EB -TY	21/21IN	✓	✓	✓	✓	✓	✓	✓	✓	J.K - 3-13
	592	SD	1862892	F8	SEA WATER TO OVERLOAD	78-80P	EB -TY	2 INCH	✓	✓	✓	✓	✓	✓	✓	✓	JM 3-16
	593	SD	1862892	F50	DISTILLATE PUMP DISCH	76-80P	R-HOSE	1 ID	✓	✓	✓	✓	✓	✓	✓	✓	MIT
	594	SD	1862892	F116	AIR EJECT CNDS TO F.W. DR COLL	79-80P	R-HOSE	3/4ID	✓	✓	✓	✓	✓	✓	✓	✓	JM
	595	SD	1862892	F116	AIR EJECT COND TO CNDS VENT	79-80P	R-HOSE	3/4ID	DELETED NOT INSTALLED								
	596	SD	1862892	F140	CONDENSATE DRAIN	79-80P	M-HOSE	2 INCH	✓	✓	✓	✓	✓	✓	✓	✓	JM
	597																

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	598																	
	599																	
✓	600	VD	1862898	F28-1	BRINE OVFL TO HEAT EXCH U.L.	95-97P	2651	-24	32	✓	—	—	—	—	—	—	—	T. Brooks 3/60
✓	601	VD	1862898	F28-1	BRINE FR HT EXCH TO LP PUMP LL	94-96P	2651	-24	32	—	—	—	—	—	—	—	—	
✓	602	VD	1862898	F37-1	SW FEED FR HT EX TO VENT COND	95-97P	2651	-20	32	—	—	✓	✓	✓	✓	✓	✓	
✓	603	VD	1862898	F42-1	BRINE FR LP PUMP TO TK OR OVBD	95P	2651	-20	32	—	—	✓	✓	✓	✓	✓	✓	
✓	604	VD	1862898	F78-1	LP BRINE PUMP SEAL	94-96P	2651	- 8	18	—	—	—	—	—	—	—	—	Brooks 3-19
✓	605	VD	1862898	F78-1	DESUPERHEATER DRIP	95-96P	2651	- 8	18	—	—	—	—	—	—	—	—	
✓	606	VD	1862898	F78-1	DISTILLATE TO COMP SEAL	94-96P	2651	- 8	18	—	—	—	—	—	—	—	—	
	607	VD	1862898	F61	DISTILLATE FROM DISTILLER	94-96P	R-HOSE	1	ID	—	—	—	—	—	—	—	✓	
	608	VD	1862898	F61	DIST PUMP SUCT	94-96P	R-HOSE	1	ID	—	—	—	—	—	—	—	—	J.K. 3-11
	609	VD	1862898	F61	DIST PUMP DISCH	93-97P	R-HOSE	1	ID	—	—	✓	—	—	—	—	—	
✓	610	GREAS	1863266	F38	OUTBD GRS STEER GEAR YOKE PIN	108	1509	-6	108									inaccessible T. Brooks
✓	611	GREAS	1863266	F39	OUTBD GRS DIV GEAR YOKE PIN	108	1509	-6	108									inaccessible T. Brooks
	612																	
✓	613	GREAS	1863264	P31	IND CONN ROD GREASING LINE 14J	31P	1509	-6	60	✓	—	—	—	—	—	—	—	J.K. 3-17
✓	614	GREAS	1863264	P31	IND CONN ROD GREASING LINE 14K	31P	1509	-6	60	✓	—	—	—	—	—	—	—	
✓	615	GREAS	1863264	P31	TILLER CONN ROD GRS LINE 16A	31P	1509	-6	60	—	—	—	—	—	—	—	—	
✓	616	GREAS	1863264	P31	TILLER CONN ROD GRS LINE 16B	31P	1509	-6	60	—	—	—	—	—	—	—	—	
	617																	
✓	618	b(3) 10 USC 130								✓	—	—	—	—	—	—	—	J.K. 3-12
✓	619									—	—	—	—	—	—	—	—	
✓	620									—	—	—	—	—	—	—	—	
✓	621									✓	✓	✓	✓	✓	✓	✓	✓	
A ✓	622									✓	✓	✓	✓	—	✓	✓	✓	
	623									✓	✓	✓	✓	✓	✓	✓	✓	

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER / EB/PNS / OTHER	DASH SIZE / LGTH. INCH SIZE IPS / SIZE	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	624	b(3) 10 USC 130							✓	✓	—	—	—	—	—	—	J.K 3-12
✓	625								—	—	—	—	—	—	—	—	
✓	626								—	—	—	—	—	—	—	—	
✓	627								—	—	—	—	—	—	—	✓	
*A	628								—	—	—	—	—	—	—	✓	
	629								—	—	—	—	—	—	—	✓	
	630																
	631									✓						L	EJK 3-18
	632									✓						A	
	633									✓						G	
	634									✓						E	
	635									✓						D	
	636																
	637									✓		LAGGED					EJK 3-18
	638																
	639								✓	✓	—	✓	✓	✓	✓	✓	JFM 4-2
	640								✓	✓	✓	✓	✓	✓	✓	✓	JFM
	641								✓	—	L	A	G	G	e	D	EJK 3-18
	642								✓	✓	L	A	G	G	e	D	Rejected 3-18
	643																
	644																
	645								✓	✓	✓	—	✓	—	✓	✓	RF 4-2
	646								✓	—	✓	✓	✓	✓	✓	✓	JM
	647								✓	✓	✓	✓	✓	✓	✓	✓	
	648								✓	✓	✓	✓	✓	—	✓	✓	
	649								✓	✓	✓	✓	✓	✓	✓	✓	RF

IND-PNS-1895 (NEW 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

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EXHIBIT. (68) 38

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS	LGTH-INCH SIZE	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LOTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
	650	b(3) 10 USC 130								✓	✓	✓	–	–	–	–	–	Efc 3-17
	651									–	–	✓	✓	✓	✓	✓	✓	↓
	652																	
	653																	F.C. 3-20-65
	654									–	–	✓	✓	✓	–	✓	✓	Code 2305
	655									✓	✓	✓	✓	✓	✓	✓	✓	2305
	656																	
	657																	
	658									✓	✓	✓	✓	✓	✓	✓	✓	2305
	659									✓	✓	✓	✓	✓	✓	✓	✓	2305
	660																	
	661																	
	662									✓	✓	✓	✓	✓	✓	✓	✓	2305
	663									✓	✓	✓	✓	✓	✓	✓	✓	
	664									✓	✓	✓	✓	✓	✓	✓	✓	
	665									✓	✓	✓	✓	✓	✓	✓	✓	↓
	666																	
	667																	
✓	668	EC	1862609	F-10	D W RET FROM EC 104	18S	2651	-10	22	✓	✓	✓	✓	✓	–	–	–	Efc 3-14
✓	669	EC	1862609	F-10	D W SUP TO EC 51	18S	2651	-10	22	✓	–	–	–	–	–	–	–	↓
✓	670	EC	1862609	F-10	D W RET FROM EC 105	18S	2651	-10	22	✓	–	–	–	–	–	–	✓	
✓	671	EC	1862609	F-10	D W SUP TO EC 52	18S	2651	-10	22	✓	✓	–	–	–	–	–	–	
✓	672	EC	1862609	F-10	D W RET FROM EC 106	18S	2651	-10	22	✓	✓	–	–	–	–	–	–	
✓	673	EC	1862609	F-10	D W SUP TO EC 53	18S	2651	-10	22	✓	✓	✓	✓	✓	–	–	–	
*	~~674~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W RET FROM EC 107~~	~~18P~~	~~2651~~	~~-10~~	~~22~~	deleted								Efc 3-21
*	~~675~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W SUP TO E C 54~~	~~18P~~	~~2651~~	~~-10~~	~~22~~									

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS	HOSE PART NUMBER OTHER	DASH SIZE LGTH-INCH SIZE IPS	DASH SIZE LGTH-INCH SIZE	CERTIFICATION PAR. 4.1.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	676	EC	1862609	F-10	D W RET FROM EC 108	18P	2651		-10	22	✓	✓	–	–	–	–	–	–	EJC 3-16
✓	677	EC	1862609	F-10	D W SUP TO EC 56	18P	2651		-10	22	✓	✓	–	✓	✓	✓	–	–	
✓	678	EC	1862609	F-10	D W RET FROM EC 121	17S	2651		-10	22	✓	✓	–	–	–	–	–	–	
✓	679	EC	1862609	F-10	D W SUP TO EC 57	17S	2651		-10	22	✓	✓	–	✓	–	–	–	–	
*	~~680~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W RET FROM EC 115~~	~~17P~~	~~2651~~		~~-10~~	~~22~~									
*	~~681~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W SUP TO EC 63~~	~~17P~~	~~2651~~		~~-10~~	~~22~~	deleted EJC 3-21								
✓	682	EC	1862609	F-10	D W RET FROM EC 122	16S	2651		-10	22	✓	✓	–	–	–	–	–	–	
✓	683	EC	1862609	F-10	D W RET FROM EC 109	16S	2651		-10	22	✓	✓	–	–	–	–	–	–	EJC 3-16
✓	684	EC	1862609	F-10	D W SUP TO EC 59	16S	2651		-10	22	✓	✓	–	–	–	–	–	–	
✓	685	EC	1862609	F-10	D W RET FROM EC 111	16S	2651		-10	22	✓	✓	✓	✓	–	–	–	–	
✓	686	EC	1862609	F-10	D W SUP TO EC 60	16P	2651		-10	22	✓	✓	✓	✓	–	–	–	–	
✓	687	EC	1862609	F-10	D W RET FROM EC 113	16P	2651		-10	22	✓	✓	✓	✓	–	–	–	–	
✓	688	EC	1862609	F-10	D W SUP TO EC 62	16P	2651		-10	22	✓	✓	✓	✓	–	–	–	–	
*	~~689~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W RET FROM EC 116~~	~~16P~~	~~2651~~		~~-10~~	~~22~~									
*	~~690~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W SUP TO EC 64~~	~~16P~~	~~2651~~		~~-10~~	~~22~~	deleted 3-21								
✓	691	EC	1862609	F-10	D W RET FROM EC 110	15S	2651		-10	22	✓	✓	✓	–	–	–	–	–	
✓	692	EC	1862609	F-10	D W RET FROM EC 112	15S	2651		-10	22	✓	–	–	–	–	–	–	–	J.K 3-14
✓	693	EC	1862609	F-10	D W SUP TO EC 74	15S	2651		-10	22	✓	–	–	–	–	–	–	–	
A ✓	694	EC	1862609	F-10	D W RET FROM EC 125	15P	2651		-10	22	✓	–	–	–	–	–	–	–	
A ✓	695	EC	1862609	F-10	D W SUP TO EC 68	15P	2651		-10	22	✓	✓	–	–	–	–	–	–	
✓	696	EC	1862609	F-10	D W RET FROM EC 114	15P	2651		-10	22	✓	✓	–	–	–	–	–	–	
✓	697	EC	1862609	F-10	D W RET FROM EC 67	15P	2651		-10	22	✓	✓	✓	–	–	–	–	–	
*	~~698~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W RET FROM EC 117~~	~~15P~~	~~2651~~		~~-10~~	~~22~~									
*	~~699~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W SUP TO EC 65~~	~~15P~~	~~2651~~		~~-10~~	~~22~~	deleted								
*	~~700~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W RET FROM EC 118~~	~~15P~~	~~2651~~		~~-10~~	~~22~~	3-21								
*	~~701~~	~~EC~~	~~1862609~~	~~F-10~~	~~D W SUP TO EC 66~~	~~15P~~	~~2651~~		~~-10~~	~~22~~									

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH. INCH	CERTIFICATION PAR. 4.4.1	TAGGED PAR. 4.4.2	SHOCK CLEARANCE PAR. 4.4.3	SUPPORT PAR. 4.4.4	ALIGNMENT PAR. 4.4.5	MIN. RAD. & LGTH. PAR. 4.4.6	LAY LINE PAR. 4.4.7	CONDITION PAR. 4.4.8	INSPECTORS SIGNATURE & DATE
✓	702	EC	1862609	F-10	D W RET FROM EC 124	12P	2651	-10	22	✓	✓	✓	—	—	—	—	—	J.K. 8-14
✓	703	EC	1862609	F-10	D W SUP TO EC 74	12P	2651	-10	22	—	—	✓	—	—	—	—	—	↓
✓	704	EC	1862609	F-10	D W RET FROM EC 123	12P	2651	-10	22	✓	—	—	—	—	—	—	—	
✓	705	EC	1862609	F-10	D W SUP TO EC 70	12P	2651	-10	22	✓	—	✓	—	—	—	—	—	
✓	706	EC	1862609	F-12	D W RET FROM LEVELING COMP	16S	2651	-20	12									INACCESSIBLE
✓	707	EC	1862609	F-12	D W SUP TO LEVELING COMP	16S	2651	-20	12	—								INACCESSIBLE
Ⓐ	708	EC	1862609	F-13	D W SUP TO RADIO XMTR	44P	2651	-12	12									NOT INSTALLED
Ⓐ	709	EC	1862609	F-13	D W RET FROM RADIO XMTR	44P	2651	-12	12									NOT INSTALLED
*	~~710~~	~~EC~~	~~1862609~~	~~F-48~~	~~D W RET FROM EC 120~~	~~14P~~	~~2651~~	~~-10~~	~~22~~	duplicate								"
*	~~711~~	~~EC~~	~~1862609~~	~~F-48~~	~~D W SUP TO EC 72~~	~~14P~~	~~2651~~	~~-10~~	~~22~~	duplicate						3-19		"
*	~~712~~	~~EC~~	~~1862609~~	~~F-48~~	~~D W RET FROM EC 119~~	~~14P~~	~~2651~~	~~-10~~	~~22~~	duplicate						EJC		"
*	~~713~~	~~EC~~	~~1862609~~	~~F-48~~	~~D W SUP TO EC 69~~	~~14P~~	~~2651~~	~~-10~~	~~22~~	duplicate								"
Ⓐ ✓	714	EC	1862609	F-51	D W SUP TO SONAR EQUIP RM	19S	2652	-40	29	✓	✓	✓	✓	✓	✓	✓	✓	EJC 3-19
*	715	EC	1862609	F-73	D W RET FROM WEAPONS CONT CONS	39S	2651	-~~24~~ 32	48	✓	✓	✓	✓	✓	✓	✓	✓	↓
* Ⓐ	716	EC	1862609	F-73	D W SUP TO WEAPONS CONT CONS	39S	2651	-~~24~~ 32	48	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	717	EC	1862609	F-81	D W SUP TO EC 38	39P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	718	EC	1862609	F-81	D W RET FROM EC 39	39P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	Kuliy 3-15
Ⓐ ✓	719	EC	1862609	F81	D W RET FROM EC 43	39P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	EJC 3-19
Ⓐ ✓	720	EC	1862609	F81	D W RET FRP, EC 37	39P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	↓
Ⓐ ✓	721	EC	1862609	F81	D W RET FROM EC 41	39P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	722	EC	1862609	F81	D W RET FROM EC 49	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	723	EC	1862609	F81	D W SUP TO EC 82	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	724	EC	1862609	F81	D W RET FROM EC 85	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
Ⓐ ✓	725	EC	1862609	F81	D W RET FROM EC 47	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	726	EC	1862609	F81	D W RET FROM EC 81	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	727	EC	1862609	F81	D W RET FROM EC 83	37P	2556	-10	30	✓	✓	✓	—	—	—	—	✓	

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REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS OTHER	DASH SIZE SIZE IPS SIZE	LGTH. INCH	CERTIFICATION PAR. 4.1	TAGGED PAR. 4.2	SHOCK CLEARANCE PAR. 4.3	SUPPORT PAR. 4.4	ALIGNMENT PAR. 4.5	MIN. RAD. & LGTH. PAR. 4.6	LAY LINE PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	728	EC	1862609	F81	D W RET FROM EC 89	36P	2556	-10	30	✓	✓	✓	✓	✓	—	—	—	KALIX-5-16
A ✓	729	EC	1862609	F81	D W SUP TO EC 94	36P	2556	-10	50	✓	✓	✓	✓	✓	✓	✓	✓	
✓	730	EC	1862609	F81	D W RET FROM EC 95	36P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	731	EC	1862609	F81	D W SUP TO EC 92	36P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	732	EC	1862609	F81	D W RET FROM EC 87	36P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	733	EC	1862609	F81	D W RET FROM EC 91	36P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	734	EC	1862609	F81	D W RET FROM EC 93	35P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	735	EC	1862609	F81	D W RET FROM EC 97	35P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	736	EC	1862609	F98	D W SUP TO EC 36	39P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	737	EC	1862609	F98	D W SUP TO EC 40	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	738	EC	1862609	F98	D W SUP TO EC 46	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	739	EC	1862609	F98	D W RET FROM EC 76	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	740	EC	1862609	F98	D W SUP TO EC 50	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	741	EC	1862609	F98	D W SUP TO EC 86	36P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	742	EC	1862609	F98	D W RET FROM EC 90	35P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	743	EC	1862609	F98	D W SUP TO EC 96	35P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	744	EC	1862609	F109	D W SUP TO EC 80	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	745	EC	1862609	F110	D W SUP TO EC 42	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	746	EC	1862609	F110	D W SUP TO EC 84	37P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	747	EC	1862609	F111	D W SUP TO EC 44	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	748	EC	1862609	F111	D W RET FROM EC 45	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	749	EC	1862609	F111	D W SUP TO EC 48	38P	2556	-10	30	✓	✓	✓	✓	✓	✓	✓	✓	
✓	750	EC	1862609	F111	D W SUP TO EC 88	36P	2556	-10	30	✓	✓	✓	✓	✓	—	—	—	
A ✓	751	EC	1862609	F118	D W RET FROM SONAR EQUIP RM	19S	2652	-40	29	✓	✓							
✓	752	EC	1862609	F123	D W SUP TO EC 58	16S	2651	-10	22	✓	✓	✓	✓	✓	✓	✓	✓	EJC 3-16
✓	753	EC	1862609	F123	D W SUP TO EC 73	15S	2651	-10	22	✓	✓	✓	—	—	—	—	—	

TYPE HOSE NOT COMPLETE ON CARD

EXHIBIT 35 (68.)

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SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	HOSE PART NUMBER EB/PNS	HOSE PART NUMBER OTHER	DASH SIZE / LGTH. INCH SIZE IPS	DASH SIZE / LGTH. INCH SIZE	CERTIFICATION PAR. 4.3	TAGGED PAR. 4.2	SAFETY CLEARANCE	PAR. 4.4	ALIGNMENT PAR. 4.5	PAR. 4.6	PAR. 4.7	CONDITION PAR. 4.8	INSPECTORS SIGNATURE & DATE
✓	754	EC	1862609	F123	D W RET FROM GRAPHIC INDICATOR	44S	2651	-10	22	✓	✓	✓	✓	✓	✓	✓	✓	T. Brook
✓	755	EC	1862609	F123	D W SUP TO EC 33	44S	2651	-10	22	✓	✓	✓	✓	✓	✓	✓	✓	
✓	756	EC	1862609	F123	D W RET FROM SHERICAL ACTIVE	44S	2651	-10	22	✓	✓	✓	✓	✓	✓	✓	✓	
✓	757	EC	1862609	F123	D W SUP TO EC 34	44S	2651	-10	22	✓	✓	✓	✓	✓	✓	✓	✓	
✓	758	EC	1862609	F125	D W RET FROM LEVELING COMP	37S	2651	-20	10	✓	✓	✓	—	—	—	—	—	J.K. 3-16
✓	759	EC	1862609	F125	D W SUP TO LEVELING COMP	37S	2651	-20	10	✓	✓	✓	—	—	—	—	—	JK 3-16
	760																	
Ⓐ ✓	761	EC	1862607	F27	NO 1 D W PUMP DISCHARGE	48S	2652	-48	30	✓	✓	✓	—	—	—	—	*	RJ. 4-1
Ⓐ ✓	762	EC	1862607	F27	NO 2 D W PUMP DISCHARGE	48S	2652	-48	30	✓	✓	✓	—	—	—	—	—	EJC 3-15
Ⓐ ✓	763	EC	1862607	F27	NO 2 D W PUMP SUCTION	48S	2652	-48	30	✓	✓	✓	—	—	—	—	—	
Ⓐ ✓	764	EC	1862607	F27	NO 1 D W PUMP SUCTION	48S	2652	-48	30	✓	✓	✓	—	—	—	—	—	
Ⓐ ✓	765	EC	1862607	F65	D W SUPPLY	48S	2652	-48	15	✓	✓	✓	✓	✓	✓	—	*	RJ 4-1
Ⓐ ✓	766	EC	1862607	F65	D W RETURN	48S	2652	-48	15	✓	✓	✓	✓	✓	✓	—	*	RJ 4-1
Ⓐ ✓	767	EC	1862607	F76	D W FROM EXP TK TO PUMP SUCT	48S	2651	-24	12	✓	✓	—	—	—	—	—	—	EJC 3-15
* Ⓐ	~~768~~	~~EC~~	~~1862607~~	~~F73~~	~~D W FROM ION EXCHANGER~~	~~47S~~	~~2651~~	~~-16~~	~~12~~									—
Ⓐ	~~769~~	~~EC~~	~~1862607~~	~~F73~~	~~D W TO ION EXCHANGER~~	~~47S~~	~~2651~~	~~-16~~	~~12~~	deleted 3-21 EJC								—
	770																	
	771	COS	1862732	F1	DR FW EXP TK NO 1 ABSORBER	50P	TEFLON	DASH	12	✓	✓	✓	—	—	—	—	—	EJC 3-15
	772	COS	1862732	F1	DR AMINE FILL TK TO NO1 ABSORB	49P	TEFLON	DASH	12	—	—	—	—	—	—	—	—	
	773	COS	1862732	F1	DR NO 1 ABSORBER	49P	TEFLON	DASH	12	—	—	—	—	—	—	—	—	
	774	COS	1862732	F1	DR FW EXP TK NO 2 ABSORBER	66S	TEFLON	DASH	12	✓	✓	—	—	—	—	—	—	Brook 3-15
	775	COS	1862732	F1	DR NO 2 ABSORBER	67S	TEFLON	DASH	12	✓	✓	✓	—	—	—	—	—	
	776	COS	1862732	F1	DR AMINE FILL TK TO NO 1 ABSOR	67S	TEFLON	DASH	12	✓	✓	—	—	—	—	—	—	
	777	COS	1862732	F2	NO 1 ABS PUMP TO FWD SAN TK	49P	TEFLON	DASH	8	✓	✓	—	✓	—	—	—	—	
	778	COS	1862732	F2	NO 1 ABSORBER DR PUMP SUCT	49P	TEFLON	DASH	8	✓	✓	—	—	—	—	—	—	
	779	COS	1862732	F2	NO 2 ABSORBER DR PUMP SUCT	66S	TEFLON	DASH	8	✓	✓	—	✓	✓	✓	✓	✓	

EXHIBIT (A) 36

IND- PNS-1095 (NEW 10-62)

FLEXIBLE CONNECTION POST INSTALLATION - DATA SHEET

SELECTED RECORD DRAWING NO. SS/N/593-845-2103292

S/N 593-501 10 005 TEST NO ..... REV. A
PAGE 36

REV.	S.R.D. ITEM NO.	SYSTEM DESIG-NATOR	INSTALLATION DRAWING NO.	PIECE NUMBER OF ASSEMBLY	SERVICE	LOCATION FR FR P/S	HOSE PART NUMBER EB/PNS / OTHER	DASH SIZE / LGTH. INCH SIZE IPS / SIZE	CERTIFICATION PAR. 4.2.1	TAGGED PAR. 4.2.2	SHOCK CLEARANCE PAR. 4	SUPPORT PAR. 4.2.4	ALIGNMENT PAR. 3	MIN. RAD. 3.1.6.7 PAR. 4.2.5	LAY LINE PAR. 4	CONDITION PAR. 4.2	INSPECTORS SIGNATURE & DATE
	780	COS	1862732	F2	NO 2 ABS PUMP TO NO 3 SAN TK	66S	TEFLON	DASH-8	✓	✓	–	–	–	–	–	–	RGT 4-2
	781	TD	1862780	F26	TRIM PUMP SUCT	67S	EB- TY	4-INCH	✓	✓	✓	✓	✓	✓	✓	✓	T. Brook 3/21
	782	TD	1862780	F27	TRIM PUMP DISCH	67S	EB- TY	3-INCH	✓	✓	✓	✓	✓	✓	✓	✓	T. Brook 3/21
✓	783	TD	1862780	F28	PRIMING PUMP SUCT TRIM	64S	2651	-16 24	✓	✓	✓	✓	✓	✓	✓	✓	
A ✓	784	TD	1862780	F35	PRIMING V SUCT FROM TRIM PUMP	67S	1509	-12 28	✓	✓	–	✓	✓	✓	✓	✓	
✓	785	TD	1862780	F70	TRIM PUMP DISCH GAGE LINE	71P	2651	- 6 12	✓	✓	✓	✓	✓	✓	✓	*	
✓	786	TD	1862780	F70	TRIM PUMP SUCT GAGE LINE	71P	2651	- 6 12	✓	✓	✓	✓	✓	✓	–	*	
✓	787	TD	1862780	F70	PRIMING PUMP SUCT GAGE LINE	71P	2651	- 6 12	✓	✓	✓	✓	✓	✓	✓	*	
✓	788	TD	1862780	F104	PRIMING PUMP DISCH GLAND LUBR	67S	2651	- 8 14	✓	✓	✓	✓	✓	–	–	–	JK 3-12
	789																
	790	TD	1862782	F30	DRAIN PUMP SUCT	76P	EB- TY	4 INCH	✓	✓	✓	–	–	–	–	–	EJC 3-16
	791	TD	1862782	F31	DRAIN PUMP DISCH	76P	EB- TY	3 INCH	✓	✓	–	✓	–	–		–	
✓	792	TD	1862782	F32	PRIMING PUMP SUCT	76S	2651	-16 24	✓	–	–	–	✓	✓	✓	–	
✓	793	TD	1862782	F39	PRIMING V SUCT FROM DRAIN PUMP	75S	1509	-12 24	–	–	–	–	–	–	–	–	
✓	794	TD	1862782	F48	GAGE LINE DRAIN PUMP DISCH	81S	2651	- 6 12	–	–	UNS	S	A	T	2	7	5 9 T
✓	795	TD	1862782	F48	GAGE LINE DRAIN PUMP SUCT	81S	2651	- 6 12	–	–		"					"
✓	796	TD	1862782	F48	GAGE LINE PRIMING PUMP SUCT	81S	2561	- 6 12	–	–		"					"
*	797	TD	1862782	F141	DRAIN PUMP GLAND SEAL	76P	2651	- 8 14	–	–	–	–	–	–	✓	–	REJ. 4-12
	798																
(A) ✓	799	TD	1862775	F28	SUBM PUMP DISCH TO DRAIN MAIN	19P	150901	-40 18	✓	✓	–	–	–	–	–	–	EJC 3-17
	800																
A ✓	801	TD	1862929	F38	SEA PRESSURE GAGE PIPING AFT	75P	2651	- 4 9	✓	✓	✓	–	–	–	–	–	EJC-3-14
A ✓	802	TD	1862929	F38	SEA PRESSURE GAGE PIPING FWD	27S	2651	- 4 9									W/ACCESS. 13 UP
✓	803	TD	1862929	F42	AFT SIGNAL EJECTOR GAGE PIPING	75P	1509	- 4 10	✓	✓	✓	✓	✓	–	–	–	3-14 M
	804																
	805																
	806																

(68) 1

EXHIBIT 37

PORTSMOUTH NAVAL SHIPYARD

USS THRESHER SS(N)593

TEST CHECK-OFF LIST PSA

NON - NUCLEAR

Date of Issue - 12 FEB 1963

One copy with original record of Proceedings

Copy of this exhibit may be obtained from:

Code 303B
Portsmouth Naval Shipyard
Portsmouth, New Hampshire

EXHIBIT (69)

USS THRESHER SS(N)593

SHIP'S FORCE TEST SCHEDULE TO SUPPORT
FOLLOWING DATES:

HOT OPS - - - - - - - - -2/11/63

STEAM OPS - - - - - - - -2/15/63

CRITICALLY- - - - - - - -2/20/63

FAST CRUISE - - - - - - -3/7/63

Dated 6 FEB 1963

One copy with original record of Proceedings

Copy of this exhibit may be obtained
from:

Code 377D
Portsmouth Naval Shipyard
Portsmouth, New Hampshire

EXHIBIT (70)

USS THRESHER SS(N)593

AVAILABILITY 13 July 1962

PSA Regular Schedule (Area Rev. #4)

PRINCIPAL EVENTS

Fast Cruise.....7-11 Mar 63

Sound Basin.....15-18 Mar 63

Sea Trials.....18-20 Mar 63

Date Issued 20 FEB 1963

One copy with original record of Proceedings

Copy of this exhibit may be obtained from:

Code 303
Portsmouth Naval Shipyard
Portsmouth, New Hampshire

EXHIBIT (71)

Circle 2 4714

Exhibit 28

DESCRIPTION: Rubber glove (right hand) size large, [redacted] paint smeared, bearing label "QM(CTM) - 11705-E-62"

LOCATION: No positive identification of glove to pinpoint location.

Exhibit 27

DESCRIPTION: Rubber glove (left hand) bearing label "Miller MP Rubber & Plastic Neoprene 10"

Similar type gloves size 10 were issued to USS THRESHER for antidecomtamination gloves.

LOCATION OF STOWAGE FACILITIES: In upper level of Auxiliary Machinery Space, Frame 64, approximately 18" to Port, and overhead in GSK Storeroom at Frame 50 approximately 12" to Starboard.

Use in nucleonics room or sampling station in Aux Machinery space. possibility of being in reactor compt.

Exhibit 25

DESCRIPTION: Large glass now labeled #3 containing:

(1) Two pieces of foamed plastic (white with oily black discoloration) (6#/cu ft Density poly urethane)

LOCATION: Midship compartment. Similar material used as insulation around Refrigeration Storerooms on USS THRESHER.

(2) Small pieces of cork

LOCATION OF SIMILAR CORK MATERIAL ABOARD USS THRESHER:

(a) Upper Level - Engine Room
(b) Upper Level - Auxiliary Machinery Compartment
(c) Overhead of Reactor Tunnel
(d) Forward side of Bulkhead 52 including Webs and all structural members down to 21'-8" Deck ABL

Exhibit (22)
1

(e) Entire forward side of Bulkhead 51 down to Deck at 7'-8" ABL
(f) Forward and Aft Bulkheads of Battery Compartment down to 51" above each battery foundation step.
(g) Midship Compartment between Frames 51-28 from 14'-8" Deck to 7'-8" Deck, cork applied on pressure hull and frame welds, including flanges of frames; also including upper structure of torpedo impulse tanks.
(h) Midship Compartment above 14'-8" Deck, cork applied to Frame Webs, Flanges and Bars, Deck Mount brackets.

(3) A quantity of dark oily substance.

LOCATION: No positive identification of material to pinpoint location.

Exhibit 24

DESCRIPTION: Small bottle now labeled #2 containing:

(1) Small pieces of cork

LOCATION: Location of cork is as explained in Exhibit 25.

(2) Small pieces of polyester microballoon material. (NOTE: Polyester resin phenolic spheres with hardener)

LOCATION:
a. Voids at Frames 104-105
b. Voids of Stabilizers
c. Voids of Rudders
d. Voids - Bridge Access - Fairwater (Center portion of Microballoons in this area was scheduled to be removed during overhaul of USS THRESHER)
e. Voids of Fairwater Planes
f. Voids - Shaft Brg - Outer Shell
g. ~~Transition~~ void frames 77-78
h. Forward Messenger Buoy
j. Aft Messenger Buoy

Exhibit (32)
2

(3) Small piece of plastic material (white)

LOCATION: Midship Compartment. Similar material used as insulation around refrigeration storerooms on USS THRESHER.

(4) Several small pieces white and off-color gelatinous material.

LOCATION: No positive identification of material to pinpoint location.

Exhibit 23

DESCRIPTION: One (1) bottle of clear liquid about 1/3 full now labeled as 1A.

LOCATION: No positive identification of material to pinpoint location.

Exhibit 22

DESCRIPTION: One (1) bottle of clear liquid (full) now labeled "#1".

LOCATION: No positive identification of material to pinpoint location.

Exhibit 29

DESCRIPTION: One (1) small plastic squeeze tube with following markings "Baker's Flavors Better Too - Squeeze Gently".

LOCATION: IF this material is from USS THRESHER, it could have been located in area of Galley, Scullery, Crews Mess, Officers Pantry, Dry Provisions Storeroom, Officers Wardroom. If material required chilling - Chilled Storeroom.

Exhibit 26

DESCRIPTION One small glass now labeled #4 containing.

(1) One (1) small piece of pale yellow plastic.

LOCATION: No positive identification of material to pinpoint location.

Exhibit (22)
3

(2) Two (2) small pieces of cork.

LOCATION: Is as explained in Exhibit 25.

(3) One (1) piece of plastic, off-white in color, with partially visible markings.

LOCATION: This material was identified as part of a capsule of Polaroid photographic material. Material not positively identified as ship equipment. If from USS THRESHER it could be located in any compartment within ship.

Exhibit 20

DESCRIPTION: Two (2) amber color translucent rubber gloves, both right hand size 8 similar to surgeon's gloves. One (1) glove had stained fingers and both bore a diamond-shaped "Pioneer" label.

LOCATION: Unable to positively identify glove as having been issued to USS THRESHER. However, from inquiry of Supply Department, surgical gloves issued to THRESHER bore trademark of "Wilgard", manufactured by Wilson Rubber Company. John Remensteiner, former member of USS THRESHER'S crew, stated that Ship's Force had purchased gloves which Supply Department has no record.

Exhibit 19

DESCRIPTION: One (1) doughnut-like, cylindrical, tan colored, foam float similar to a rope float. This was about 3 inches in diameter by 2 inches in height. Material identified as Neoprene rigid foam.

LOCATION: Unable to identify material as part of structure of USS THRESHER.

Exhibit 21

DESCRIPTION: One (1) large yellow plastic sheet about 1" thick x 12 inches x 10 inches with two (2) reasonably square edges and two (2) irregularly shaped edges, one (1) showing evidence of a pipe having penetrated it. This sheet bore a dimly discernable marking "BORATED" GRADE II.

Exhibit (22)
4

Exhibit 21 - continued

LOCATION: Similar material was installed on USS THRESHER'S Reactor Shielding Bulkheads, Frame 52, 60, and Reactor Tunnel Passageway Bulkheads.

Exhibit 57

DESCRIPTION: (1) One (1) large yellow slab of yellow plastic material resembling borated polyethylene, irregular fractured edges and two (2) circular openings for piping; sample appears to have been heavily compressed. Identified as borated polyethylene.

LOCATION: Similar to locations listed for Exhibit 21.

(2) A number of particles clinging, and imbedded particulate materials removed from slab - lead, s[redacted]s, low alloy steel (magnetic and imbedded magnetic wire), and organic fibers could also be part of adjacent structure of areas listed for Exhibit 21.

Exhibit 58 Many pieces of miscellaneous material.

Exhibit 58(A)

DESCRIPTION: (1) Yellow plastic - char on surface. Identified as borated polyethylene.

LOCATION: Similar to Locations listed for Exhibit 21.

Exhibit 58(B)
DESCRIPTION: (2) White Plastic identified as virgin polyethylene.

LOCATION: Similar to locations listed for Exhibit 21.

Exhibit 58(C)

DESCRIPTION: (3) Pale Yellow Plastic identified as Commercial Polyethylene.

LOCATION: Unable to pinpoint location.

Exhibit (52)
5

Exhibit 58(D)

DESCRIPTION: (4) Hard resinous material. Identified as compounded epoxy resin (microporous).

LOCATION: Unable to pinpoint location.

Exhibit 58(E)

DESCRIPTION: (5) Off-color hard resin identified as high density foamed polyurethane.

LOCATION: Unable to pinpoint location.

Exhibit 58(F)

DESCRIPTION: (6) Red Plastic Cap identified as polyethylene (commercial).

LOCATION: If Cap comes from USS THRESHER, it could have been located in any Compartment.

Exhibit 58(G)

DESCRIPTION: (7) Small Piece of Yellow Plastic identified as Borated Polyethylene.

LOCATION: Similar to Areas specified for Exhibit 21.

Exhibit 59 Several Miscellaneous Items

Exhibit 59(A)

DESCRIPTION: (1) Yellow Plastic identified as borated polyethylene.

LOCATION: Similar to Areas specified for Exhibit 21.

Exhibit 59(B)

DESCRIPTION: (2) White Plastic identified as Virgin Polyethylene.

LOCATION: Similar to Areas specified for Exhibit 21.

Exhibit (32)
6

Exhibit 59(C)

DESCRIPTION: (3) Piece of Hard Plastic identified as compounded epoxy resin.

LOCATION: Unable to pinpoint location.

Exhibit 59(D)

DESCRIPTION: (4) Piece of Red-Brown porous plastic (flat) identified as syntactic foam-polyester-microballoons void filler material.

LOCATION: Similar to locations listed for Exhibit 24.

Exhibit 59(E)

DESCRIPTION: (5) Brown Grease-like substance identified as Petrolatum Type Grease.

LOCATION: Unable to locate.

Exhibit 59(F)

DESCRIPTION: (6) Small pieces of porous white plastic adhering to grease identified as low density Polyurethane foam.

LOCATION: Unable to pinpoint location due to lack of positive identification.

Exhibit 60

DESCRIPTION: (1) Two plastic covered buoyant cushions slightly stained orange-red. Appeared to be buoyant elements from orange colored life jackets. Fiber removed from one proved to be non-flammable continuous synthetic fiber, evidently "Kapok".

LOCATION: similar Life jackets were stored in Control Center, Frame 33, Starboard.
Also possible that Jackets could be in Eng Rm. or Fwd Compt.

Exhibit (32)
7

MJG

303B-2
SS(N)593/9080
5 Apr 1963

MEMORANDUM

From: 303B
To: 310

Subj: USS THRESHER (SS(N)593); Dock Trial Inspection or Test Items not accomplished prior to Sea Trials during P.S.A.

1. The following items listed by Job Order, T/M number and paragraph, have not been accomplished prior to Sea Trials for subject vessel.

JOB ORDER	TEST MEMO	PARAGRAPH	
15-930-20325	43-02-001	4.5	X56
15-930-20925	01-10-005	Several unsatisfactory items still remain	X56
15-930-50213	38-03-010	Entire Memo	X56
15-930-50801	48-01-004	4.4 Aft Pump	X38
15-930-51401	58-01-004	4.3	X56
14-930-52601	21-01-009	4.1 Operation of MS1 and MS2 Anchor Gear	X38
15-930-52633	17-01-004	4.4.3.3	X51
15-930-51315	49-01-009	4.2	X56
15-930-50614	58-01-003	4.4	X56
15-930-50803	Special Test PSA 8		X56
15-930-20906	41-01-001	Test not acceptable	X11
15-930-20813	65-05-071	4.4.2.6	X56

(b) (6)

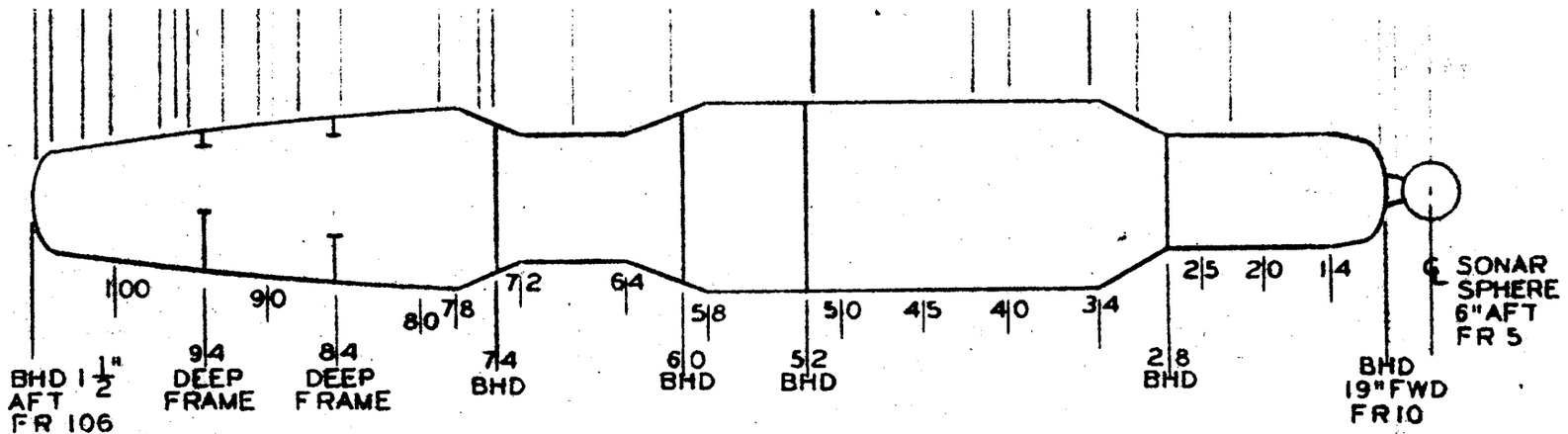
Copy to: ✓
313, 303B, 303, 956, 938,
947, X51, 303B-2, X11

EXHIBIT (73)

b(1)

EXHIBIT (74)

EX 94



USS THRESHER - PRESSURE HULL FACTORS OF SAFETY 4/15/60

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, N. H.

MTK

IN REPLY REFER TO
264B
SS(N)593/9490
22 Apr 1963

MEMORANDUM

From: 264B
To: 240

Subj: USS THRESHER (SS(N)593) High Pressure Air System, comments on

Encl: (1) Record on SS(N)606 (TINOSA) Air Bank Equalizing Time

1. It has been reported that, on two (2) occasions, it was found to take 78 seconds on SS(N)606 (TINOSA) to open bank stop valves and that the Design lecture stated they were trying for 60 seconds in lieu of 30 seconds.

2. Change Orders 151 and 213 require the following:

"Air bank solenoid stop valves shall be designed to linearly control pressure equalization across the valves. The time to equalize upstream and downstream pressure regardless of downstream volume shall be 30 ± 3 seconds."

3. Code 264B comments:

a. USS THRESHER (SS(N)593). The equalization time was checked and specification met as indicated by pressure gages, located in air regeneration space on USS THRESHER (SS(N)593). These tests were witnessed by Chief Stokel and Chief Johnson of THRESHER prior to original ship's trials. A report of the tests was made verbally to Lt. (b) (6) by these persons, who accepted the test results.

b. SS(N)606 (TINOSA).

(1) Crew training lecturer was Mr. L. Bosse. He explained that the bank actually equalizes in 30 ± 3 seconds; however, the verification light on the ballast control panel will light in approximately one (1) minute. He has apparently been misquoted. Shipboard test memorandum S49-01-006 Rev A attachment was signed off on 27 December 1962, which indicated satisfactory compliance with the requirement 30 ± 3 seconds.

Exhibit (75)
1

(2) The ballast control panel bank indicator light is controlled by a switch on the bank stop valve. The bank stop valve must be 98% open before the light will come on. It has been found that it takes about 90 seconds for the indicating light to actuate; however, in no case has the actual equalizing time exceeded specifications. Enclosure (1) is a set of readings made at 0100 hours on 19 April 1963 on TINOSA, which verify the above statements.

(b) (6)

Copy to:
240
260
264
264B(2)
246B
OIC SS(N)606

Exhibit (35)
2

	HEADER PRESS	ORIG PRESS	FINAL EQUAL PRESS	TIME TO EQUAL AT AIR MANIFOLD	TIME TO GET LIGHT
AIR BANK 1	b(1)		-	32. sec	78
AIR BANK 2			-	28.25 sec	50
AIR BANK 3			-	26.5 sec	61
				26. sec	62

Exhibit (55)
3

ENCLOSURE (1)

Operational Test of Finnair MBT
Blow System: ON 19 APRIL 1963

Test I:

Initial Conditions:

(a) Bank #2 in service at b(1)
(b) All other banks isolated.

Test:

Commenced blowing the FWD. GROUP b(1) MBT's. Header pressure settled out at de-energized the #2 air bank solenoid then quickly re-energized. Initially b(1) header pressure dropped to zero. After 10 seconds pressure began to increase; reached ~~20 seconds~~ b(1) after 25 seconds; and was steady at b(1) after 30 seconds. Pressure then began to drop as bank pressure dropped. The air bank stop open light came on after 1 min 10 secs.

Exhibit (76)

Test II

Initial Conditions:

(a) Bank #3 on service at b(1)

(b) all other banks isolated.

Test:

Commenced blowing MBT #1. b(1)

header pressure settled out at b(1)

de-energized the #3 air bank

solenoid then quickly re-energized.

Initially b(1) header pressure

dropped to zero. After 10 seconds

pressure began to increase;

reached b(1) after 20 seconds;

and was steady at b(1) after

30 seconds. Pressure then began

to drop as bank pressure dropped.

The air bank stop open light

came on after 60 secs.

Exhibit (76)

2

CONDITION			TIME – SECONDS
CASUALTY	ACTION		0 15 30 45 60 75 90
1. LOSE A C POWER – POWER REMAINS OFF	A. AUTOMATIC ACTION	VALVE BANK #1 VALVE BANK #2 VALVE BANK #3 VALVE BANK #4	← APPRECIABLE QUANTITIES OF AIR AVAILABLE FOR BLOWING OPENS — EQUALLIZES → — NO LIGHT ON BPC SHUT TIME 100-500 MILLI SECS
	MANUAL ACTION	1. OPEN ACCESS DOOR TO MBT BLOW VALVES LOCATE ON FWD EDGE OF B.P.C. 2. ACTUATE MANUAL OVERRIDE ON INDIVIDUAL BLOW VALVES I.E. MBT #1, MBT FWD GROUP & MBT AFT GROUP – TOTAL -3 VALVES. AIR BANK #1 WILL SUPPLY BLOW AIR UNTIL IT EQUALLIZES WITH SEA PRESSURE	← START BLOW MBT MANUALLY
	B. MANUAL ACTION	PASS WORD TO MANUALLY OPEN AIR BANK #2,3 & 4 (THIS IS ACCOMPLISHED AT THE BANK CONTROL VALVE) ASSUME AIR BANK #2,3 & 4 ARE OPEN IN 15 SECONDS	← ALL BANKS ON HEADER & FULLY EQUALLIZED ← FULL QUANTITY OF AIR AVAILABLE FOR BLOWING
2. LOSE AC POWER – POWER REGAINED AFTER ½ SECOND	A AUTOMATIC ACTION	VALVE BANK STOP #1 OPEN VALVE BANK STOP #2 SHUTS VALVE BANK STOP #3 SHUTS VALVE BANK STOP #4 SHUTS	½ SEC — 30½ SECS SHUT IN 100-500 MILLI SECS STARTS TO OPEN BANKS EQUALLIZED → ← FULL QUANTITY OF AIR AVAILABLE FOR BLOWING
		LIGHT FOR BANK STOP #1 LIGHT FOR BANK STOP #2 LIGHT FOR BANK STOP #3 LIGHT FOR BANK STOP #4	LIGHT APPEARS ON PANEL IN APPROX 50-80 SECS
	B. MANUAL ACTION	ACTUATE SWITCHES ON B.C.P. TO BLOW MBTS ACTUATE IN 15 SECONDS	
3 LOSE AC POWER POWER REGAINED AFTER 15 SECONDS	A. AUTOMATIC ACTION	VALVE BANK STOP #1 VALVE BANK STOP #2,3 & 4	STARTS TO OPEN ← SHUTS SHUT ← STARTS TO OPEN BANKS EQUAL → LIGHT IN APPROX 65-95 SECS ← FULL QUANTITY AVAILABLE FOR BLOWING
	MANUAL ACTION	MANUALLY BLOW AS IN #1-A MANUALLY OVERRIDE THE SOL BANK STOPS AS IN #1-B	← START MANUAL BLOW AT OVERRIDEN VALVES
	B. POSSIBLE MALOPERATIONS IN FIRST 15 SECONDS	1. BANKS #2,3 & 4 CONTROL VALVES COULD BE SWITCHED TO SUIT & LEFT IN SHUT POSITION, DEENERGIZED POSITION. 2. BANK #1 COULD HAVE BEEN LEFT ON SHUT, ENERGIZED POSITION. 3. COMBINATION OF #1 & 2 RESULTS IN NO AIR SUPPLY AVAILABLE FOR BLOWING. AIR FROM CHARGED HEADER ONLY ENTER BALLAST TANKS RESULTING IN A VERY SHORT BLOW TIME.	NO BLOWING ACTION POSSIBLE EXCEPT FROM AIR STORED IN HEADER UNLESS FURTHER CORRECTIVE ACTION IS TAKEN

EXHIBIT - 77

SS(N)593 CREW TRAINING LECTURE

LECTURE NO. 15

Title: Steering and Diving Hydraulic Systems

Training Aids: (See list on last page)

Objectives:

1. To familiarize the trainees with the over-all make-up of the steering and diving systems.

2. To acquaint the trainees with the names, locations, and purposes of the principles system components.

3. To familiarize the trainees with the operation of the system.

4. To develop a knowledge of the safety precautions to be observed when using the steering and diving system.

Presentation:

I. Over-all make-up of the steering and diving system. The steering and diving systems are made up of a set of control surfaces. These control surfaces are namely:

a. The rudder (See Training Aid Booklet, pg. 5)

b. The Stern Planes

c. The Fairwater Planes

1. The rudder is located forward of the screw and mounted above and below the centerline of the ship. The rudder is used to steer the ship when the vessel is submerged or surfaced.

2. The stern planes are located forward of the screw and mounted in a horizontal plane on either side of the centerline of the ship and mounted on the after end of the stabilizers.

EXHIBIT - 78

3. The fairwater planes are located on each side of the fairwater, forward end. Each plane is mounted on a common shaft and moves together.

4. All control surfaces are permanently rigged out.

5. The steering, stern planes and fairwater planes all function in a similar manner. Only location of the various components will be different. Therefore, a description of one of the sets of planes will be similar in operation to the rest.

II. OPERATION OF THE RUDDER (Use Training Aid Booklet, pg. 48)

A. The rudder is mounted on a shaft. The shaft is caused to rotate by the push and pull of a hydraulic cylinder. The hydraulic cylinder is a double-acting cylinder. That is to say, oil pressure can be supplied to either end of the cylinder, causing the cylinder to move in the direction of the oil pressure. There are three modes of operation for the rudder:

1. Normal hydraulic system - which is an electro hydraulic system that can operate the rudder from electric signals which are transmitted from the steering control station.

2. Emergency - which is a manual hydraulic system that ports oil directly to the control surface rams. The controls are also mounted in the Control Room.

3. Hand System - which is a manual hydraulic system that ports oil directly to the control surface. The control valve is located near the respective ram mechanical indicator.

B. Normal Hydraulic System. (Use Training Aid Booklet, pg. 49). As was said before, the rudder is controlled by a hydraulic ram. The movement of the ram causes the rudder to move in the direction that is

required to steer the ship. Oil pressure is ported to the ram through a servo valve. This servo valve is made up of a slave valve, which has a main spool that is hydraulically operated; mounted on top of this slave valve is a pilot valve which pilots oil pressure to the main spool causing the spool to move in the proper direction. The pilot valve has a force motor which is electric and causes the pilot spool to move in the proper direction. The force motor receives electric current signals from an amplifier. The amplifier in turn receives voltage signals from the helm station or ordering post and also receives voltage signals from the feedback portion or from the ram, so that the amplifier becomes a summing device and also a transmitter of current signals to the force motor. When the signal from the ordering station is equal and opposite in magnitude to the signal from the feedback signal the amplifier will send no signal or zero current to the servo force motor. In this position the servo valve is in a neutral position and is blocking the oil ports to the ram. That is to say, no oil is flowing to or from the ram when the servo valve is in its neutral position.

C. Rudder Function. (Use Training Aid Booklet, pg. 49). Let us take a look at a left rudder sequence and see what happens.

1. The helmsman rotates the steering wheel counter-clockwise to let's say an ordered angle of 20 degrees left rudder. As he rotates the helm he is actually rotating an electrical synchro.

2. This electrical synchro sends a voltage to the amplifier and let us call that voltage plus ten volts. Now, since the rudder is in a neutral position, the feedback synchro is generating no electrical signal and,

therefore, sends no signal to the amplifier or zero voltage to the amplifier.

3. The amplifier sums up zero voltage and the plus ten volts that it receives and, therefore, sends a current which has a positive polarity to the servo force motor.

4. The servo force motor receiving this positive current moves the pilot spool to the servo valve to the left.

5. The pilot spool then ports oil to the main spool of the servo valve causing the main spool to shift to the right.

6. As the spool shifts to the right it opens the pressure port to the left hand side of the ram and opens the return port to the right hand side of the ram causing the ram to move towards the right.

7. As the ram moves toward the right it generates, through a feedback synchro, a negative voltage which is increasing in proportion to the displacement or movement of the ram.

8. As the voltage from the feedback synchro increases it is being summed at the amplifier and the positive voltage from the control station or helm synchro added together with the negative voltage from the feedback synchro will cause the current which is being transmitted to the force motor to decrease.

9. When the current to the force motor reaches the operational range or the control range of the servo the pilot spool will start to close which will in turn tend to close the main spool of the valve which will then meter the flow to the ram causing the ram to slow down.

10. When the ram has finally reached its ordered position of 20 degrees left rudder it will be generating an electrical voltage of -10 volts

which will be equal and opposite to the plus 10 volts which is generated from the helm station.

11. Since the voltage is canceled and becomes zero the force motor will receive no current or zero current from the amplifier causing the pilot spool to center to its neutral position which in turn will cause the main spool to center to its neutral position which will then block the ports to the ram causing the ram to stop at the ordered angle.

12. As long as the helm is held at its ordered angle of 20 degrees left rudder, the rudder will remain in its ordered position.

13. Now let's suppose the helmsman returns the helm to neutral or zero angle.

14. As the helmsman returns the helm to zero, he actually is canceling out the ordered angle voltage of plus 10 volts to the amplifier. However, the ram cannot respond as quickly as the rudder, therefore, in the initial case it is still at its 20 degree ordered position which is actually generating a minus 10 volts to the amplifier.

15. The amplifier now sums up the two voltages and since it has zero voltage from the helm it will send a current to the servo valve which has a negative polarity.

16. This negative current will now cause the pilot spool to move to the left.

17. As the pilot spool moves to the left it will port oil to the main spool of the valve causing it to move to the left.

18. The main spool will then port oil so that the pressure side of the system will now be open to the right hand side of the ram and the return

will be open to the left hand side of the ram, causing the ram now to move to the left which tends to make the rudder move to the right.

19. As the rudder moves to the right, it will send a decreasing voltage signal to the amplifier from its feedback synchro.

20. As the voltage to the amplifier decreases, the summed up voltage will also decrease because there is no voltage being transmitted from the helm station.

21. As the voltage approaches zero the servo valve current will start to approach zero which will cause the pilot spool to start to center causing the main spool to start to close causing the oil to be metered to the ram, slowing down the ram.

22. When the ram has reached its neutral or zero position the summation of the voltage to the amplifier becomes zero, therefore, the current to the force motor is zero and the servo valve will go to its neutral position blocking the ports to the ram causing the ram to stop at zero angle.

In summarizing we can say then that each set of planes is controlled in a normal position by a servo control loop so that the planes or rudders will follow the position of the ordered control whether it be a stick or a wheel.

Normal operation of the various control surfaces is directed through a servo control valve. However, the power supply for normal operation can be from either a pressure demand system or a constant pressure system. The selection of which power supply to be used is located on a panel

mounted in the Control Room on the ballast tank. This panel allows an operator to select either one or the other power supply for normal operation of any of the control surfaces, that is, any one of the control surfaces may be operated by either of the power supplies at any time during normal operation of the ship.

Pressure demand system is nothing but a pump and tank pumping oil to the servo valve through a pressure compensating valve. This pressure compensating valve will by-pass oil when oil is not required at the rams, will flow the exact amount of oil that is required at the rams and by-pass the excess oil that is coming from the pump.

The constant pressure system is actually the accumulator part of the main hydraulic system which will be covered in a later lesson. It suffices to say at this time that the constant pressure system has a bank of accumulators which are charged off a pump.

D. (Use Training Aid Booklet, pg. 49). Emergency operation of the ship comes from a separate control loop than that of the normal operation of the ship, however, certain hydraulic lines are common to both systems. We can choose either emergency operation or normal operation with the use of a power transfer valve, therefore, the lines from the power transfer valve to the ram will be common to both systems. That is to say, we pipe hydraulic lines from the servo valve to the power transfer valve in the normal system. For the emergency system we pipe lines from our emergency control valves to the power transfer valve. By shifting

the power transfer valve we can shift from one mode of operation into the other. That is, we can shift from normal into emergency operation. Shifting from normal to emergency operation will be covered in a later lesson plan.

The emergency operating system is simply a hydraulic control valve which ports oil directly through the power transfer valve to the hydraulic rams. The control valve is a 4-way manually operated valve which is located in the Control Room. Each set of planes, fairwater, stern-diving and rudder has a separate control valve for emergency operation, located at a separate control station in the Control Room.

A power for emergency operation is taken from the b(3) 10 USC 130 system. The b(3) 10 USC 130 system will be covered in a later lesson plan. It suffices to say at this time that the b(3) 10 USC 130 system comes from a set of accumulators which are charged by a pump.

E. (Use Training Aid Book, pg. 49). Hand operation of the various control surfaces is similar to emergency operation in that direct porting of oil to the rams is used. However, the hand system does not go through the power transfer valve. In order to utilize the hand operating system of the vessel, you must open and close ball valves which will isolate the rams to the hand operating system.

The hand operating system derives its power from a separate power supply. This power supply has a separate supply tank and also a separate pump which is energized with a DC electric motor. The hand system is used when both the normal and emergency power plants or systems have failed.

The hand system has three separate control valves, one for each set of planes. The control valves are located near their respective rams such that an operator can see the mechanical angle indicator when controlling the movements of the ship. The ship cannot be controlled in hand operation from the Control Room, except for fairwater planes, as it can be controlled during normal or emergency operations.

III. Precautions to Observe when using Systems.

a. Rudder controls are over-sized for normal speeds and operations. Basic tests reveal the need for an extra large rudder to provide steering control at slow speeds. As a result rudder controls are extremely sensitive at high speeds. Operators should avoid the use of large control angles on control surfaces during high speeds.

b. Rudder movement at moderate and high speeds will produce a dive angle on the boat. Counteract this dive angle by placing rise on the stern planes.

c. Avoid jamming control surfaces at extreme limits of travel. To do so at dive at high speeds could be fatal.

d. In shifting from normal operation to emergency operation with the use of the power transfer valve it may be found that the valve will stick toward the normal operating position. If this happens the operator can force the valve over to the emergency position by applying the air pressure that is available to the spring side of the power transfer valve. The air valve which is used to do this is located in the Control Room.

e. During emergency operation of the ship and during hand operation of the ship it must be remembered that in order to bring the control surfaces

back to zero or neutral position the operator must turn his control wheel or stick to the opposite side of what he has ordered. In other words, if the operator has ordered a 20 degree right rudder and returns the stick to neutral the planes will remain at 20 degrees right rudder. In order to bring the plane back to zero the operator will have to turn his rudder to the left watching the indicator and when the rudder has approached zero the operator should then return the rudder control to zero.

TRAINING AIDS:

1. Training Aid Booklet - Vol. 1. - Piping SS(N)593
   (a) Page 5 - Location of Control Surfaces.
   (b) Page 48 - Control Console, Rudder, and Fairwater.
   (c) Page 49 - Steering Hydraulic System.

SS(N)593 CREW TRAINING

Title: Service Air System

Training Aids:

1. Training Aid Booklet, Vol. I, Piping

   a. Page 33 - Service Air System

   b. Page 32 - Diesel Start

   c. Page 30 - Diesel Fuel Oil Tanks

   d. Page 34 - MBT Blow & Vent

   e. Page 11 - Fwd & Aft Escape Trunk

Objectives:

1. To describe the service air system.

2. To describe the power supply and the various pressure manifolds that are available to the service air system.

3. To describe the various system components that are associated with the service air system.

Presentation:

1. Description of service air system - The service air system can be defined as the air system on the ship that serves all components using air pressures from b(1) down to atmospheric.

2. Description of power supply and service air. The service air system has three main headers which run fore and aft through the ship. These headers are the b(1) header, the 100 PSI header, and the 20 PSI header. The b(1) header is actually reduced from the high pressure b(1) system, which was described in the high pressure air system lecture. The 100 PSI header and the 20 PSI header are reduced from the b(1) header. In the service air system there are other various pressure reducing stations which feed apparatus at lower pressures. These reducing stations are: b(1) - which is used to operate torpedo ejection pump ram return, b(1) reducer - which is used to operate the snorkel head, and 100 to 15 PSI reducer - which is used to operate various air conditioning controls.

3. Description of System Components - The following is a list of system components which are operated in the service air system:

EXHIBIT #79

A. Forward trim tank - the forward trim tank, which is located approximately in the bow of the ship, contains sea water which is used to trim the ship. Normally, sea water is moved from the forward trim tank to the after trim tank with the trim pump. However, if the pump breaks down and the water cannot be moved by pumping, water can be moved by the use of air pressure. This pressurizing system acts off the b(1) system air header. The forward trim tank is pressurized by opening valve ALP-161. This allows air to enter the forward trim tank, pressurizing the tank, and forcing water through the various water lines back to the after trim tank. The various sea water valves which are normally opened and closed during pumping to allow water to flow from the forward trim tank to the aft trim tank will have to be opened during the air charging process. When transferring water via the water pump the forward trim tank is open to the ship's atmosphere through valve ALP-162 and valve ALP-219; valve ALP-161 is normally closed.

B. Diesel Engine Start - the diesel engine start is done by pressurizing the engine with air. This air supply comes off a 250 PSI line which has been reduced from the b(1) header through reducing valve AHP-122. Diesel engine operation will be covered in another lecture.

C. Forward Main Ballast Tank Closure Doors - Forward main ballast tank closure doors in main ballast tanks 3B, 2B, 3A, 2A and main ballast tank 1 can be operated by air cylinders. Normally, these closure doors are operated by the air pressure which is forcing the sea water out of the ballast tank. That is, by pressurizing the tank with air, the water will force the closure doors open. However, each closure door is attached to an air cylinder. The air cylinder is a single acting spring return cylinder. Therefore, when the pressure of the water in the main ballast tank is less than the spring force in the cylinder, the door will be closed. In case the door sticks or the air pressure in the tank does not force the door open, the air cylinder may be charged with air to aid or force the closure door open. These air cylinders are connected to a charging connection. In order to operate the air cylinders, a hose connection must be connected from the b(1) source to the air charging connection on the closure door cylinder line. Then, by opening valves ALP-111 and ALP-173 main ballast tank 1 closure doors will open. By opening valves ALP-112 and ALP-174 main ballast tanks 3B, 2B, 3A, and 2A closure doors will open.

D. Sea Chest Valves - The various sea chest valves on the ship which allow sea water to enter or leave the ship sometimes clog up. When these valves clog up, it is necessary to blow them to remove the clogging material. The service air system has provided air connections to these various sea chest valves. A hose connected from the b(1) source to the connection on the sea chest valve will blow these valves clear of foreign material.

E. Fuel Oil Tanks - The diesel fuel oil tanks which are located fore and aft in the ship are sea water compensated. That is, when fuel oil is used in the tank, sea water is allowed in to replace the used fuel. The fuel is normally pumped from the tank to the diesel engine. However, if the pump fails, there is a charging line which is similar to the trim tank charging line in operation so as to move the fuel oil to the diesel engine. This charging line comes from the service air system. Each individual fuel oil tank has a separate air charging connection mounted to it. This charging connection also has a pressure gauge mounted on it. In line with the shut-off valves is a palm-operated three-way, two-position, spring return to open, valve. This valve is normally open so that the fuel oil collecting tank is open to ship's atmosphere when the various valves are open. When the charging line is connected to its charging connection and the valve that has the charging connection is open, air pressure from the ship's service air supply will then enter the ship's atmosphere. The operator is forced to push the palm button down in order to pressurize the fuel oil tanks. By regulating the shut-off valve and operating the manual valve the operator can safeguard against rupturing the fuel oil tanks which are not hard tanks.

F. Negative Tank Vent to Ship - The negative tank is vented to the ship's atmosphere through two separate hydraulic controlled valves. ALP-118 and ALP-117 are two-way, two-position, normally closed, air valves which are hydraulically operated and electrically controlled at the ballast control console.

G. Fuse Valves - Mounted in various parts of the ship, coming from the b(1) header, are fuse valves which have charging connections on them so that they can be plugged in for operation of any of the ship's apparatus. The fuse valve is simply a valve in which if the pressure drop on the output side of the valve falls below a predetermined amount, the valve will close, preventing the ship's supply from being depleted.

H. Torpedo Firing System - The torpedo firing system or part of the torpedo firing system is operated with b(1) air, reduced from b(1) The torpedo is ejected by a hydro-pneumatic ram utilizing b(1) air reduced from H.P. air bank #1. The hydro-pneumatic ram is returned to Battery position using 110 PSI air reduced from b(1) service air.

I. Air Whistle - There are two air whistles mounted on the fairwater of the ship. These air whistles are controlled by two, two-way two-position, mechanically operated valves. The valves are ALP-337 and ALP-78. The air whistles are operated from the 100 PSI system header that runs through the ship. The operation is very simple. By pulling on the lever the operator opens the valves allowing air to go to the whistles; releasing the handle to the whistle will spring return the valve to close and shut the air supply to the whistle.

J. Whip Antenna - As was pointed out in the external mast hydraulic system lecture, the whip antenna is raised with air pressure. This air pressure comes from the b(1) system air header in the ship. The air pressure is reduced to 60 PSI through solenoid controlled reducing valve. To actuate the reducer, the solenoid No. 2 must be energized. Air is then allowed to enter the whip antenna mast. The air pressurizing the whip antenna to 60 PSI will raise it. When the whip antenna is in the raised position, the pressure will be 60 PSI. To lower the whip antenna, de-energize solenoid valve No. 2. This will allow all air in the mast to vent to atmosphere except 30# through the relief valve attached to No. 2 solenoid valve. The hydraulic motor which drives the whip antenna down is then energized. As the hydraulic motor rotates, it pulls the whip antenna down. When the whip antenna is finally in its lowered position, solenoid valve #1 is energized and the small volume of the remaining air is vented to atmosphere through the reducer relief valve. This keeps the whip antenna down. The hydraulic motor and both reducer solenoid valves can then be de-energized and the whip antenna is in the stored position.

K. Snorkel Exhaust

L. Snorkel Induction -Mounted in the snorkel induction is an air pressure line which comes from the 20 PSI header. This line is used to promote draining the water from the snorkel induction mast to negative tank. Hand valves ALP-70 and ALP-68 must be opened to blow the water from the snorkel induction mast. The snorkel induction mast also has a vent. Closing valve ALP-68 and opening valve ALP-69 will vent the snorkel induction mast to the ship's atmosphere. This vent should be opened when raising and lowering the mast.

M. Periscope and Jet Box - Mounted in the periscope is an air line which is used for defogging and drying of the periscope lens. The air line which runs up to the periscope to dry the lens is supplied with air pressure from the 100 PSI air header. When it is required, the valve which operates the air jet box can be energized to allow air to run to the periscope, defogging or drying it.

N. Snorkel Head - The snorkel head has a poppet type valve which can open and close the snorkel mast. This snorkel head is air operated. The operation of the snorkel head comes from the 200 PSI system pressure which has been reduced from the b(1) header or the b(1) header. When the snorkel mast is raised, the snorkel head may be opened by energizing valve ALP-61. Valve ALP-61 is a double three-way, two-position, solenoid-controlled valve. The electrical controls for the valve can be found on the ballast control panel. When valve ALP-61 is energized, pilot air pressure moves the spool to a position that allows air to go up into the snorkel head, moving the snorkel head up, opening the snorkel mast. If for any reason a wave comes along and slaps the top of the snorkel head, it will energize electrical switches which will then de-energize the solenoid, moving the main spool to a position which will allow air pressure to close the snorkel head. In addition to this outboard safety device, there is an inboard safety which will allow quick

closing of the snorkel head. Mounted in the line, which feeds the periscope drying air jet box, is a three-way, two position, manually operated, spring return to open, valve. This valve is ALP-338. By hitting the hand button on ALP-338, the operator will vent air from control valve ALP-61. The vented air will cause the main spool of valve ALP-61 to shift to the position where the air pressure from the 200 PSI source runs up into the snorkel head and closes it. Valve ALP-338 then acts as an over-ride on the solenoid valve of ALP-61.

O. Sanitary Tank Blow and Vent Manifold - Sanitary tanks #1, 2 and 3 have an air pressurizing system that is used to blow the tanks clean and also to vent them to the ship's atmosphere. Each tank has an individual blowing and venting system, so a description of one will suffice for all three. When a sanitary tank must be discharged to sea, it is necessary to charge the tank with air. This charging air is taken from the b(1) system header. A line from the b(1) system header is connected to the blow and vent control valve. Sanitary tank #1 is charged by valve ALP-27. Sanitary tank #2 is charged by valve ALP-26. Sanitary tank #3 is charged by valve ALP-216. Each valve is a four-way, four-position, manually-operated, valve which is spring detented to hold it in any one of the four positions. The sanitary tank during normal operation is vented to the ship's atmosphere and the control valve is placed in the venting position which allows the tank to vent itself through a filter to the ship's atmosphere. When it is necessary to blow this tank, the various drain valves which discharge into the sanitary tank are closed. The air pressure control valve is then moved to the Blow position. This valve is also a metering type valve. Each tank has a pressure gauge mounted on the charging line so that the operator may charge the tank to any desired pressure. When the tank is charged to the pressure necessary to blow the tank to sea, according to the depth that the ship is at, the operator then puts the control valve into the Closed position. This Closed position blocks all of the ports of the sanitary tank. The sanitary tank discharge valve is then opened to the sea and the sanitary tank is blown free of all matter. The discharge valve is then closed and the manual valve is placed in the vent through orifice position. This vent through orifice position vents the sanitary tank through a restrictor. This restrictor will slowly bleed the air from the sanitary tank through the filter. This is done to prevent damage to the filtering elements which could occur if the sanitary tank were open directly to the filters without an orifice. When the tank is finally completely bled of all air and the pressure in the tank is equal to the pressure in the ship's atmosphere, the control valve is then put into the fully vented position so that the tank is fully vented to the ship's atmosphere, and is once more ready for normal operation. Mounted on each pressure line to the sanitary tank is a relief valve which is set at b(1) This relief valve prevents over-pressurizing of the tank during the discharge process.

P. Air Conditioning Controls - Various air conditioning controls are operated from the ship's service air supply system. The b(1) air

is reduced down to 100 PSI. This air is further reduced down to 15 PSI through a separate reducer. Air conditioning controls will be taken up in another lesson.

Q. Depth Detector - Mounted approximately amidships is a depth detector. This depth detector allows water to enter through the hull of the ship through ball type valves so as to record the depth of the ship due to the sea water pressure. Sometimes this hull valve which allows the water to enter is clogged. Therefore, a separate line is connected to the head of this ball valve to an air charging valve. This air charging valve has a charging air connection mounted on it which can be plugged into the ship's service supply to blow the valve clean of all foreign matter.

R. Shallow Depth Recorder - The ship has a shallow depth gauge which reads the depth of the ship from the pressure of the sea water. This valve also has an air charging valve for blowing any clogged material from the hull valve. It is similar in operation to the depth detector charging valve.

S. Potable Water - The potable or drinking water on the ship is charged with air pressure so as to distribute the water throughout the ship to various drinking and faucet stations. This charging air is taken from the 20 PSI header. The potable water tank is normally open to this 20 PSI system. Valve ALP-7 is closed and valve ALP-82 is when filling potable water tank #2. Potable water tank #1 is filled by closing valve ALP-85 and opening ALP-86. In a similar manner, potable water tank #3 is filled by opening valve ALP-84 and closing valve ALP-83. After filling with water, vent valves are closed and 20# air valves are opened to the tanks. The tanks are now ready for use.

T. External Mast Hydraulic Oil Supply Tank - The external mast hydraulic system oil supply tank is charged with air pressure. This air pressure is taken from the 100 PSI system header. The charging line has a check valve to prevent oil from backing up. It also has a set of hand control valves which are used to charge the tank. Opening valve ALP-48 and closing valve ALP-264 will charge the tank. Closing valve ALP-48 and opening valve ALP-264 will vent the tank to ship's atmosphere.

U. Aft Main Ballast Tank Closure Doors - The after main ballast tank closure doors, in main ballast tanks 6B, 5B, 4B, 6A, 5A, and 4A operate in a similar manner as do the closure doors in the forward main ballast tanks. Valve ALP-177 is the charging valve with the charging connection to be connected to the b(1) system pressure.

V. Main and Vital Oil Supply System Tank - The main and vital oil supply system tank is charged with air. This air charge is taken from the 100 PSI system header. The main oil supply tank is charged by opening valve ALP-198 and closing valve ALP-5. By opening valve ALP-5 and closing valve ALP-198 the main oil supply tank may be vented to ship's atmosphere.

W. Forward and Aft Escape Trunk Venting and Blowing - The forward and after escape trunks can be vented inboard and can be assisted by blowing air. The air pressure comes from the service air supply. The after and forward escape trunks operate off the b(1) air system. Actual operation of the trunk will be covered in another lesson. It should be noted at this time that in addition to the blowing and venting of the escape trunks, a separate line runs into the escape trunks which can be used for charging the breathing lungs. The breathing lungs are charged from the b(1) system by opening valve ALP-239 for the after escape trunk and ALP-240 for the forward escape trunk. Pressure reducer ALP-241 is operated for the after escape trunk and pressure reducer ALP-242 is operated for the forward escape trunk. Operation of these valves, in addition to the operation of the needle valves 245 and 246, will facilitate the charging of the breathing lung.

X. Auxiliary Tanks 1 and 2 and WRT Tanks - Auxiliary tanks #1 and 2 and WRT tanks which are associated with them are located approximately amidships. They are used for controlling the list of the ship. They are operated in a similar manner as the forward and aft trim tanks. As the forward and aft trim tanks have their air charging systems to facilitate breakdown of the sea water pump, so do auxiliary tanks #1 and 2 have their air charging system. In addition, the WRT tanks can be charged to force water from them into their associated auxiliary tank. The charging of these tanks is similar to the process which was used to charge the forward and after trim tanks. Although charging of auxiliary tanks #1 and 2 is done manually, sea water can be forced from the WRT tank into the auxiliary tank through a hydraulically operated air valve. This air valve is number ALP-301 for auxiliary tank #2 and ALP-302 for auxiliary tank #1. These two valves are two-way, two-position, normally closed, ball type, valves which are hydraulically operated.

Y. Main Ballast Tank #7 - Main ballast tank #7 closure doors can be operated in a similar manner to the rest of the main ballast tanks. The air charging valve for main ballast tank #7 is ALP-178.

Z. After Trim Tank - The after trim tank can be charged with air to force the sea water to the forward trim tank in a similar manner as was described for the forward trim tank. The tank is charged from the b(1) system header and goes through control valve, ALP-218. Opening valve ALP-218 will charge the after trim tank with air. Opening valve ALP-219 and closing valve ALP-218 will vent the after trim tank to the ship's atmosphere.

SS(N)593 CREW TRAINING LECTURE

HIGH PRESSURE AIR SYSTEM

Training Aids

1. From Training Aid Booklet, Volume No. 1, NAVSHIPS TAB SS(N)593-1

   a. Page 32
   b. Page 33
   c. Page 34

Objectives

1. To give a general description of the high pressure air system.

2. To describe the high pressure air compressor, its controls, discharge lines, and air dehydrator.

3. To describe the high pressure air manifold and the various components associated with it.

Presentation

1. General Description. The high pressure air system is used as a pressure source for all of the air operations on board ship except the low pressure blow system which has its own air compressor.

2. Air Compressor. The air compressor is used to charge a total of twenty-one air flasks. The volume of each air flask is 19.3 cubic feet, which gives the ship a total air capacity of 405.3 cubic feet. The air compressor is run for charging the air flasks and to remove any pressure build-up within the ship's atmosphere. The air compressor system is actually two compressors. Each compressor having a capacity of 13.5 cubic feet per hour at a pressure of b(1) Each air compressor has a gauge and relief valve built onto it. In the compressor circuit there is a separator which separates moisture from the air. Moisture being water vapor, oil vapor, or any other liquid matter. The separator separates approximately 97% of all the moisture in the air. In line with the separator is a cuno-filter. The cuno-filter is nothing more than a finer type separator. It removes all vapors both oil and water except approximately three parts per million by volume. The air compressors actually take air from the interior of the ship. When the ship is running surfaced or when it is running in a snorkel position, and its air compressors are in operation, the air will come from the atmosphere outside the ship.

3. High pressure air manifolds and components. The following is a list of components that are operated off the high pressure air manifold.

A. b(1) charging manifold.

B. Charging flasks. There are 21 air flasks located in various main ballast tanks. Each of these flasks has a 19.3 cubic foot capacity. The distribution of these flasks is as follows:

1. Forward charging flasks -- there are 4 charging flasks located in main ballast tank 2A. There is one charging flask located in main ballast tank 3A. These flasks make up air bank No. 1, "Captain's Bank."

2. Aft charging flasks starboard side. There are 3 charging flasks located in main ballast tank 5A. There are 2 charging flasks located in main ballast tank 4A. These flasks make up air bank No. 3.

3. Aft charging flasks portside. The 2 charging flasks located in main ballast tank 4B and 3 of the 6 charging flasks located in main ballast tank 5B make up air bank No. 2. The 3 charging flasks in MBT No. 6B and 3 of the 6 flasks in MBT 5B make up air bank No. 4. The 21 charging flasks give the ship a total charging capacity of 405.3 cubic feet. These flasks are located in the main ballast tanks.

C. Charging. The various air flasks located in the main ballast tanks can be charged by two means. One of these means is by the two compressors which are located aboard the ship. When the air pressure in the various charging flasks falls below an operational level and it is decided to re-charge the flasks, they can be charged by the two ship's compressors located in the air regenerating space.

a. Valves AHP-5, AHP-6 are opened -- the compressor motors are started -- the compressors feed air through the separator, then through the cuno-filter into the b(1) charging header. The charging header runs fore and aft in the ship to the various control valves that operate or charge the various air banks located in the main ballast tanks. Valve number AHP-23 when de-energized will charge air bank No. 1. Valve AHP-23 is a two way, two position, pilot operated, opened de-energized solenoid control valve. It is energized to close the bank from the b(1) header. The electrical control for this valve can be found on the main ballast tank control panel. The valve itself has a manual override feature in the pilot section of the valve in case of electrical failure. The valve will fail to the "OPEN" position. Valve AHP-20 will charge air bank No. 3. Valve AHP-20 is similar in operation to valve AHP-23 except that valve AHP-20 is normally closed and energized to open. It will fail to the "CLOSED" position. Just the opposite of valve AHP-23. Valve AHP-13 will charge air bank No. 2. Valve AHP-13 is similar in operation to AHP-20. Valve AHP-16 will charge air bank No. 4. Valve AHP-16 is similar in operation to Valve AHP-20.

The second means of charging the air flasks is an external means. That is to say the charging flasks on board ship may be charged from an external compressor. The external compressor is connected to the external connection located in the ship's sail. Valves AHP-36 and AHP-35 are opened allowing the charging air to flow through the separator, through the cuno-filter, and through Valves AHP-5 and 6. The outboard charging is done similarly to the inboard charging. That is the valves which charge the air banks in the various main ballast tanks are operated to charge the air flasks in a similar manner as they were for inboard compressor charging. When either inboard or outboard charging is completed, Valves AHP-5 and AHP-6 are closed.

D. Components. The following are the components that are served by the b(1) system. Although the air flasks are charged to (b) (1) the various components on board ship use air at reduced pressures.

b(1) reducer. Running fore and aft in the ship is a b(1) service header. This service header is fed from two locations; amidships and in the forward part of the ship. In the amidships position, the b(1) service header receives its air from two pressure reducers that reduce the pressure b(1) In the forward part of the ship, the b(1) header is also serviced by one pressure reducer valve similar to the two located amidships. Therefore, if either the forward pressure reducer or one aft pressure reducer breaks down, there is still one pressure reducer feeding the b(1) service header. The following components are operated off the b(1) header:

a. Forward main ballast tanks high pressure blow system. Forward main ballast tanks 3A, 2A, 2B, and #1 are blown simultaneously from Valve AHP-76. This valve is a two way, two position, pilot operated solenoid control valve. By energizing the solenoid of this valve, the b(1) system pressure is allowed to flow to the forward main ballast tanks. The valve is controlled electrically from the main ballast control panel.

b. Forward main ballast tank #1 only. In addition to being operated simultaneously with main ballast tanks 3A, 2A, 3B, and 2B, main ballast tank #1 can be blown individually by the operation of Valve AHP-118. This valve is similar in operation to AHP-76. The electrical control for this valve can be found on the main ballast tank control panel.

c. Negative tank high pressure blow system. The negative tank is blown from the high pressure or b(1) system with the use of Valve AHP-114. The operation of this valve is similar to the operation of Valve AHP-76.

d. Aft main ballast tank high pressure blow system. The after main ballast tanks 4A, 5A, 6A, 4B, 5B, 6B and #7 are blown simultaneously by the operation of Valve AHP-68. This valve is similar in operation to Valve AHP-76. NOTE: Each main ballast tank connection has a hull stop valve and a check valve to prevent the sea water from backing up into the air supply. In case of failure or a break in the b(1) system service header, the ballast tanks may still be blown by isolating the header. This is done by closing valves AHP-120 and AHP-41, then opening AHP-89 and AHP-48. The b(1) service header is closed off from the system and the air flasks are now open through a bypass circuit to the various main ballast tank blow valves.

e. Aft signal ejector. The aft signal ejector is operated from the b(1) system header. However, this air pressure is further reduced through an adjustable pressure reducing valve AHP-166. The pressure reducing valve has a gauge and a relief valve on the reduced side of the valve. This is done so that the signal ejector can be operated at various pressures. The need for this is evident. When the submarine changes its depth, the water pressure changes on the outboard side of the ship. Therefore, various pressures are required to operate the signal ejector. The signal ejector is operated by Valves AHP-167 and AHP-168. AHP-167 is similar in operation to Valve AHP-76. It allows air pressure to enter the impulse tank. Valve AHP-168 is similar in operation to AHP-167 except that it allows the air pressure from the impeller tank to be vented to the ship's atmosphere.

f. Main and vital hydraulic power plant air charging manifold. The main and vital hydraulic system power plant accumulators are charged with air b(1) This air is taken from the b(1) air header; N.S. hand valve AHP-56 allows b(1) to enter the charging manifold.

g. Hydraulic desurger charger. The various hydraulic desurgers mounted on the main hydraulic power plant are charged from the b(1) system through reducer AHP 8. This is done by connecting an air hose from the hydraulic desurger charging connection to the desurger. Fuse valve AHP-173 protects the operator; in case of hose failure AHP-173 will automatically close.

h. Torpedo charging. Torpedo charging is operated from the b(1) system header. The (b) (1) system header feeds air to charging valves. These valves are AHP-4, AHP-128, and AHP-129. On the other side of these three valves are torpedo charging connections. Torpedo charging will be taken up in a later lesson plan.

i. Torpedo firing. Torpedo firing is operated from the b(1) system header. However, before this air goes into our firing system, it is reduced from b(1) by two pressure reducing valves. These valves are AHP-92 and AHP-96. These two reducing valves feed our charging manifold which operates or then feeds into our torpedo ejection cylinders. The torpedo firing or torpedo ejection cylinder system will be covered in a later lesson plan.

j. 250 PSI Air Supply. Located in the forward part of the ship is pressure reducing valve AHP-122. This valve reduces the system pressure from b(1) down to 250 PSI. This low pressure system is for engine starting and will be covered later.

k. 200 PSI Air Supply. Located amidships is pressure reducing valve AHP-39. This valve reduces the b(1) system pressure down to 200 PSI. This 200 PSI pressure is for snorkel head valve control.

l. External Hydraulic Power Plant Air Charging Manifold. The external hydraulic power supply accumulator is charged with air at b(1) This air is taken from the b(1) system header.

m. Pressurizing Ship. The atmosphere of the ship can be pressurized to check for leakage or to recondition the ship's atmosphere from the b(1) system. Valve AHP-107 is a two way, two position, pilot operated, solenoid controlled valve similar to AHP-76. It allows air pressure to enter the ship's atmosphere from the b(1) system header. The valve is located in the torpedo room.

2. b(1) Reducer. There are two pressure reducing valves located amidships which reduce the b(1) This air pressure which is reduced is used for service air on board the ship. The service air will be taken up in another lesson plan.

SS(N)593 Crew Training

TITLE: Main & Auxiliary Sea Water Cooling Systems.

OBJECTIVES:

I. Familiarize student with functions of Main Sea Water System.

II. Describe and illustrate the Main Sea Water System, its operation, and control.

III. Describe the major components of the Main Sea Water System.

IV. Familiarize the student with functions of the Auxiliary Sea Water System.

V. Describe and illustrate the Auxiliary Sea Water System, its operation, and control.

VI. Describe the major components of the Auxiliary Sea Water System.

MATERIALS:

I. Lesson.

II. Transparencies.

1. Main Sea Water System - Diagram. (Training Aid Booklet Pg.20).

2. Auxiliary Sea Water System.

Auxiliary Machinery Space - Diagram. (Training Aid Booklet Pg.23).

3. Auxiliary Sea Water System.

Engine Room Forward - Diagram. (Training Aid Booklet Pg.23).

4. Auxiliary Sea Water System.

Engine Room Aft - Diagram. (Training Aid Booklet Pg.23).

III. Small Size Diagrams; to be distributed to members of the crew.

1. Main Sea Water System (1862579).

2. Auxiliary Sea Water System

2 sheets (1862582).

EXHIBIT -80

INTRODUCTION:

I. Establish friendly relations.

II. Scope of lesson.

To introduce the main and auxiliary sea water cooling systems to the crew.

III. Create general interest.

Steam plant fluid cycle gives heat to systems; this heat must be removed in some way.

FUNCTIONS OF THE MAIN SEA WATER COOLING SYSTEM.

A. This system condenses steam from the main turbines, ship service turbines, and auxiliaries exhaust by circulating sea water through tubes of the main condensers.

MAIN SEA WATER SYSTEM DESCRIPTION, OPERATION AND CONTROL.

b(3) 10 USC 130

a. Outboard and inboard suction valves and controls.

b. Main sea water cooling pump.

c. Water side of main condenser.

d. Outboard and inboard discharge valves and controls.

e. Suction and discharge sea chests.

b(3) 10 USC 130

B. Flow Path.

1. Water enters the suction sea chests through strainer plates (7/16 D) (tubes 2, 495).

2. Water then flows through two hydraulically-operated valves remotely controlled from manifolds.

3. Pumps running b(3) 10 USC 130 dis-charge to main condenser water tubes.

4. b(3) 10 USC 13 valve hydraulically-operated, remotely controlled from manifold.

5. Main condensers discharge to sea through discharge lines and hydraulically-operated valves remotely controlled from a manifold.

6. Air blow connections are provided at the sea chest.

7. Pumps are controlled from the steam plant gage board.

C. Pump control and operation.

b(3) 10 USC 130

2. Pushbuttons b(3) 10 USC 130 on steam plant gage board.

3. Pumps b(3) 10 USC 130 on decrease in condenser vacuum.

a. Vacuum depends on: how much steam is being condensed; sea water temperature; b(3) 10 USC 130 are being used.

b(3) 10 USC 130

c. Too much vacuum means too much cooling, loss in plant efficiency; too little vacuum means not enough cooling, don't get all the work out of the steam; run pumps accordingly.

b(3) 10 USC 130

5. Pump discharge vented to continuous vent system.

D. Sea valves control and operation.

1. Valves are opened at startup and shut after system is secured.

2. Controlled from manifolds in E. R. upper level.

a. Indicator lights are located at the manifold stations.

b. Hand pumps near manifold stations for use in hydraulic system casualty.

E. Main condenser operation (water side).

1. Waterbox relief valve set at

5. Local thermometers for inlet and outlet sea water temperatures.

MAIN SEA WATER COMPONENTS

A. Pumps.

1. Vertical, single stage, single suction, mixed flow.

B. Valves.

1. Hull and backup valves are sleeve type, hull valves are hydraulically operated, backup valves manually.

3. Condenser waterbox relief valves are spring loaded.

C. Condensers.

1. Double tube and tube sheet.

FUNCTIONS OF THE AUXILIARY SEA WATER COOLING SYSTEM

A. This system distributes sea water to various heat exchangers throughout the engine room and auxiliary machinery space. The various types of heat exchangers serviced are: lubricating and hydraulic oil coolers, fresh water coolers, air coolers, and gland exhaust condensers.

AUXILIARY SEA WATER SYSTEM DESCRIPTION, OPERATION

C. Pump suction and overboard discharge hull valves remotely operated by hydraulic manifolds.

D. Flow path.

1. Water enters the suction sea chests through strainer plates.

2. Water then flows through the hull valves, backup valves, and into the pumps. b(1)

3. The water is discharged from the pumps, through the and into the supply header. b(1)

4. The supply header feeds the cooling water to any of the various heat exchangers being used and from there the water goes into the discharge header.

5. There are four overboard discharge lines, all normally open through which the water flows from the discharge header.

E. System control and operation.

1. Hydraulically controlled hull valves are operated from remote manifold.

2. b(3) 10 USC 130 controlled from the steam plant gage board.

3. The major part of the system is controlled by manually operated valves.

b(3) 10 USC 130

b. Heat exchanger supply lines have ball valves.

c. Heat exchanger discharge lines have globe flow control valves.

d. Venturi meters and thermometers are used to guide flow control.

e. Sea chest blow connections are available.

b(3) 10 USC 130

g. Double tube sheets have interspace open vents and drains (no valves) telltales.

b(3) 10 USC 130

i. Maintenance of parallel strainers on piping to stern tube flushing and flax packing.

AUXILIARY SEA WATER SYSTEM COMPONENTS

A. Pumps.

1. Vertical, single stage, single suction, mixed flow.

2. b(3) 10 US with 45 PSI total dynamic head.

B. Valves.

1. Hull, backup, and heat exchanger supply valves are ball valves.

2. Flow control valves are globe valves.

3. Waterbox relief valves are spring loaded.

C. Heat Exchangers.

1. Reactor FW cooling b(3) 10 USC 130

2. Motor generator air coolers.

a. AC b(3) 10 USC 130

b. DC b(3) 10 USC 130

3. CO_2 scrubber b(3) 10 USC 130

4. SSTG LO cooler b(3) 10 USC 130

5. SSTG air cooler b(3) 10 USC 130

6. Air ejector condenser b(3) 10 USC 130

7. Main LO cooler b(3) 10 USC 130

8. Shaft LO cooler b(3) 10 USC 130

9. Hydraulic oil cooler b(3) 10 USC 130

10. E.P. motor air cooler.

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, N. H.

MSB

245T

SS(N)593/1500
28 May 1960

MEMORANDUM

From: 240
To: Distribution List

Subj: SS(N)593 Crew Training Program, initiation of

Encl: (1) Schedule of SS(N)593 Crew Training Program

1. This memorandum initiates and schedules the subject Program as outlined by enclosure (1). All lectures will be held on the Ship's Barge on the dates and at the times indicated.

2. The duration of each lecture is an indication of the importance placed upon the subject and the amount of detail requested by the Crew of the USS THRESHER. They will have almost no other opportunity to get the information required to write operating procedures and to safely operate and maintain the equipment and systems of the Ship during the test program and sea trials. Lecture notes and other hand-out material should be worthy of retention by the Crew as valuable reference material.

3. Lecturers of topics where "All" ratings attend are requested to submit to Code 245T by 30 June one four answer multiple choice final examination question for each hour of classroom time. Please indicate the correct answer.

4. Shipyard personnel are invited to attend on a need-to-know basis.

(b) (6)

Distribution:
CO SS(N)593 (100)

180	242	251	272(3)
200	243	252	273(3)
204	244(3)	253	303(5)
205	245	260	307(5)
207(5)	245P	261(3)	311(10)
211	245S-2	262(3)	350(35)
225A(10)	245T	263(3)	Each Shipyard Lecturer
240	246(3)	264(3)	
241C	247(3)	270	
241E	250	271(3)	

30

Exhibit (81)
1
8 pages

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR SOURCE
1	6/3	0800	8	Tour of GE Turbine Plant	Officers EN/MM	-	GE	Vendor
2	6/3	0900	3	Tour of Mock-ups	EM/ET 1C	-	(b) (6)	247
3	6/6	0815	1	Introduction to THRESHER Concept	All	-	(b) (6)	241E
4	6/6	0915	1	Nuclear Power and Shipyard Organization	All	-	(b) (6)	205A
5	6/6	1015	1	Shipyard Safety Program	All	-	(b) (6)	189
6	6/6	1300	3	Tour of Mock-ups	Officers EN/MM	-	(b) (6)	247
7	6/7	0815	3	Tanks and Compartmentation	All	1	(b) (6)	247
8	6/8	0815	3	Main Steam and Steam Generator	All	16A	(b) (6)	207S
9	6/9	0815	3	Condensate System	All	16B	(b) (6)	261
10	6/9	1300	2	Condensate System Component Details	EN/MM	16C	(b) (6)	261
11	6/9	1500	2	Main Condensor & Air Ejector Details	EN/MM	V1	GE	Vendor
12	6/10	0815	3	Feed System	All	16D	(b) (6)	207S

Exhibit 8 (18)

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR SOURCE
13	6/10	1300	2	Feed System Component Details	EN/MM	16E	(b) (6)	207S
14	6/13	0815	3	Auxiliary Steam, Gland Seal & Exhaust Systems	All	17	(b) (6)	261
15	6/14	0815	3	High Press Drain & FW Drain Collecting	All	18	(b) (6)	261 261
16	6/15	0815	3	Main and Auxiliary SW Sys	All	19A	(b) (6)	261
17	6/15	1300	2	Main and Auxiliary SW Sys Component Details	EN/MM	19B	(b) (6)	261
18	6/16	0815	3	Main, SSTG, Shaft LO Sys (incl. fill, transfer, purif.	All	20A	(b) (6)	261
19	6/16	1300	3	Main, SSTG, Shaft LO (component Details)	EN/MM	20B	(b) (6)	261
20	6/17	0815	3	Main Turbine & SSTG	All	V2	GE	Vendor
21	6/17	1300	3	Main Turbine & SSTG Controls	All	V3	GE	Vendor
22	6/20	0815	3	Main Reduction Gear	All	V4	GE	Vendor
23	6/20	1300	3	Sound Isolation Feature of Main Propulsion Plant	All	V5	GE	Vendor
24	6/21	0815	2	Clutch (including control)	All	V6	GE	Vendor

EXHIBIT (81) 3

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR SOURCE
25	6/21	1030	1	Main Shaft Flexible Control	All	V7	GE	Vendor
26	6/21	1300	1	Shaft, Shaft Brg, Prop.	All	23	(b) (6)	261
27	6/21	1430	1	Fuel Oil System & Storage	All	24	(b) (6)	263 263
28	6/22	0815	2	Temperature & Salinity Ind. Sys.	All	26A 26A 26B	(b) (6)	272 273 207
29	6/22	1300	3	Primary & Secondary Chemistry	All	--	Main Prop Asst.	593
30	6/23	0815	3	2000, 8000 GPD Systems	All	21A	(b) (6)	261
31	6/23	1300	3	Details of 2000, 8000 GPD Stills	EN/MM	21B	(b) (6)	261
32	6/24	0815	1 1/2	Diesel Systems	All	22A	(b) (6)	261
33	6/24	1000	1 1/2	Snorkel System(Mech & Elec)	All	22B	(b) (6)	261
34	6/24	1300	3	DC Power Dist, Battery, and EPM and Control	All	25	(b) (6)	272
35	6/27	0815	3	AC Pwr Dist. & Control Pwr Dist.	All	27	(b) (6)	272
36	6/27	1300	3	Diesel Engine Details	EN/MM	V8	(b) (6)	Vendor

EXHIBIT (81) - 4

ENCL. (1)

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR SOURCE
37	6/28	0815	3	Electric Plant Control & Primary Plant Control Sys.	All	28A 28A	(b) (6)	272 207
38	6/28	1300	3	Switch Gear Details	EM,ET,IC	V9	(b) (6)	Vendor
39	6/29	0815	3	Steam Plant Control System	All	29	(b) (6)	272
40	6/29	1300	3	SSTG Regulator	EM,ET,IC	V10	GE	Vendo.
41	6/30	0815	1	b(3) 10 USMG Set	All	V11	(b) (6)	Vendor
42	6/30	0930	2	b(3) 10 USMG Set Regulator	EM,ET,IC	V12	(b) (6)	Vendor
43	6/30	1300	2	b(3) 10Pwr System	All	30	(b) (6)	272
44	6/30	1500	2	b(3) 10Set & Regulator	EM,ET,IC	V13	(b) (6)	Vendor
45	7/1	0815 1300	3 3	Modes of Plant Operation and start up including power analysis of Ship	All	31A 31B	(b) (6)	247 207
46	7/5	0815	2	Radiation Monitoring Sys.	All	38	(b) (6)	207N
47	7/5	1030	1	Radiation Safety at PNSY	All	--	(b) (6)	207N

EMI.4.1.(8).

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR SOURCE
48	7/5	1300	3	HP & Service Air Sys.	All	6	(b) (6)	264
49	7/6	0815	2	Hydraulic Sys Power Plant	All	12A	(b) (6)	264
50	7/6	1030	1	Hyd Plant Component Details	EN/MM	12B	(b) (6)	264
51	7/6	1300	3	Main & Vital Hyd Sys	All	13	(b) (6)	264
52	7/7	0815	2	External Hyd Sys	All	14A	(b) (6)	264
53	7/7	1030	1	External Hyd Sys Component Details	EN/MM	14B	(b) (6)	264
54	7/7	1300	3	Steering & Diving (Hyd & Elec)	All	15	(b) (6)	264 271
55	7/11	0815	2	Electronic & HP Air Compressor Cooling Water System	All	5A	(b) (6)	263 271
56	7/11	1030	1	Electronic & HP AC Cooling Water Sys Component Details	All	5B	(b) (6)	263 27
57	7/11	1300	1	Masts & Fairwater	All	10	(b) (6)	247 262 273
58	7/11	1415	1	Anchor	All	11	(b) (6)	262
59	7/11	1515	1	Periscope	All	V14	(b) (6)	Vendor

Exhibit (81) 6

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR SOURCE
60	7/12	0815	3	Oxygen System & Oxygen Generator	All	7A	(b) (6)	264
61	7/12	1300	2	Main Ballast Flood & Vent LP Blower, Escape & Rescue, Air Salvage	All	7B	(b) (6)	263 262 262
62	7/13	0815	3	Fresh water, plumping, electrolyte agitation	All	4A	(b) (6)	263 263
63	7/13	1300	3	CO_2 scrubber, ventilation, control air, gas analyzer $CO-H_2$ Burner	All	9 4B	(b) (6)	263 263
64	7/14	0815	1 1/2	Trim & Drain Sys	All	2	(b) (6)	263 263
65	7/14	1000	1 1/2	Air Con., Refrig, chilled water systems	All	8	(b) (6)	263
66	7/14	1300	3	Lithium Bromide Plant Details	EN/MM	V15	Carrier Corp.	Vendor
67	7/15	0815	3	Ballast control panel & diving control station	All	3	(b) (6)	273 264 264
68	7/15	1300	2	Fire Control Systems	All	32	(b) (6)	271
69	7/15	1515	1	THRESHER'S Weapons	All	--	Gunnery Officer	593
70	7/18	0815	3	Torpedo tubes & Ejection System; torpedo handling & stowage	All	33 34	(b) (6)	264 264

Encl. (1) x (b) (6)

SS(N)593 CREW TRAINING SCHEDULE
ALL LECTURE SESSIONS HELD ON SHIP'S BARGE

ITEM NO.	DATE 1960	TIME	DURATION IN HOURS	TOPIC	SHIP'S FORCE ATTENDING	593 SERIES LECTURE NO.	LECTURER OR SOURCE	CODE OR OR SOURCE
71	7/18	1300	2	Compass, Log System, SINS	All	35	(b) (6)	271
72	7/18	1515	2	Radar, ECM, Radio, IC Systems	All	37	(b) (6)	271 273
73	7/19	0815	3	Sonar System	All	36	(b) (6)	271
74	7/19	1300	2	Hy80 Steel for Hulls	All	--	(b) (6)	
75	7/20	0815	3	Review Symposium on Design Concept of THRESHER and Noise Specs	All	--	(b) (6)	240 241C 241E 242
76	7/20	1300	3	Accoustical Treatment (Maintenance & Purpose)	All	39	(b) (6)	250
77	7/21	0815	3	FINAL EXAM	All	--	Training Officer	593
78	7/22	0815	3	Primary Systems (General)	All non-Bettis		Main Prop. Asst.	593
79	7/22	1300	3	Basic Reactor Theory & Design of SSW Core 2	All non-Bettis	--	Electrical Asst.	593
80	7/25	0815	3	Basic Reactor Control, Protection, Instrumentation	All non-Bettis		Electrical Officer	593

E4.1.b.1 (18) g

ENCL. (1)

Unclassified

1ND—PNS—128 Navy—OPPO 1ND, Portsmouth, N. H.

FILE 3/22/61
Checked by

NGB

251B
SS(N)593C1/9010
Ser 078-61 4
APR -4 1961

FIRST ENDORSEMENT ON BUSHIPS LTR SS(N)593C1/9060 ser 525-043 of 21 Feb 1961 (C5831 SS(N)593C1/9010)

From: Commander, Portsmouth Naval Shipyard
To: Officer-in-Charge SS(N)593 (THRESHER)

Subj: SS(N)593 Class Performance Data

Ref: (a) DTMB Report C-1088 (593 Submerged Turning)
(b) DTMB Report C-1161 (593 Surfaced Turning)
(c) DTMB Report C-1245 (593 Motion Simulation)
(d) DTMB Report C-1111 (585 Tactical Trials)

Encl: (2) Submerged Turning Circles
(3) Surfaced Turning Circles
(4) Vertical Overshoot Maneuvers (6 sheets)

1. Enclosures (2) through (4) were prepared from data contained in references (a) through (d) to illustrate the path of the subject submarine during changes in course or depth.

2. The paths for turning shown in enclosures (2) and (3) are based on reference (d) but with tactical diameters from references (a) and (b). Angle of snap roll and steady heel at various speeds are shown on page 12 of reference (c).

3. Enclosure (4) illustrates the path during a vertical depth-change maneuver as predicted from vertical overshoot data of reference (c) and should indicate the performance limitations for THRESHER. The overshoot maneuver is defined on page 9 of reference (c). Many variations are possible when considering various plane angles, plane rates, steady-pitch approach, timing, operator skills and the "Pull Out" characteristics.

4. The pull out maneuver as defined on page 6 and reported on pages 7 and 8 of reference (c) is executed from a steady down angle by putting the stern planes on zero. It should be noted that the maximum operating angle for the fairwater planes is 20° instead of 25° as given in reference (c).

HARRY A. JACKSON
By direction

MAILED
Let. K.
Incls.
FILED

Copy to:
241E
251B

Prepared by (b) (6) 3/20/61, Received 3/22/61, Typed 3/22/61

Capt Kern

Exhibit (82)

Unclassified

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
SS(N)593C1/9060
Ser 525-043

Unclassified

CERTIFIED MAIL

21 FEB 1961

From: Chief, Bureau of Ships
To: Prospective Commanding Officer, THRESHER (SS(N)593)
Via: Commander, Portsmouth Naval Shipyard

Subj: SS(N)593 Class; Predicted Performance data, forwarding of (U)

Encl: (1) SS(N)593 Class Predicted Performance Data

1. During the preliminary and subsequent phases of each new submarine design, the David Taylor Model Basin conducts model and computer studies to determine predicted performance of the completed ship. Inasmuch as the results of these may be beneficial to the Prospective Commanding Officer in his preparation for Builder's Trials and subsequent operations, they have been summarized in enclosure (1). Although not confirmed by model investigation comments are also included relative to submerged backing.

C 5831

Copy to:
DEPCOMSUBLANT
COMSUBDEVGRP TWO
DATMOBAS
CNO (OP-31)

WILLIAM A. PUDDISTER, JR.
By direction

Unclassified

Exhibit (82)
2

Unclassified

Unclassified

SS(N)593 CLASS PREDICTED PERFORMANCE DATA

A. Speed-power (DATMOBAS Report C-1121)

	Submerged (Model tests)		Surfaced (Calculated)	
Speed (kts)	SHP	RPM	SHP	RPM

b(1)

B. Submerged, Horizontal Manuevering (DATMOBAS Reports C-1088 and C-1245).

1. Tactical diameter will be 214 yards using 35° rudder angle and 245 yards at 25° rudder angle.

2. Maximum angle of snap roll in a turn will be about 22° at b(1) using 35° rudder angle. The steady angle of heel for this condition will be about 7°.

C. Surfaced, Turning and Manuevering (DATMOBAS Report C-1161)

1. Tactical diameters using 35° rudder angle range from 288 yards at 8 knots to 387 yards at 16 knots.

2. When going astern the ship will be very difficult to control even with large rudder angles, if allowed to veer from a straight course.

D. Submerged, Depth Changing (DATMOBAS Report C-1245)

1. The submarine will be stable in pitch at all ahead speeds submerged.

2. The submarine with controls fixed at zero is capable of pulling out of a 15 degree dive at maximum speed without use of diving planes or emergency blowing of ballast with a loss of depth of about 400 feet.

E. Submerged, Backing

1. Submarines are directionally unstable when backing. Despite this instability, depth control has been successfully maintained on other submarines at speeds up to 8 knots astern, when the

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Exhibit (82)
3

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maneuver has progressed gradually from low ahead speed to the astern condition. Depth control may be difficult during a change from ahead way to astern way when the reversal is made rapidly from full ahead to full astern and until considerable astern way is on. The maximum safe astern speed which was determined during surface backing trials should not be exceeded.

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Exhibit (82)
4

Department of the Navy
DAVID TAYLOR MODEL BASIN

Shock-Noise Tests on USS THRESHER (SSN593)
Preliminary Report of Shock Tests

by

(b) (6)

Structural Mechanics Laboratory
Research and Development Report
July 1962 Report C-1445

(This report is

One copy #3 with original record of Proceedings

Copy of this exhibit may be obtained from:

David Taylor Model Basin
Washington 25, D. C.

EXHIBIT (83)

Exhibit (84) - 9 pages

HULL

[redacted] DATE	ITEM	CASUALTY OR DEFICIENCY	EFFECT	CORRECTION	PNSY J.O. NO	REMARKS
6-[redacted]-51	HIGH SALVAGE VALVES IN AUX MACHY RM	SEAT DAMAGED	LEAK FROM SEA	CHANGE SEAT MATERIAL TO NYLON.	15-930 86153	PER PNSY REPORT
6-176 SN-24	NO 3 SANITARY TANK COVER IN ENG RM	LOOSENED	OPENED TANK INTO ENG RM	STRENGTHEN & IMPROVE SECURING ARRGT	86067	B/S SER 633A-159 of 2/4/63
6-[redacted]-55	NO 2 PUFFS WELL	CRACKED WELD	LEAKS 5 DROPS/MIN AT 400 FT.	PUFFS REMOVED	86097 (CANCELLED)	ORIGINAL WELL WAS IMPROPERLY INSTALLED. NEW PUFFS INSTALLED UNDER J.O. NO 40816 & 40841
6-[redacted]-54	MAIN HYDRAULIC ACCUMULATOR (ENG RM)	FOUNDATION BOLTS SHEARED	ACCUMULATOR LOOSE.	INSTALL HIGH TENSILE BOLTS PER PLAN (GR. 5 MATL)	86096	IMPROPER BOLT MATERIAL USED, B/S SER 648E-2439 of 12/4/62

[redacted]

MACHINERY

ITEM NO TMB	ITEM NO PNSY	ITEM	CAS/DEF	EFFECT	CORRECTION	PNSY J.O.№	REMARKS
		PIPNG SYS	SIL-BRAZE	CONNECTIO	N FAILURES	—	
6-147 ✓	—	STERN PLANE RAM VENT	JOINT FAILED (ENG RM)	LEAK	REBRAZED	—	
1-1 ✓	—	HYD LINE TO FWD TRIM TK	ACTUATOR LINE SEPARATED FROM VALVE	LOST MAIN HYD SYS FOR ONE MINUTE. FWD TRIM TK VALVE INOPER.	REBRAZED	—	ULTRA-SONIC TESTING OF ALL SW, HYD & COMPRESSED GAS SYS REQ'D BY B/S SER 525-0232 OF 8/28/62. THIS WAS COVERED BY PNSY J.O.№ 90393
4-5 ✓ 932	—	MN HYD SYS ½" PILOT LINE TO ACCUMULATOR	JOINT FAILED IN ENG RM.	LOST MAIN HYD ACCUM.	REBRAZED	—	
4-6 ✓	—	№1 AIR EJECTOR DRAIN LINE (ENG RM)	JOINT FAILED	LEAK FROM SEA	REBRAZED	—	
5-12 ✓ & 5-13 ✓	—	DRAIN LINE IN MIDSHIP COMPT	JOINT FAILED	FLOODING FROM SEA CAUSED ELEC FIRE IN CREWS MESS	REBRAZED	—	
5-14 ✓ 967	—	№3 SANITARY TANK VALVE OPER GEAR (ENG RM)	JOINT FAILED	PARTIALLY DISABLED MAIN HYDRAULIC SYS	REBRAZED	—	
6-10 ✓ 997	SM-53	№3 SANITARY OVBD DISCH LINE (ENG RM)	2½" JOINT FAILED	OPEN TO SEA (THRU 2 VALVES)	REBRAZED	86129	
6-12 ✓	SM-56	№1 AIR EJECTOR CONSTANT VENT (ENG RM)	JOINT FAILED	MINOR FLOODING	REBRAZED	86131	
6-214	SM-85	DRAIN PUMP OVBD DISCH LINE	4" JOINT FAILED (ENG RM)	UNABLE TO PUMP TO SEA WITH DRAIN PUMP	REBRAZED	86159	

Exhibit (84)

ITEM NO. DTMB	ITEM NO. PNSY	ITEM	CAS/DEF	EFFECT	CORRECTION	PNSY J.O. NO.	REMARKS
4-94		STERN PLANE "RISE" SURVEY LINE CONN TO CYLINDER	O' RING FAILED	LARGE HYD FLUID LEAK. 5 PLANES MOVED TO FULL DIVE	REPLACED O' RING - PNSY TO INVESTIGATE PLANE ALIGNMENT, O' RING & GROVE SIZES	52644	THIS FAILURE OCCURRED PRIOR TO SHOT NO 4 & HAD REPEATEDLY OCCURRED SEVERAL TIMES PREVIOUSLY. SHIP INDICATED SPRUES PINING AS CAUSE.
GAGES 3-40 / 4-91 / 5-118 / 6-142 / 945	SE-9 / SM-10 / —	IT IS NOTED HERE THAT VARIOUS GAGES WERE OUT OF CALIBRATION OR INOPERATIVE AS A RESULT OF SHOCK TESTS, HOWEVER THESE ARE ITEMS WHICH ARE EASILY & ROUTINELY TESTED AND REPLACED PRIOR TO SEA TRIALS. IT IS CONSIDERED THAT SHOCK TESTS WOULD NOT BE RESPONSIBLE FOR ANY NEW FAILURES AND THAT THE FAILURES DURING SHOCK TESTS WOULD NOT BE LIKELY TO POINT OUT ANY RELATED FAILURES FOR FURTHER INVESTIGATION, STUDY OR THEORIZING.					
3-80	SM-95	BALL VALVE CONTINUOUS VENT OVBD (ENG RM)	SHIFTED PARTIALLY OPEN	MINOR	REPOSITIONED VALVE	86169	WHY J.O. CANCELLED ? ANY ACTION TO INSTALL MASS BALANCED HANDLES OR LATCHES
6-35	SM-65	STERN DRNG HYD PUMP SUCTION VALVE (ENG RM)	SHIFTED TO "SHUT"	PUMP NOT OPERATING - IF PUMP HAD BEEN RUNNING COULD STARVE PUMP & LEAVE HOUSE DISABLED	OPENED VALVE / PNSY TO INSTALL MASS BALANCED HANDLES	57646	WHY CANCELLED ? IT HAS BEEN REPORTED THAT THIS TYPE OF VALVE SOMETIMES VIBRATES TO WRONG POSITION.
4-88	SM-10	(SEE NEXT PAGE)					

ITEM Nº MB	ITEM Nº PNSY	ITEM	CAS/DEF	EFFECT	CORRECTION	PNSY J.O. Nº	REMARKS
4-38 ✓ 1SL		PIPE HANGERS (ENG RM)	RUBBER SHEARED BOLTS LOOSE & BROKEN	COULD OVER-STRESS PIPING OR COMPONENTS	INCREASE CAPACITY OR NUMBER OF HANGERS		B/S SER 64804-2035 OF 10/30/62 APPLIES WERE PIPING & COMPONENTS INSPECTED ?
4-146		MN STM HANGER	WELD ATTACHMENT FAILED				
3-70	SM-18	PIPE HANGERS MIDSHIP CMPT	BROKEN			86062	
6 56		PIPE HANGER PSK STORERM	BROKEN				
6-226		AUX HANGERS AUX MACH RM	BOLTS STRETCHED				
4-96	SM-87	b(1)					
4 131	SM-446	THROTTLE CONTROL SYS OIL SUPPLY TK (ENG RM)	THREADED FITTING FAILED	LOSS OF SYS FLUID SUPPLY			BACK-UP MANUAL MECH THROTTLE CONTROL AVAILABLE.
5-11 ✓	—	LUB OIL SUPPLY LINE TO MN PROP STDY BRG & FLEX COUPLING (ENG RM)	THREADED ELBOW CRACKED	TEMPORARILY SECURED MN PROPULSION	ELIMINATE THREADED FITTINGS	86123	
6-166	SM-446	TRIM HEADER HIGH PRESSURE TRANSMITTER PIPE FITTING	THREADED FITTING FAILED	OPEN TO TRIM MAN-UNABLE TO ISOLATE - HANGERED USE OF TRIM SYSTEM			
6-11 ✓ 93L	—	b(1) AIR SYS LINE (WARDROOM)	THREADED FITTING FAILED	BLEEDING DOWN TWO AIR BANKS TH SYS WAS SECURED			

ITEM. Nº DTMB	ITEM. Nº PNSY	ITEM	CAS/DEF	EFFECT	CORRECTION	PNSY J.O. Nº	REMARKS
5-27	SM-36	GARBAGE DISPOSAL UNIT (MIDSHIP COMPT)	BOLTS BROKEN	OUTER DOOR UNABLE TO OPEN	REPLACE OUTER DOOR WITH BALL VALVE	60907 OR 86152 ?	C/O Nº 99 S/A PENDING CORRECT S15 CL AVE PNSY DWGS
6-~~14~~	SM-70		REACH RODS FOR DRAIN & FLUSH & HAND VALVES LOOSE	LOST REMOTE OPERATION OF VALVE		86142 CANCELLED	WHY CANCELLED ?
5-~~10~~ 4.79	~~SM-45~~	MSW BACK-UP VALVES (ENG RM)	REMOTE OPER RODS- MISALIGNED	UNABLE TO OPERATE REMOTELY & LOCAL OPER. DIFFICULT	PROVIDE HYD OPER FOR VALVES	86124 CANCELLED	B/S SER 648~~0~~2-18 OF 3/8/63 WHY CANCELLED ?
6-22	—	MSW VALVES (ENG RM)	REACH RODS BENT, BROKEN & BOLTS MISSING POSITION INDICATORS DERAILED	UNABLE TO OPERATE REMOTELY & LOST POSITION INDICATION		—	B/S SER 648~~0~~2-18 OF 3/8/63
5-126	SM-64	MN VENT OPER GEAR (FWD COMPT)	HYDR VALVE SHIFTED OUT OF "POWER" POS.	MINOR	DEPOSITIONED VALVE	86137 CANCELLED	SHOULD MASS BALANCE OPER GEAR ? WHY CANCEL
6-216	—	MAIN SHAFT SEAL (SEALOL) (ENG RM)	CARBON RING BROKEN	LEAKAGE FROM SEA	INSTALL VULCANIZED CARBON RINGS	20932	B/S 644 pending

ITEM NO. DTMB	ITEM NO. PNSY	ITEM	CAS/DEF	EFFECT	CORRECTION	PNSY J.O. NO.	REMARKS
6-217 ✓ 407	SM-8D	b(1)					
[redacted]	SH-47	HYD PUMP FILTERS	LOOSE AT FLANGES & BRACKETS — SOME BRACKETS BROKEN	—	REPAIR & INSTALL PER PLAN.	86089	NOT ORIGINALLY INSTALLED PER PLAN
6-261		b(1)					

Unclassified

E1

ELECTRICAL

[illegible]	No PNS	ITEM	CAS/DEF.	EFFECT	CORRECTION	PNS JO No	REMARKS
[illegible] 4-12 5-40 6-17	EE-25	b(1) [redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[illegible]	EE-1	Signalling for rudder & diving plane control ER	Ill fitted	Rudder & diving plane orders [illegible] controller [illegible] control	Relocate lamps	P6001	S/S on 665-2902 of [illegible] S/S [illegible]
[illegible]	?	Clutch control oil pump switch ER	Switch broke	Could not shift propulsion clutch	?		S/S on 660-4289 of 10/24/2
2-11 6-207	SM-12	Secondary propulsion motor AMR	Cannot run in trim	Lost use of motor	Repaired by PNS, changed [illegible] damaged	P6106	S/S on [illegible] P-401 of 2/5/3 [illegible]
2-24 [illegible]	SM-14	b(1) [redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[illegible]	SM-89	Position and linkage [illegible]	Linkage shifted [illegible] on [illegible]		Relocate [illegible]	P6163	Do

ELECTRICAL

E2

ITEM NO JCMB	ITEM NO PNS	ITEM	CAS/DEF	EFFECT	CORRECTION	PNS RA W	REMARKS
1-1 thru 1-8	SE 38	b(1)					
4-112	SE 68	Boiler handrail (Boiler Wall)	Support bolt missing	Possible safety hazard	PNS maintenance	PA 156	Reported to site representative Aug 69

PNH-117 (84)

ORDNANCE

ITEM No		ITEM	CAUSE	EFFECT	CORRECTION	PWS	REMARKS
DTMB	PWS					No.	
S-2 S-6 S-181	SM-17	Fuze Elec. Det. Cable TR	Corrosion Bent Pins Moisture	Could not fire Fuse	Improper Use	50104	Was called Elec. Det. Cable
S-7 S-8 S-24	SM-14	Fuse Signal Gun Fuse Cap	Bent Pins Moisture Corrosion Loose Pin	Could not fire	Replace Use Proper Cable	50107	D/R on 9225-1 of 10/1/52 Was called Elec. Det. Cable
S-240	SM-18	Weapons System Element	Possible Maltreatment	Unknown	Not known	50150	Why ignore Maltreatment?
S-241	SM-19	Top Breech Door Assy	Improper Packing Damaged During Transport	Unknown	Strengthen Transportation	50157	Why cancelled?

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

250

IN REPLY REFER TO

C-SS(N)593
Ser 525-0227
11 JULY 1962

Unclassified

- REGISTERED MAIL

From: Chief, Bureau of Ships
To: Commander, Portsmouth Naval Shipyard

Subj: USS THRESHER, SS(N)593; shock damage repairs and shock hardening design investigation (non-nuclear items)

Ref: (a) BUSHIPS ltr C-SS(N)593 Ser 525-0141 of 3 May 62

Encl: (1) List of USS THRESHER Shock Damage Items Requiring Yard Repair and/or Design Improvement Study

1. THRESHER shock damage resulting from the recent shock tests was reviewed by NAVSHIPYD PTSMH and Bureau representatives at Key West. Items which will require shipyard repair during THRESHER PSA and which will require shipyard design investigation are listed on enclosure (1). Copies of damage report cards for these items were furnished to the shipyard representatives.

2. The shipyard is requested to have the following information available for THRESHER arrival conference:

a. Itemized cost estimates for repair items listed in enclosure (1) and for any additional known shock damage repairs requiring shipyard assistance.

b. Recommendations and cost estimates for design changes to those items in enclosure (1) which can be shock hardened during THRESHER PSA. In this connection, items marked with an asterisk in enclosure (1) should be given priority.

3. In addition to the above, for all items in enclosure (1) requiring design investigation the shipyard is to submit a review and analysis as outlined in paragraph 4 of reference (a).

4. Any additional shock design deficiencies revealed during shipyard availability should be referred to the Bureau for authorization to conduct similar studies.

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Exhibit (85) 4 pages

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C-SS(N)593
Ser 525-0227

5. With regard to shock deficiency items under investigation by BUSHIPS or BUWEPS, shipyard shock hardening work in THRESHER during PSA will be reviewed during the arrival conference or in separate correspondence.

6. As noted in reference (a), cost for the above analysis work is chargeable to Project Order 20995-741 Cost Category 2A SCN Subhead 2457.

(b) (6)

JAMES E. CALLAHAN
By Direction

Copy to: (w/encl (1))
COMSUBLANT
DEPCOMSUBLANT
COMSUBDEVGRU TWO
CO USS THRESHER (SS(N)593)
BUWEPS
DATMOBAS COMSUBPAC
1500-0
423
525T
525BLA
603
640
670
5214T (30)

Prepared by (b) (6), Ext. 67707
Typed By (b) (6), 7-9-62

Unclassified

Exhibit (85)
Unclassified

ENCLOSURE (1)

USS THRESHER SHOCK DAMAGE ITEMS
Requiring Yard Repair and/or Design Investigation

ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
I. HULL				
C4-59,61	Wardrm door	Sheared rivets & mldg.	+	
C4-92, 5-132a&b	ERLL deck plate	Bolts sheared		+
C3-67	Chill box	Latch shaft bent	+	+
C3-81, 5-131 6-65,72,168c	Locker doors	Doors unlatched. Rivets popped	+	+
C4-54	Hyd lines, torp rm.	Nuts popped off cover		+
C4-101, 6-175	Freon bottles	Dislodged		+
C4-102, 6-90,91 6-54,70,168a,b,d,e	Lockers	Bolts sheared. Lkrs dam.	+	+
* C2-35, 3-13 4-44, 6-108	Hatches in super-structure	Doors sprung or dislodged	+	+
C5-73	~~6SB sal. cell~~ CHART DESK	~~Cable bracket weld failed~~ CRANCO	+	+
* C6-176	San. tank	Cover loosened		+
C6-171	Fairing superstr.	Buoy and hatch bent		+
C6-49	Attack console	Flow swr. mtg. bolts failed		+
C6-52	Emerg. breathing app.	Out of bracket		+
C6-172	8B per. deceleration valve	Cam dislodged		+
~~C6-88~~ 6-153	WRT manifld	Bolts sheared		+
C6-103	Fire extinguisher	Dislodged		+

Exhibit (85)

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ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
I. HULL (cont)				
INVEST C6-109	MB tanks	Top plating dimpled		+
C6-169	Salvage cover	Carried away		+
C5-74	Vent duct support	Bolts popped off		+
C5-78	Alcohol tank	Bulged		+
C6-170	Fairing covers for esc. trunk	Dished		+
C6-167	Puffs hydrofone fairing	Cover bent		+
II. MACHINERY				
S1-24,3-49,5-84	MSW disch valve ind.	Linkage broke		+
* S2-2, 3-5, 4-8 5-26,6-161	BPS-9 antenna	Mast raised & jumped track	+	+
S2-4, 5-16	Torp tube air line	Joint failed		+
S3-31	Stern plane control	Shifted to Emerg & back		+
S3-64	FW drain tank valves	Tripped		+
* S3-40,41 4-78,91, 5-118 6-144,163	Gages	Damaged. Out of cal.		+
S3-44	Mag. thermometer	Bracket failed	+	+
S3-56,C6-174	Nitrogen bottle	Valve opened. Bracket bent		+
S3-51	Trim flow meter	Xmtr bracket loose		+
INVEST * S4-71A	Main LO pump press switch	Caused pump to cut in		+
S4-87	Lathe	Leg broke		+

Enclosure (1) to BUSHIPS SER 525-0227

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Exhibit (85)

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ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
II. MACHINERY (cont)				
✓ S4-88A, 6-56 6-146	Cooling systems	Pipe brackets failed		+
✓ S4-88B, 6-56	Shaft LO piping	Bracket bolt sheared		+
✓ S4-89	Reserve hyd transf. pump	Misalined & bound		+
R S4-96	Main turb. throttle linkage	Support brackets loose	+	
✓ S4-36	Steam gage bd. ind. lites	Bulbs broken		+
Invest * S4-10, 5-31 6-145	Elex. cooling water	Plastic piping failed		+
? S5-56 (under 3-4)	San. drain liq. gage	Not indicating		+
✓ S5-40, 6-22	b(1)			+
R S5-7				
✓ S5-111	FW drain coll tank probe	Cover loose		+
Invest ✓* S4-131, 5-15 6-11,100,165 6-166	Threaded fittings	Failed		+
R ✓ S5-17	b(1)			
✓✓* S5-126	Hyd sys. main vent	Opr gear dislodged		+
R S5-103	DG set	Insp. glass broke	+	
✓* S6-28	b(1)			+
✓ S6-31	Hyd. flask	Fittings sheared		+
Invest S6-35	Stern hyd. pump	Suction valve shut		+
✓ S6-63,73 (6-148)	Ventilation	Diffusers loose or off		+
Invest* S6-77	Main hyd. supply tank	Bracket & bolt sheared	+	+
✓ * S6-10	San disch & drain lines	Large brazed joints Opened	+	+

Exhibit (85)
5

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ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
II. MACHINERY (cont)				
✓ S6-12	Const vent for air ejector	Pipe sheared at fitting		+
✓ * R6-182	b(1) air to torp tube	Pipe sheared		+
INVEST S6-149	Hyd. sys. air flask	Shifted 1/2"		+
✓ S6-153	Trim manifold	Bolts sheared		+
✓ S6-154	DG gage bd.	Bolts loose in mtg. panel		+
✓ S6-157	b(1)			+
✓ S6-158	b(1)			+
INVEST S6-159	LO purif. sys.	Valve stem broke		+
INVEST * S6-160	b(1)			+
INVEST * S6-164	Trim & drain tank valves	Reach rod pins sheared		+
INVEST? * S6-155 (SE-36)	b(1)			+

NOTE: Item S 6-155 added subsequent to conference. Yard should investigate and comment on b(1)

III. ELECTRICAL				
✓ * E3-59	Elex. cooling ton exch	Plastic tank broke		+
✓ E1-4,2-31,4-119	Shaft pos. ind.	Out of cal		+
✓ (E1-28),2-6,3-77 4-7,5-99,(105)	Synchros	Shifted		+
Invest * E1-2,3-22a&b 5-19c,6-24	ALB-5 circ. bkrs	Tripped, Mtg questioned		+
* E1-7,8,2-17 3-50,5-98 5-107,6-80	Duetsch connectors to micro switches	Plugs dislodged		+

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	ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
	III. ELECTRICAL (cont)				
✓ *	E1-23,3-18,75 4-79,110,111,6-1	GE controllers	Opened		+
Invest *	E2-5a&b,4-121 5-96	GE switch for hyd control	Damaged		+
✓	E3-65,74	Batt vent fan	Lost ss ind		+
✓ *	E3-69,4-105	Distr panel	Low ins res		+
INVEST	E2-24,28a&b 3-48,78,4-106	Pos. ind. switches	Improper ind		+
✓	E2-44	Diff press switch	Out of cal		+
✓ *	E3-16,17,80 5-95,6-45	Size 0 controllers	Tripped		+
INVEST *	E2-11	Secondary prop motor	Can't start		+
Invest. *	E5-100,6-8b	Emerg stern plane ind	Switch dam.	+	+
✓	E5-106,6-119	Hyd control relay panel	Elect lead broke		+
✓	E6-55	Hand lanterns	Inserts pulled out		+
Invest.	E6-129a&b	Tank level ind. 4TK	Low rdg for surge tank		+
✓	E6-128	5VS trim valve sw.	Encl broke at seam		+
Invest.	E6-125	8000 GPD still relay module	Mtg block broke		+
N.P. ✓?	E3-46,4-82,123 5-94,6-189,190	Temp monitoring systems	Damaged and lost ind.		+
	IV. ELECTRONICS				
✓	ER-4-27	BQS-6 transformer	Grd strap broke		+
✓ *	ER-4-46	ECM mast	Fairing broke	+	+
Invest. *	ER-5-119	BQH-1 bathy thermograph	Sensing elem failed		+

Enclosure (1) to BUSHIPS SER 525-0227

Unclassified

12

Exhibit (85)
?

Unclassified

Unclassified

ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
V. ORDNANCE				
* R2-39,4-17, 6-184	Torp tube muzzle door fir int.	Cams jammed		+
R2-42	Torp tube press equal valve	Leaks	+	
R2-48	Torp tube over-ride nameplate	Unfastened	+	
* R3-2,5-6,6-181	Torp tube door latch	Pins sheared on rel. handle		+
* R3-7,6-21	Ford signalgun	Outer door drive pin out and breech rotated		+
* R4-18	Torp port rack	Hinged end broke off		+
* R4-47	Torp handling rammer rollers	Teflon liners broke		+
* R4-51	Torp tube breech doors	Latch rings popped & dam.		+
* R4-52,5-76	Torp tube muzzle door opr. gear	Cover bolts sheared		+
* R4-48a	Torp cradle locking handle	Unable unlock		+
* R4-48b,6-178	Torp cradle casting	Cracked		+
* R4-48c	Torp cradle locking bar	Guides broke & pinion way cracked		+
R4-50	Weapons launch console	Covers broke		+
* R5-4,6-183	Torp tube MK 5 sw. box	Plugs out, Amph. loose		+
* R5-5	Torp cradle holding bars	Bars failed	+	+
* R5-28a,6-177	Torp rammer track	Sec. bolts bent & stripped	+	+
R5-28b	Torp tube loading rammer rabbit	Out of line. Bolts stripped	+	+

Unclassified

Exhibit (85)
8

Unclassified

Unclassified

ITEM NO.	EQUIP OR SYSTEM	CASUALTY	YD. ACTION REQ'D REPAIR	YD. ACTION REQ'D DESIGN INVEST
V. ORDNANCE (cont)				
R5-77	Torp tube overside cover	Studs stripped	+	+
* R3-3a (SM-72)	MK 113 F.C. Weap. Launch Console	Trouble in switching	+	+
* R5-133 (SM-71)	Torp tube firing sol.	Failed	+	+

NOTE: Items R3-3a and R5-133 added subsequent to conference.

INVEST? 2CO

2CO INVEST?

16
17
20
16
18
13
3
---
107 Total No. of items
26 INVEST
---
81 repair compl
7 Repair
---
74 Total items ready for PSA and comp 7/19/cc

Unclassified

Exhibit H(85)
9

Unclassified

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO

Unclassified

C-SS(N)593
Ser 525-0262
3 August 1962

REGISTERED MAIL

UNCLASSIFIED upon removal of enclosure (1) & (2)

From: Chief, Bureau of Ships
To: Commander, Portsmouth Naval Shipyard

Subj: USS THRESHER, SS(N)593, shock damage design investigation (non-nuclear items)

Ref: (a) BUSHIPS ltr C-SS(N)593, ser 525-0227 of 11 July 62

Encl: (1) List of Additional USS THRESHER Shock Damage Items Requiring Yard Design Improvement Study
(2) USS THRESHER revised or new shock damage cards; pages C-11,12,13; R-14,20,21,22; S-36,37,38,39, 40; ER-23,24; E-4,7,9,14,18,19 (NAVSHIPYD PTSMH only)

1. Enclosure (2) contains revisions to previously furnished damage report cards and additional cards for items not previously listed in enclosure (1) to reference (a). Based on a review of these additional cards, enclosure (1) has been prepared to list the additional items requiring shipyard design investigation.

2. The shipyard is requested to include a review and analysis of the additional items listed in enclosure (1) with the items previously forwarded by reference (a).

(b) (6)

J. WOOLSTON
By Direction

Copy to: (w/encl (1))
COMSUBLANT
DEPCOMSUBLANT
COMSUBPAC
COMSUBDEVGRU TWO
CO USS THRESHER (SS(N)593)
BUWEPS
DATMOBAS

Unclassified

Exhibit(86) - 21 pages

Unclassified

Unclassified

ENCLOSURE (1)

USS THRESHER ADDITIONAL SHOCK DAMAGE ITEMS
REQUIRING YARD DESIGN INVESTIGATION

ITEM NO.	EQUIPMENT OR SYSTEM	CASUALTY
I. HULL		
X SM-~~26~~ 80 C6-217 ✓	b(1)	
SH-45 E6-221 ✓	FW sounding device	Bracket loosened
II. MACHINERY		
SM-65 S6-35 ✓	Stern hydraulic suction	Valve shut
SM-81 S6-60 ✓	Snorkel hydraulic valve gage	Out of calibration
SM-59 S6-102 ✓	Vent diffuser	Dislodged
SH-46 S6-218 ✓	Pantry grill	Mountings loose
SM-82 S6-222 ✓	LO pressure switch	Bellows ruptured
SH-18 S6-226 ✓	ASW piping	Hanger bolts stretched
SM-83 S6-229 ✓	b(1)	
SM-70 S6-230 ✓	T & D valve	Reach rod pulled out
SE-65 S4-69 ✓	FW drain tank	Probe disconnected
SHA-~~84~~ S4-74 ✓	Main steam valve indicator	Link binding
III. ORDNANCE		
SM-75 R6-225 ✓	Torpedo tube eject pump	Door will not open fully
SH-25 R5-71, 6-49 ✓	F.C. Cooling pressure switch	Hold down bolts failed
SH-17 R5-79 ✓	Subroc battery locker	Loose on mountings

Unclassified

Exhibit (86)

Unclassified

HULL

SHIP: USS THRESHER (SSN593) SHOT NO: 6 SHOT DATE: 6/29/62 FILE: C-6-175
EQUIPMENT (FR. 90 COMP'T. ENGINE RM) LOWER LEVEL
FREON BOTTLES
STOWAGE BRACKETS
CASUALTY:
BOTTLES LOOSE STRAP OFF
DEFICIENCY:
HOLD DOWN BOLTS FAILED
RECOMMENDATION:
DESIGN INVESTIGATE
ACTION:
PORTSMOUTH INVESTIGATE

STOCK ITEM

SHIP: USS THRESHER (SSN593) SHOT NO: 6 SHOT DATE: 6/29/62 FILE: C-6-176
EQUIPMENT (FR. 92 COMP'T. ENGINE RM) LOWER LEVEL
NO 3 SANITARY TANK
MANHOLE COVER
CASUALTY:
MANHOLE COVER BLEW OFF ITS SEAT
DEFICIENCY:
INADEQUATE LOCKING DEVICE
RECOMMENDATION:
DESIGN INVESTIGATE
ACTION:
PORTSMOUTH INVESTIGATE

STOCK ITEM

7569

SHIP: USS THRESHER (SSN593) SHOT NO: 6 SHOT DATE: 6/29/62 FILE: C-6-208
EQUIPMENT (FR. 35 COMP'T. SONAR CONTR.) 1ST PLATFORM
NO 2 PUFFS HYDROPHONE
CASUALTY: 1/8" LONG CRACK IN HULL WELD
SALT WATER LEAK
LIMITED SHIP TO ½ TEST DEPTH
DEFICIENCY:
RECOMMENDATION: INVESTIGATE
ACTION: BUSHING 440 & 525 INVESTIGATE

STOCK ITEM

NEW

Page C-11

Exhibit (86)
3

SHIP: USS THRESHER (SSN593) SHOT NO: 6 SHOT DATE: 6/29/62 FILE: C-6-216
EQUIPMENT (FR. 104 COMP'T. ENGINE RM) UPPER LEVEL
MAIN SHAFT SEAL (SEAL01)

CASUALTY: EXCESSIVE SALT WATER LEAKAGE

NEW

DEFICIENCY: UNKNOWN - POSSIBLY NONE - SEAL LEAKED CONSIDERABLY PRIOR TO TESTS.

RECOMMENDATION: DISASSEMBLE, INSPECT & RENEW.

ACTION: ~~PORTSMOUTH INVEST & REPORT TO BuS~~ Bureau to investigate

b(1)

SHIP: USS THRESHER (SSN593) SHOT NO: 6 SHOT DATE: 6/29/62 FILE: C-6-219
EQUIPMENT (FR. 84 COMP'T. ENGINE RM) UPPER LEVEL
LADDER

CASUALTY: WELD ON HOLD DOWN SUPPORTS BROKEN

NEW

DEFICIENCY: WORKMANSHIP OR QUALITY CONTROL

RECOMMENDATION: REPAIR

ACTION:

Exhibit (86)
4

SHIP: USS THRESHER (SSN593 SHOT NO: 6 SHOT DATE: 6/29/62 FILE: C-6-229
EQUIPMENT (FR. 84 COMP'T. ENGINE RM) UPPER LEVEL
DECK PLATE

CASUALTY: SHOCK
WELD ON DECK PLATE BRACKET FAILED NEW

DEFICIENCY: WORKMANSHIP OR QUALITY CONTROL

RECOMMENDATION: REPAIR ITEM

ACTION:

SHIP: SHOT NO: SHOT DATE: FILE:
EQUIPMENT (FR. COMP'T.)

CASUALTY: SHOCK

DEFICIENCY:

RECOMMENDATION: ITEM

ACTION

SHIP: SHOT NO: SHOT DATE: FILE:
EQUIPMENT (FR. COMP'T.)

CASUALTY: SHOCK

DEFICIENCY:

RECOMMENDATION: ITEM

ACTION:

Exhibit (86)
5

MACHINERY

SHIP: U.S.S. THRESHER SSN 593 SHOT NO: 6 SHOT DATE: 6/29/62 FILE: S-6-166
EQUIPMENT (FR. 35 COMP'T. AFT. ENGINE ROOM) TRIM SYSTEM - PRESSURE TRANSMITTING SYSTEM

CASUALTY: THREADED TAPERED FITTING SHEARED

DEFICIENCY: SIL BRAZE FAILURE

RECOMMENDATION: REBRAZE & INVESTIGATE

ACTION: PORTSMOUTH REPAIR. TEMPORARY REPAIRS MADE BY SSN 593

b(1)

SHIP: U.S.S THRESHER SSN593 SHOT NO: 6 SHOT DATE: 6/29/62 FILE: S-6-35
EQUIPMENT (FR. 90 COMP'T. ENGINE ROOM) STERN HYDRAULIC SYSTEM SUCTION VALVE

CASUALTY: VALVE SHUT (PUMP WAS NOT IN OPERATION) NEW

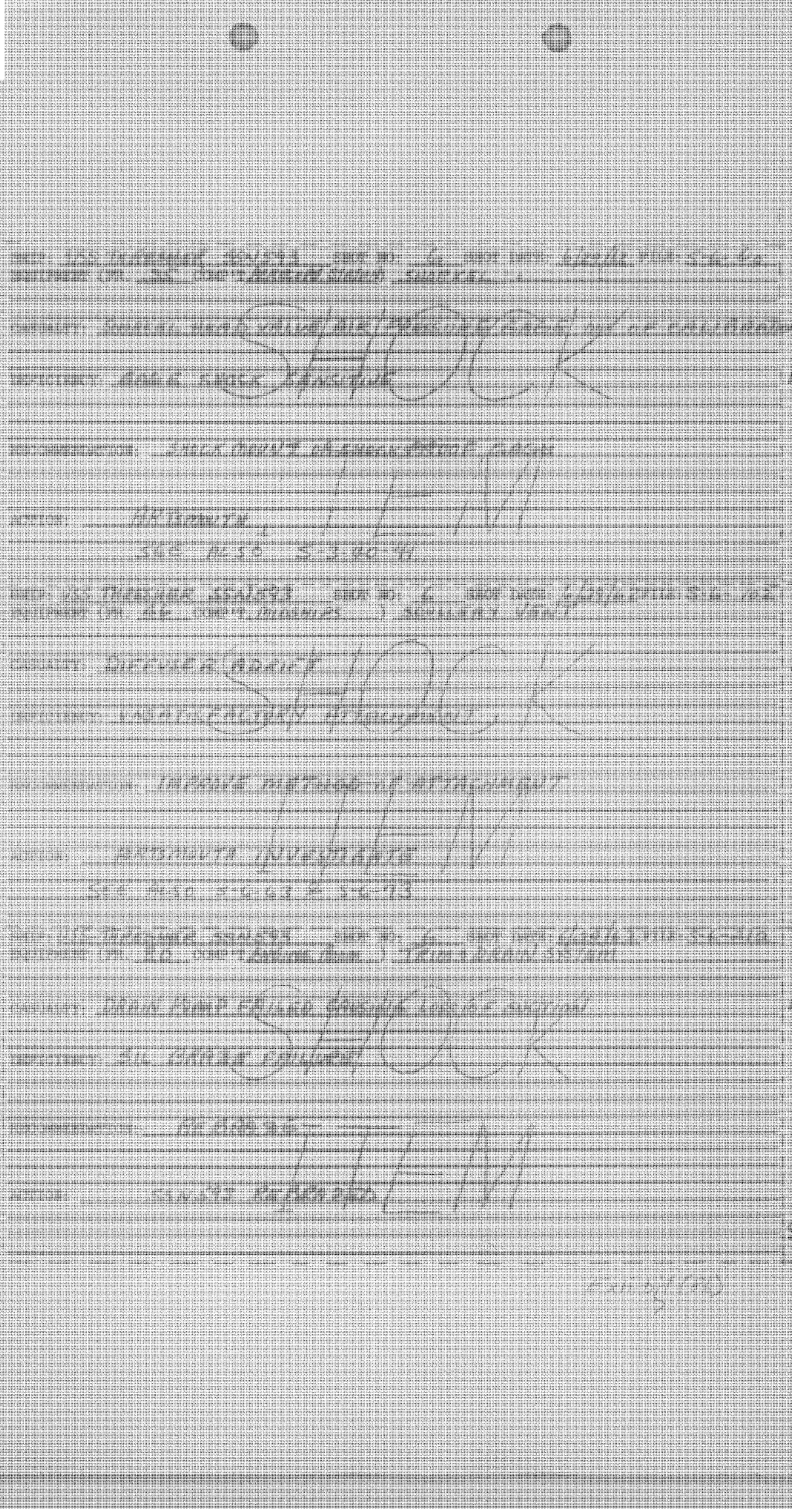
DEFICIENCY: UNKNOWN

RECOMMENDATION: INVESTIGATE

ACTION: PORTSMOUTH

Page S-36

Exhibit (86)
6



SHIP: USS THRESHER (SSN 593) CERT NO: 6 CERT DATE: 6/29/62 FILE: S-6-206

EQUIPMENT (PR. 14 COMP'T ENGINE ROOM) SEAWATER SYSTEM

CASUALTY: LOSS OF PRIMARY SEAWATER SYSTEM PRESSURE

DISCREPANCY: SIL BRAZE FAILURES

RECOMMENDATION: REBRAZE

ACTION: SWS83 TO REBRAZE

SHIP: USS THRESHER (SSN 593) CERT NO: 6 CERT DATE: 6/29/62 FILE: S-6-206

EQUIPMENT (PR. 54 COMP'T ENGINE ROOM) TRAIN DRAIN SYSTEM

CASUALTY: TRAIN PUMP OVERBOARD DISCHARGE/LINE LEAK

DISCREPANCY: SIL-BRAZE FAILURE

RECOMMENDATION: REBRAZE

ACTION: SWS83 REBRAZE

SHIP: USS THRESHER (SSN 593) CERT NO: 6 CERT DATE: 6/29/62 FILE: S-6-206

EQUIPMENT (PR. 43 COMP'T MISSILE) MAIN BALL

CASUALTY: BALL MOUNTING CAPSCREWS (THREE OUTER HOLE-DRILLED SCREWS FAILED THROUGH BASE OF CAPSCREW)

DISCREPANCY: UNDRILLED FACTORY HOLE-DRILL

RECOMMENDATION: IMPROVE INSPECTION

ACTION: FABRICATE NEW CAPSCREWS

Exhibit (B)

b(1)

NEW

SHIP: U.S.S. THRESHER SSN 593 SHOT NO: 6 SHOT DATE: 6/29/62 FILE: S-6-42.1

EQUIPMENT (FR. 66 COMP'T AUX. MACH. SPACE) AUXILIARY SALT WATER SYSTEM

CASUALITY: PIPE HANGER BOLTS STRETCHED

NEW

DEFICIENCY: BOLTING INADEQUATE

SHOCK

RECOMMENDATION: INSTALL BOLTS OF HIGHER STRENGTH

ACTION: PORTSMOUTH INVESTIGATE

b(1)

NEW

S-39

Exhibit (86)
9

SHIP: USS THRESHER SSN-593 HULL NO: 593 HULL DATE: 6/9/60 FILE: S-6-33(3)
EQUIPMENT (FR. 28 COMPT. FWD) TRIM AND DRAIN SYSTEM

CASUALTY: PIN SHEARED AND BRACKET PULLED OUT

DEFICIENCY: MISALIGNMENT

RECOMMENDATION: INVESTIGATE ARRANGEMENT TO REDUCE MOMENT

ACTION: ACTION TO INVESTIGATE

SEE ALSO S-5-40 & S-6-32

SHIP: U.S.S. THRESHER SSN-593 HULL NO: 593 HULL DATE: 6/9/60 FILE: S-6-33
EQUIPMENT (FR. 28 COMPT. FORWARD ROOM) FRESH WATER DRAIN COLLECTING TANK

CASUALTY: TANK PROBE DISCONNECTED

DEFICIENCY: LEVEL INDICATOR INDICATING ULLAGE INCORRECTLY

RECOMMENDATION: INVESTIGATE

ACTION: ACTION TO INVESTIGATE

b(1)

S-40

Exhibit (16)

Electrical

b(1)

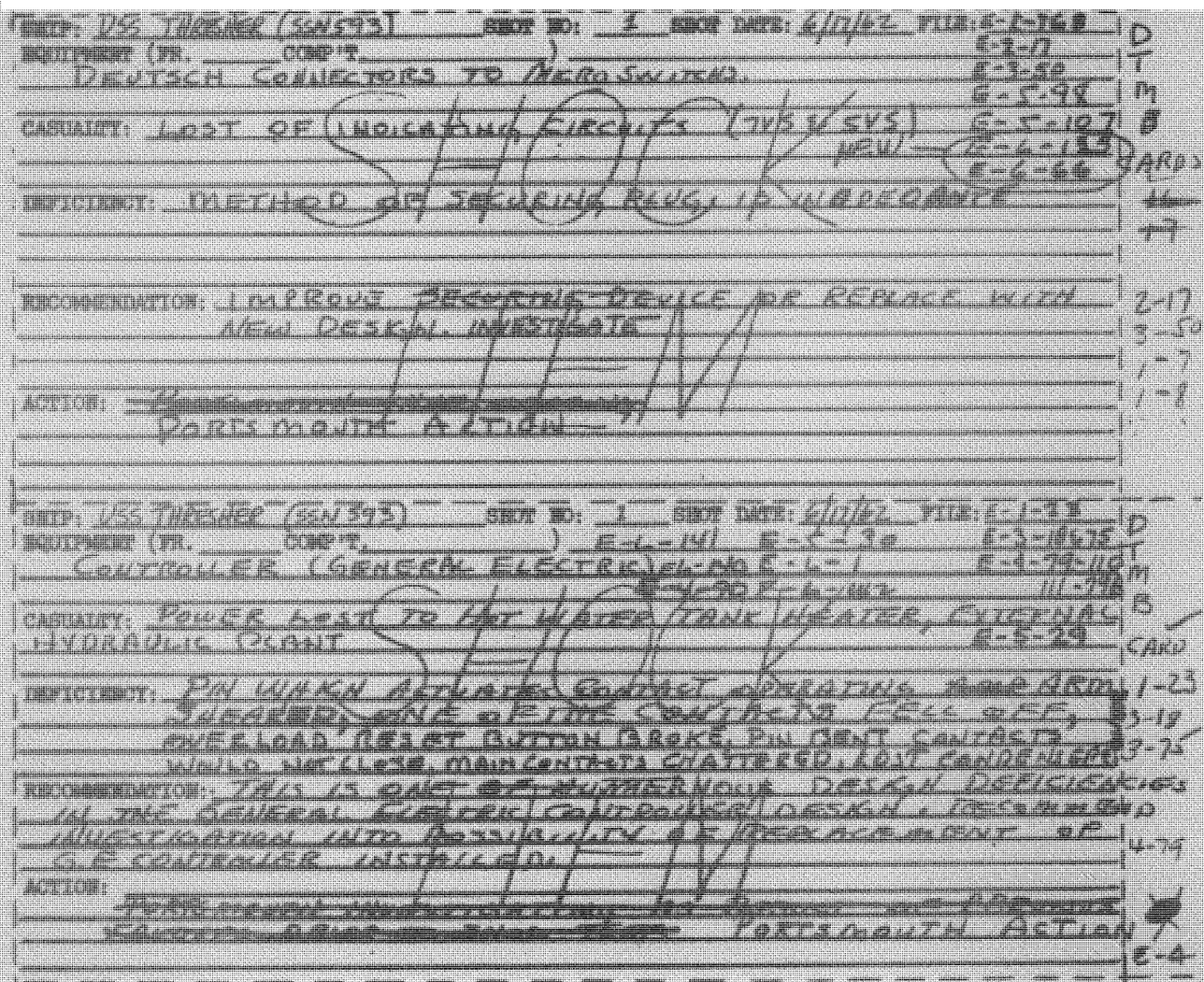
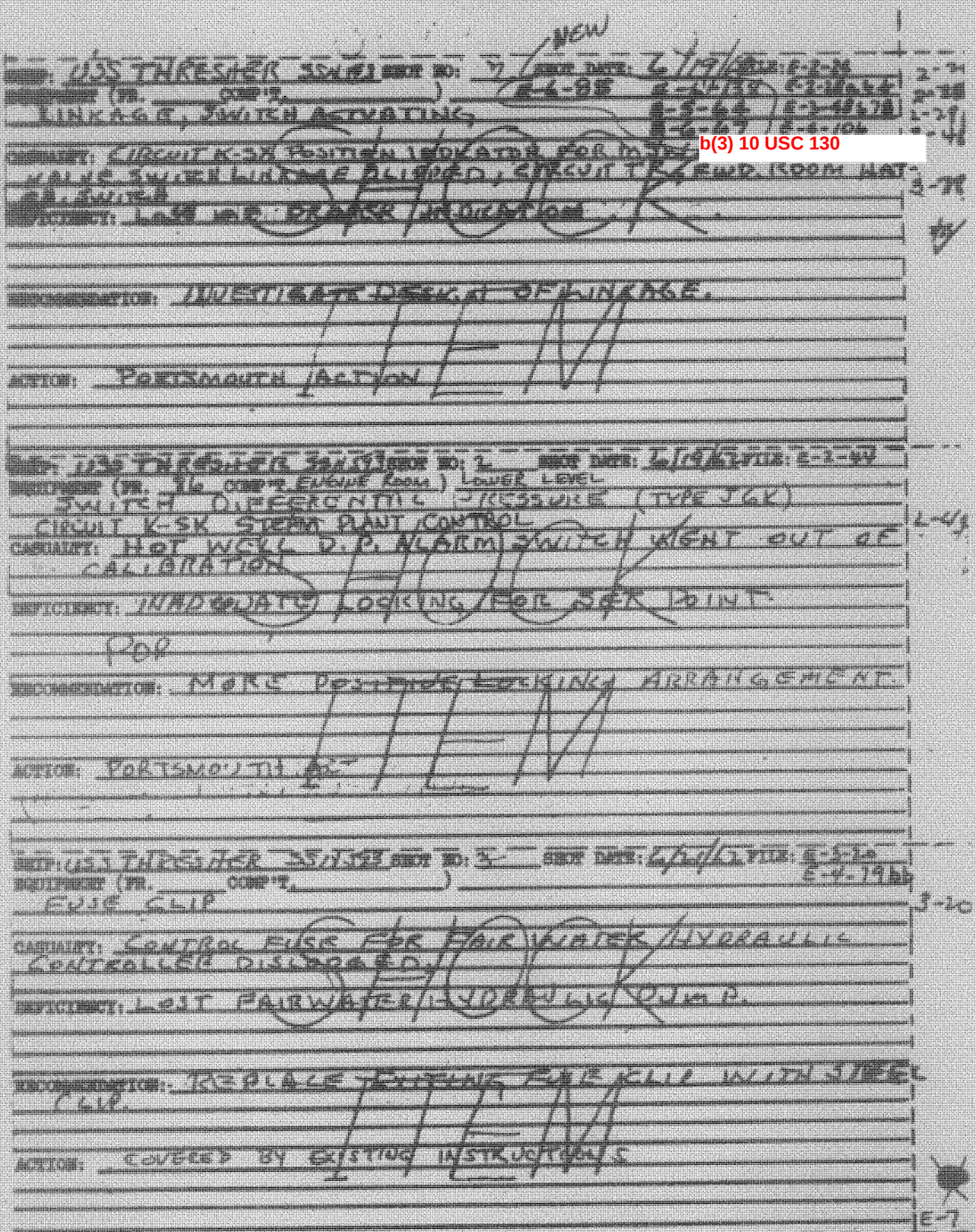


Exhibit (80)
11



b(3) 10 USC 130

Exhibit (B)
12

Unclassified

SHIP: USS THRESHER (SSN 593) SHOT NO: 4 SHOT DATE: 6/23/62 FILE: E-4-43

EQUIPMENT (FR. 29 COMP'T. ENG ROOM) 2MC

INTERCONNECTING BOX J-1068/WIC

CASUALTY: LOSS OF OPERATION OF AN/WIC SYSTEM (2MC)

DEFICIENCY: PLUG DISLODGED

RECOMMENDATION: INVESTIGATE PLUG LOCKING DEVICE

ACTION: BUREAU ACTION / CODE 664

SHOCK TEST

b(1)

b(1)

E-9

Exhibit (BC)
13

SHIP: USS THRESHER SSN593 SHOT NO: 2 SHOT DATE: 4/64 FILE: E-4-2A
EQUIPMENT (FR. COMP'T.)
SWITCH, EMERGENCY STERN PLANE INDICATOR (VIEW)

CASUALTY: Loss of stern plane angle indication

INSPECTION: Switch not per new test connect with contacts

RECOMMENDATION: Investigate switch design.

ACTION: Parts mouth Theaten

SHIP: USS THRESHER SSN593 SHOT NO: 6 SHOT DATE: 4/64 FILE: E-4-3A
EQUIPMENT (FR. COMP'T.)
HAND LANTERN

CASUALTY: Cover Cond Lens

INSPECTION: Brass inserts in plastic base pulled out

RECOMMENDATION: Investigate type of plastic used in design of brass inserts

ACTION: Parts mouth Action

SHIP: USS THRESHER SSN593 SHOT NO: 6 SHOT DATE: 4/64 FILE: E-4-3A
EQUIPMENT (FR. COMP'T.)
WIREWAY

CASUALTY: Zero GROUND [redacted] 24 AC Rays

INSPECTION: Sharp edge of securing band of wire way support cut into strands cable to lighting transformers.

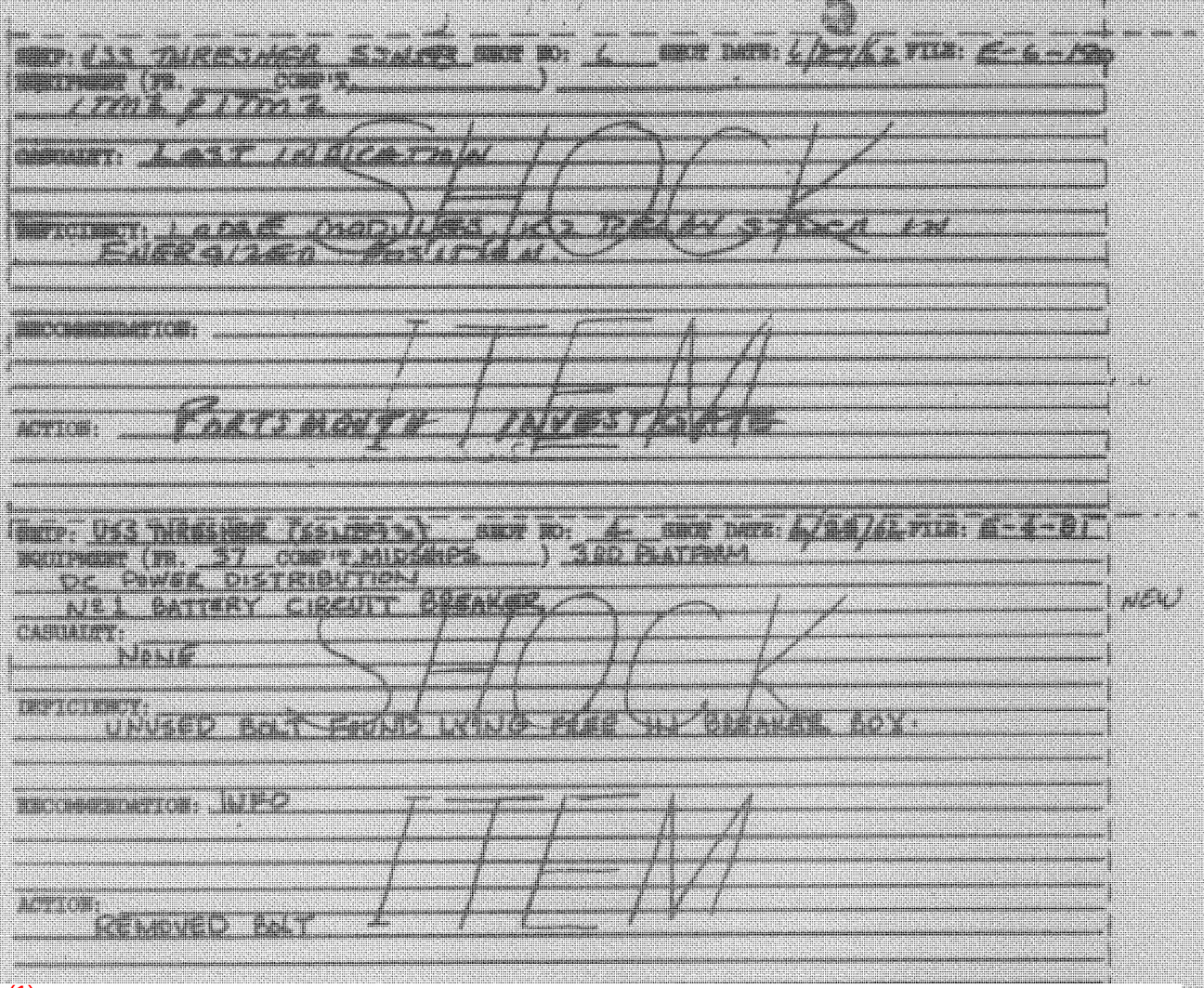
RECOMMENDATION: Investigate possibility of adding mechanical protection to wireway where bands may have removed cut into cable jacket.

ACTION: Parts mouth Theaten

Page E-14

Exhibit (BE)
14

Unclassified



b(1)

Unclassified

ELECTRICAL

b(1)

Exhibit (16)

SHIP: USS THRESHER (SSN593) SHOP NO: 6 SHOP DATE: 4/29/62 FILE: 62-6-202

EQUIPMENT (PR. 43 COMP'T MISSILES) 1ST PLATFORM

COMMUNICATIONS

AN/BQC-1 SONAR RECEIVER

CASUALTY:

BALL LOCK MECHANICAL LINKAGE

DEFICIENCY:

RECOMMENDATION:

INFO

ACTION: SHIP FORCE REPAIR

NEW

SHIP: USS THRESHER (SSN593) SHOP NO: 6 SHOP DATE: 4/29/62 FILE: 62-6-210

EQUIPMENT (PR. 43 COMP'T MISSILES) 1ST PLATFORM

COMMUNICATIONS

AN/URC-27 UHF TRANSCEIVER

CASUALTY:

THRUST NUT SECURING SCREW BACKED

DEFICIENCY:

RECOMMENDATION:

INFO

ACTION:

SHIP FORCE REPAIR

NEW

SHIP: USS THRESHER (SSN593) SHOP NO: 6 SHOP DATE: 4/29/62 FILE: 62-6-211

EQUIPMENT (PR. 43 COMP'T MISSILES) 1ST PLATFORM

COMMUNICATIONS

AN/UGA-5 TELETYPE

CASUALTY:

TRACK LATCH OF TYPING UNIT

TORN SOCK SPRING

DEFICIENCY:

RECOMMENDATION:

INFO

ACTION:

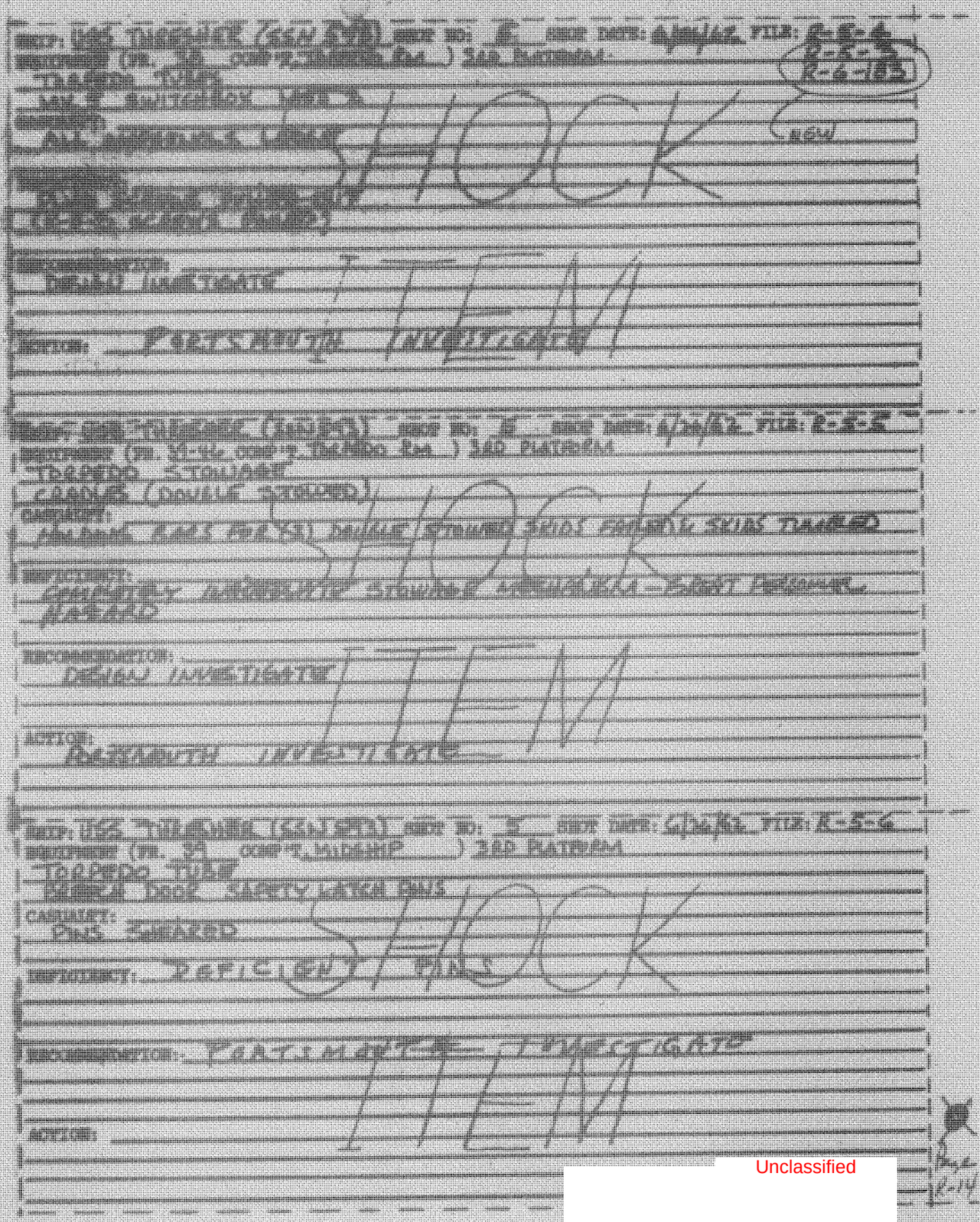
SHIPYARD REPAIR DEPT

NEW

Page 62-36

Exhibit (62)
13

ORDNANCE



SHIP: SSN(688) TORSK HULL NO: 686 SHOT DATE: 6-21-82 FILE: A-6-182

EQUIPMENT (SYS. 58 COMP'T. TORP RM)

#2 TORPEDO TUBE

CASUALTY: SHOCK DAMAGE TO #2 TORPEDO TUBE AW
MK 48 SHIPPED BOX

INSPECTIONS: STUDS 58 BROKE

RECOMMENDATION: REPAIR STUDS

ACTION: EVALUATION ACTION
SEE RS-4 & RS-3

SHIP: SSN(688) TORSK HULL NO: 686 SHOT DATE: 6-21-82 FILE: A-6-182

EQUIPMENT (SYS. 58 COMP'T. TORP RM)

TORPEDO TUBES #2 & #4

CASUALTY: MUZZLE DOOR, FAILED OPEN DUE TO BACK UP HYDRO SWITCHES
NOT REACHED DUE TO DOOR NOT OPENING INTERLOCK
MUZZLE DOORS NOT OPEN YES WATER IN TUBE YES

INSPECTIONS: DOORS PROPER NOT MOVE & DOOR FAILED OPEN SATISFACTORY

RECOMMENDATION: REPAIR & INSTALL DEVICE ON DOOR TO
NOT SHAT TUBE WHEN HEAVY SHOCK

ACTION: EVALUATION ACTION

SHIP: USS SUBMARINE (SSN 593) HULL NO: 593 SHOT DATE: 6/1982 FILE: A-6-182

EQUIPMENT (SYS. — COMP'T. TORPEDO HULL RM 688 PLATFORM

TORPEDO TUBES
STBD EJECTION PANEL DOOR

CASUALTY:
DOOR WILL NOT OPEN FULLY
UNABLE TO EJECT TUBES

INSPECTIONS:
UNKNOWN

RECOMMENDATION:

ACTION: EVALUATION INVESTIGATE

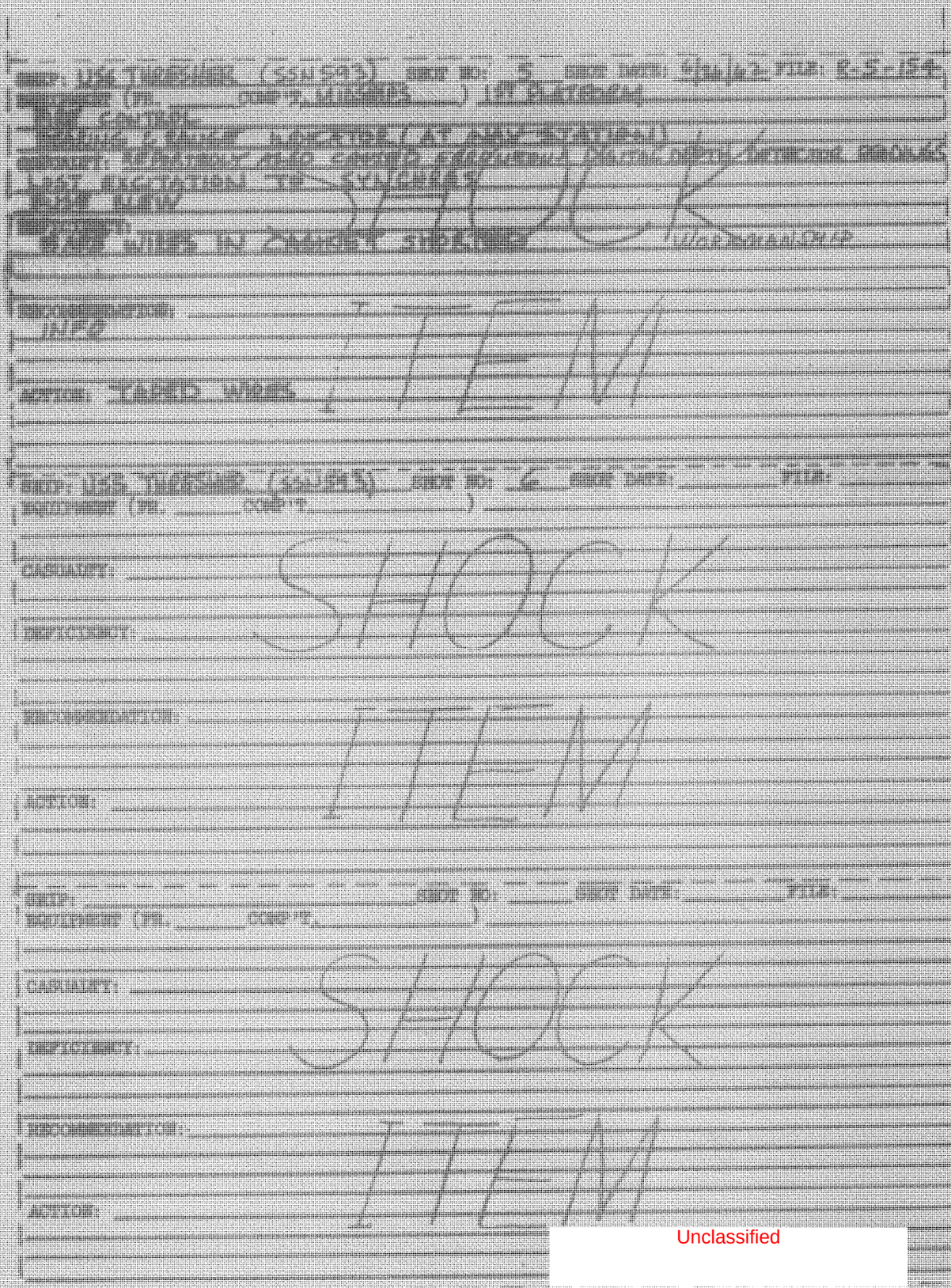
Exhibit (66)
19

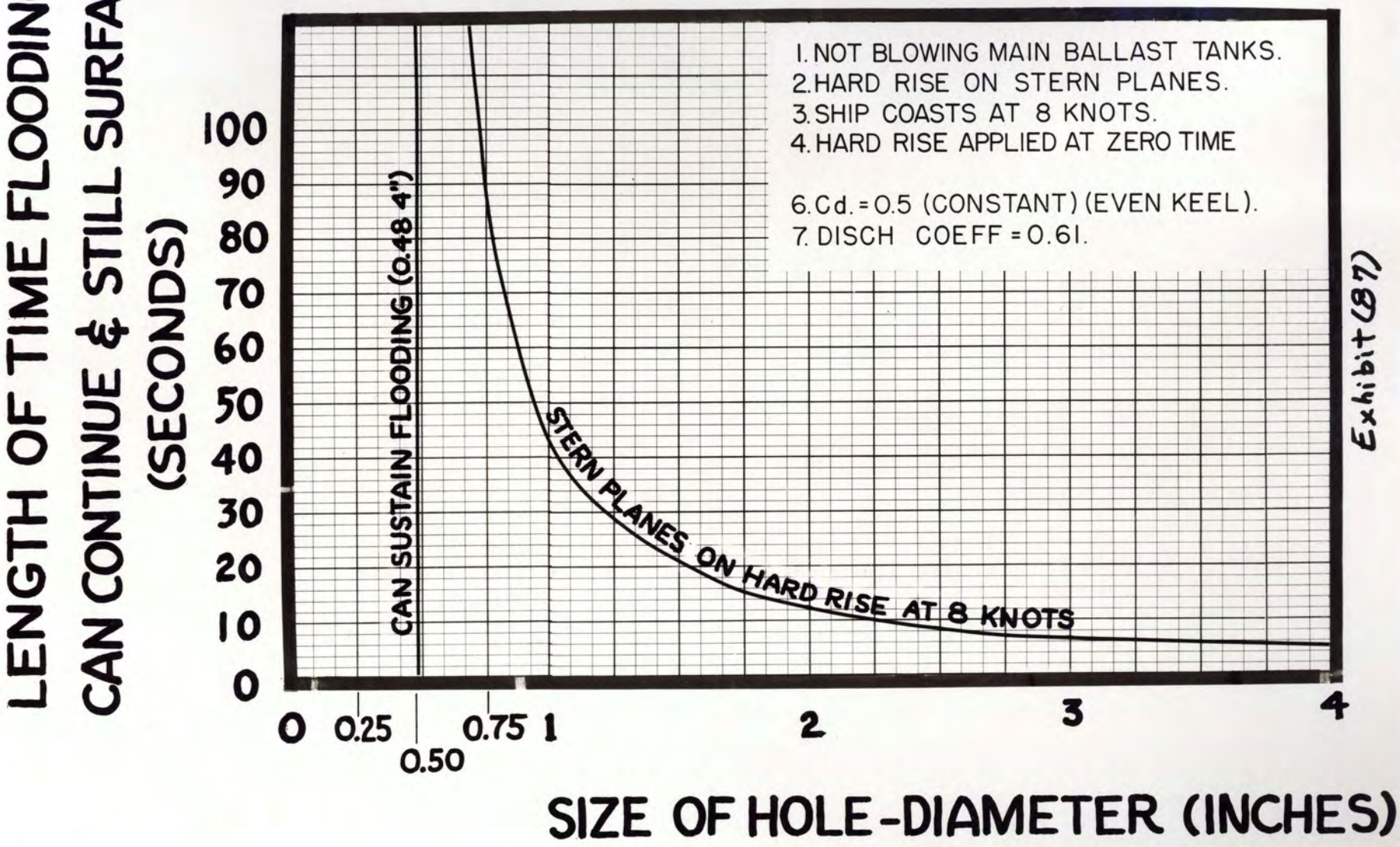
SHIP: USS THRESHER (SSN-593) SHOT ID: 5 SHOT NAME: Cyclops FILE: R-E-71
DISTANCE (NM. 12 OVER 2 MINUTES) TO PLATFORM
TWO CENTRAL ATTACK PERISCOPE
CASUALTY: ELECTRONIC CABINETS DESTROYED
TWO OF THREE MAIN PROPULSION MOTORS FAILED
OBSERVATIONS:
RECOMMENDATION: NUREG Report I Post-Accident Investigations
ACTION: Revised Rules

SHIP: USS THRESHER (SSN-593) SHOT ID: 5 SHOT NAME: Cyclops FILE: R-E-72
DISTANCE (NM. 12 OVER 2 MINUTES) TO PLATFORM
TWO MAIN
MAIN TANK
CASUALTY:
TANK RUPTURED
OBSERVATIONS:
RECOMMENDATION: Design Investigation Piping Inspection
Consider Underwater Ships
ACTION:

SHIP: USS THRESHER (SSN-593) SHOT ID: 5 SHOT NAME: Cyclops FILE: R-E-21
DISTANCE (NM. 12 OVER 2 MINUTES) TO PLATFORM
MAIN BATTERY LOCKER
CASUALTY: Locker Came Loose on Movement
OBSERVATIONS:
Some Battery Modules Ruptured
RECOMMENDATION: Design Improvements
ACTION:

Exhibit (82)
20





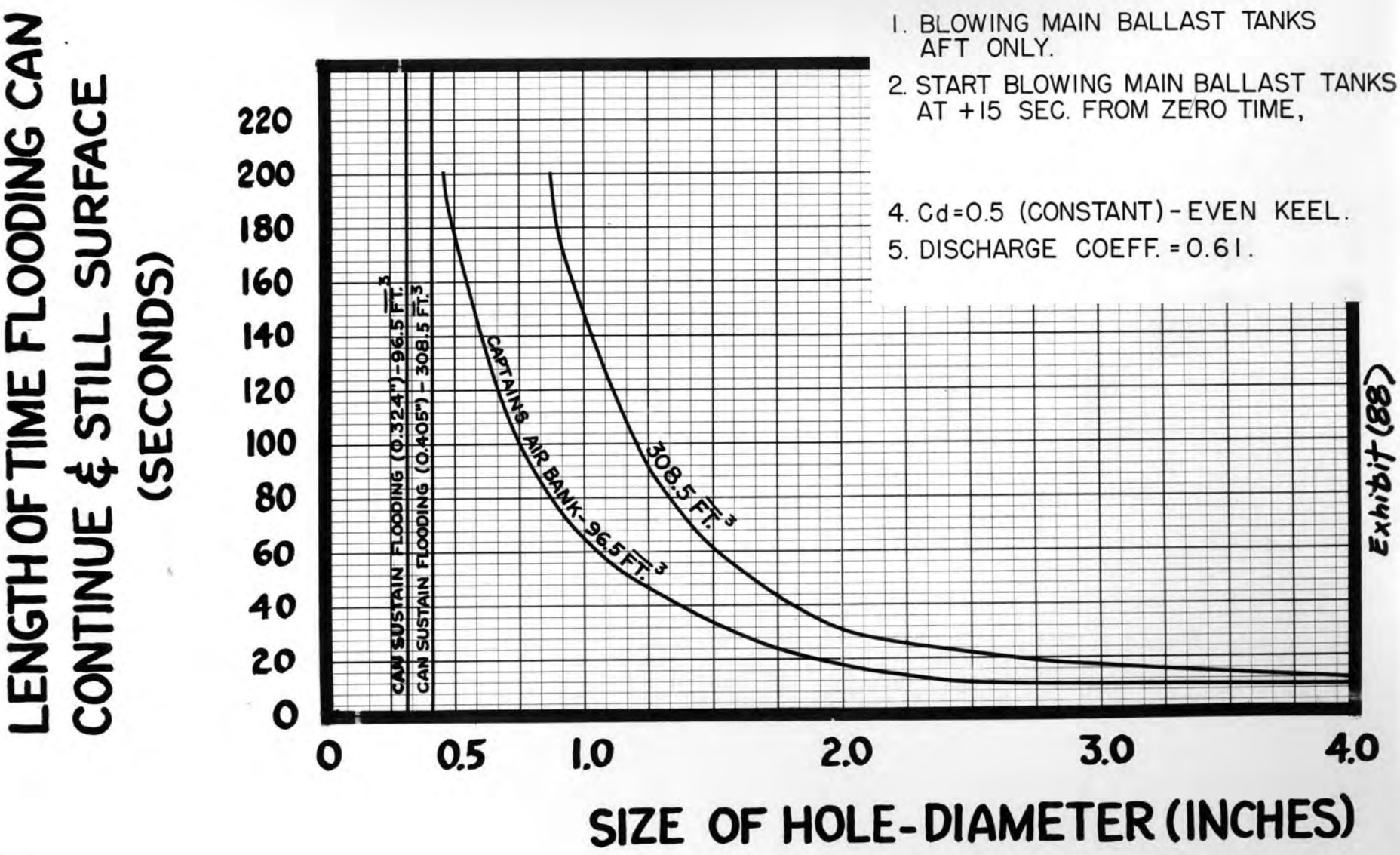
Unclassified

NO. 1572-63 DATE

UNIT 113

MADE FOR

SUBJECT



1571-63

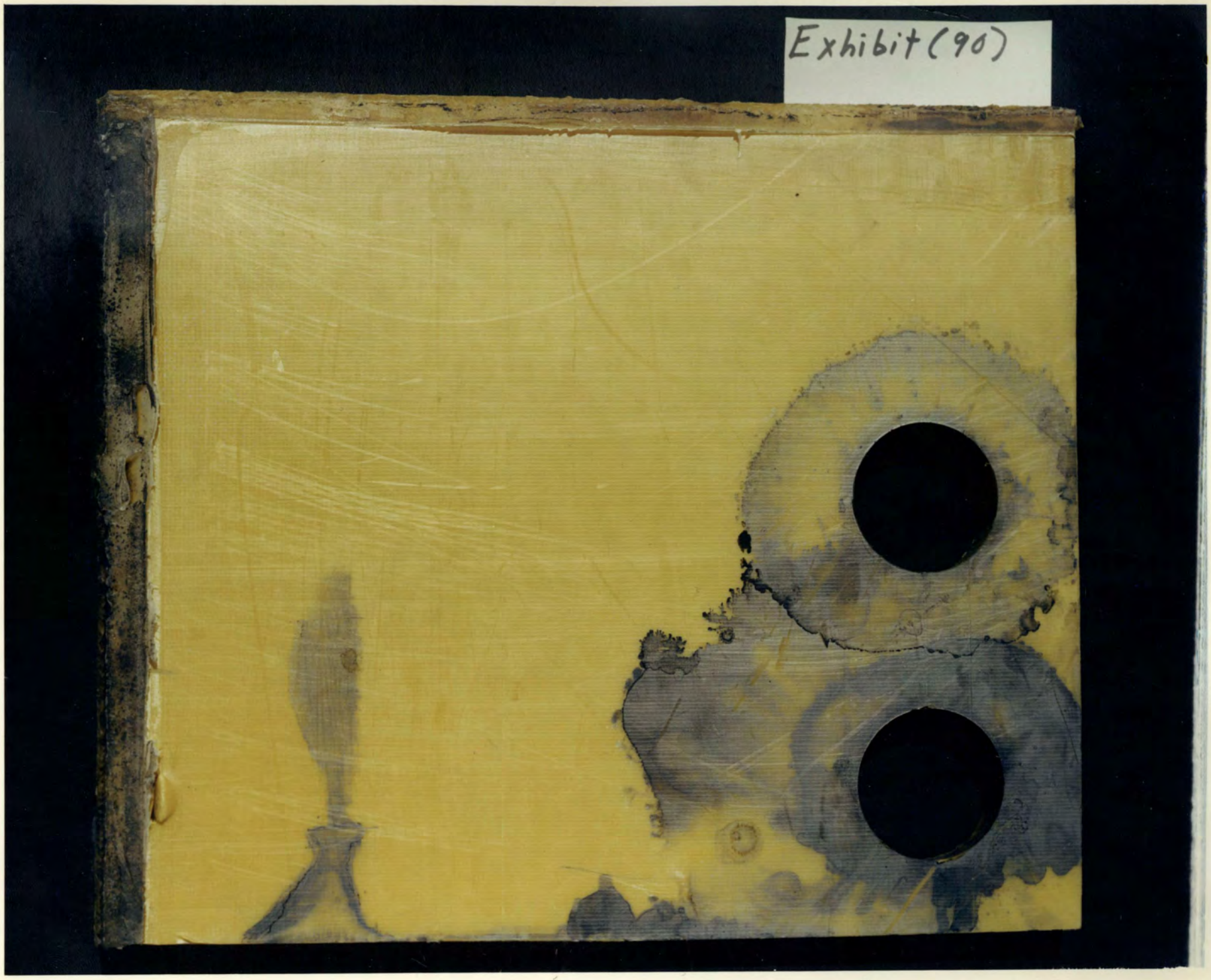
UNIT 403

Unclassified

ASB-30H5/14-63

Unclassified

ASB-29(15)4-63



Unclassified

ASA-31/15/14-63

VOLUME IX OF 12 VOLUMES

RECORD OF PROCEEDINGS

of a

COURT OF INQUIRY

convened at

U. S. Naval Submarine Base New London
Groton, Connecticut

and

Portsmouth Naval Shipyard
Portsmouth, New Hampshire

by order of

Commander in Chief
U. S. ATLANTIC FLEET

To inquire into the circumstances
of the loss at sea of

USS THRESHER (SS(N)593)

which occurred on

10 April 1963

Ordered on 10 April 1963

Exhibits 91 to 160

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

16 JULY 1962 TO 11 APRIL 1963

- - - - -

SHIPYARD ESTIMATES SHOWING EVOLUTION OF WORK BY

CATEGORY, APPLICABLE WORK LIST AND FINAL CHARGES IN MANDAYS

Prepared by the Planning and Estimating

Division of Portsmouth Naval Shipyard

Exhibit 91 (99 pages)

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963

RECAPITULATION OF SHIPYARD ESTIMATES SHOWING EVOLUTION OF SS(N)593 WORK BY WORK CATEGORY, SHIPYARD WORK LISTS AND FINAL CHARGES IN MANDAYS

NON-NUCLEAR

C.O. 14-930 & 15-930 (BUSHIPS)

Work Items	No. of Items	Initial W/L of 2/28/62	Pre-Arrival Conf. W/L of 7/3/62	Post-Arrival Conf. W/L of 8/3/62	Final W/L of 1/15/63	Supplements to W/L of 1/15/63	Total Estimate	Total Mandays Expended
M	284	4297	2963	3175	7645	5	18,085	20,525
N	115	544	9884	8095	6737	922	26,182	36 991
S	18	518	414	-	-	-	932	975
INSURV	97	16458	1584	512	2263	69	20 886	18,462
SHOCK	109	-	-	2984	225	-	3 209	2,651
Sub-Total	623	21817	14,845	14,766	16 870	996	69,294	79 604

MISCELLANEOUS CUSTOMER ORDERS

BUSHIPS C. O. 10-937, 14-937, 15-935, 77-103 and Reproduction Services

	4525	1000	1863	-	828	8,216	8,707

DEPCOMSUBLANT C. O. 25-544 and 25-930

	-	-	303	-	15	318	256

BUWEPS (NOL) C. O. 82-556, 82-557 and 87-434

	-	307	-	491	40	838	1,507
Sub-Total	-	4525	1307	2166	491	883	9,372	10,470
Total	623	26342	16152	16932	17361	1879	78,666	90,074

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963

RECAPITULATION OF SHIPYARD ESTIMATES SHOWING EVOLUTION OF SS(N)593 WORK BY WORK CATEGORY, SHIPYARD WORK LISTS AND FINAL CHARGES IN MANDAYS

NUCLEAR

C.O. 15-939 (BUSHIPS)

Work Items	No. of Items	Initial W/L of 2/28/62	Pre-Arrival Conf. W/L of 7/3/62	Post-Arrival Conf. W/L of 8/3/62	Final W/L of 1/15/63	Supplements to W/L of 1/15/63	Total Estimate	Total Mandays Expended
M	20	5955	42	391	-	-	6,388	7,585
N	32	1769	5197	883	232	41	8,122	6,470
S	2	51	-	-	-	-	51	80
INSURV	2	210	-	-	-	-	210	32
MISC.	6	-	48	42	-	64	154	147
Sub-Total	62	7985	5287	1316	232	105	14,925	14,314
Total	685	34327	21439	18248	17593	1984	93,591	104,388

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

"M" ITEMS -- SHIP'S FORCE WORK ITEMS REQUESTED SUBSEQUENT

TO COMPLETION OF 4 DEC 1961 - 8 FEB 1962 RAV

AND AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	4,297 MD
FINAL EXPENDITURE	--	20,525 MD
RATIO OF GROWTH		378%
NUMBER OF ITEMS		284

USS THRESHER SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 TO 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-10305	M-278	DECK PLATES Screws for holding down deck plates in escape trunks have rusted and break on attempt to extract. Replace screws with screws of proper material.	10					10	2
-10306	M-302	DEFICIENCY Portable deck plates in torpedo loading areas of 1st and 2nd platforms have proven unsatisfactory. Distortion of plates prevents engaging the cam-lock bolts. Investigate method used by Mare Island to provide a hinged decking. If satisfactory, install in THRESHER. If hinging cannot be accomplished, provide a positive securing device that will accommodate distortion.		34				34	38
-10307	M-707	PORTABLE BEAMS AND HOLDING DEVICES Portable beams and associated holding devices that support 2nd and 3rd platform deck and deck plates, have become warped so that fitting is time consuming and difficult. Redesign a more satisfactory beam holding device and refit beams for easier operation.							35
-11303	M-30	SHAFT AND SSTG L.O. PUMP FDNS Accomplish modification to foundations. (Grind off ribs to eliminate interf. during hi-shock excursions. DMs 261A-113-61 and 261A-114-61.	12					12	12
-11402	M-18	H&A BHD 74 Patch hole #338 in accordance with DM252A-171-61	7					7	8
-11411	M-391	b(1) the deck support for the platform deck just to starboard and aft of b(3) 10 USC is welded to the box girder.		18				18	2

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-11412	M-395	SAIL CLOSURE PLT HOLDING DEVICES--REPLACE Closure plates on forward portion of sail are held with bayonet type lugs. The internal welding device has proved too weak and one plate was lost as a result. Replace all sail closure plate bayonet type holding devices with improved, stronger design or with standard flat head machine screws.			7			7	38
-11503	M-331	#1 and #2 SANITARY TANKS Re-run the sanitary vent lines to the port side, outboard of the cocoon, and thence via an in-line charcoal filter into the ventilation exhaust line servicing the crew's and officer's heads.		19				19	37
-11504	M-597	#1 SURGE TANK STANDPIPE Repair leak in capacitance probe standpipe.				16		16	4
-12305	M-24	15" X 23" ACCESS HATCH TO BATTERY COMPARTMENT Accomplish as per plan 2013857 (Adds coaming to prevent water slopping into battery)	42					42	47
-12309	M-268	HATCH HANDWHEELS Presently installed hatch handwheels are of mild steel-chrome plated. This has proved unsatisfactory in that the wheels have rusted and fouled the running gear. Detailed specs 16-2 page 205 call for running gear hatches to be of CRES. Produce running gear, including handwheels, for new hatches to be installed on SS(N)593 of CRES as per detailed specs.		43				43	48
-12501	M-334	MANUFACTURE PORTABLE STERN CLEAT Manufacture a portable cleat capable of being pinned to the mine clearing padeye or install other suitable cleat. Operational experience to date has conclusively demonstrated that there is a requirement for a mooring fixture as far aft as possible.		24				24	18

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-20112	M-40	REDUCTION GEARS Accomplish modification to jacking gear oil seal gears. Ref: NAVSHIPS 342-0139 Fig 7-28 vendor drawings.	12					12	9
-20135	M-409	L.O. BUBBLER--MAIN TURBINE HP BEARING During recent high speed operations, the lube oil "bubbler" for the b(3) 10 USC 130 bearing failed to drain properly. The sight glass appeared full and the local thermometer read 160°F, representing a rise of 45°F across the bearing. Rectify this situation by providing proper and adequate drainage for the "bubbler".				6		6	6
-20138	M-178	STEADY BEARING (REDUCTION GEAR) Locate and correct the leakage path that exists between the main and shaft lube oil systems. Previous efforts to do so have failed. The ship holds data sheets which indicate leakage of about 5-7 gallons per hour.				68		68	139
-20142	M-239	DIESEL GENERATOR AIR COOLER The diesel generator has excessive temperature (160°F) in the generator casing during heavy load periods. An inspection of the generator air cooler tubes is impossible because cooler constant vent piping has no take-down connections. Install mechanical connections in the cooler constant vent piping. Inspect and clean cooler tubes as necessary. Repair as necessary. Renew zincs as required. Ref: NAVSHIPS 361-1634 Vol I and II		23				23	13
-20155	M-238	CONSTANT VENT PIPING--DIESEL S.W. COOLING PUMP The constant vent from the diesel attached salt water pump is a threaded connection and is leaking. The associated piping configuration does not permit tightening the connection without disassembling the pump and drive unit. Rebuild the constant vent piping with a union that will permit proper assembly of this line. Repair the leak.	6					6	9

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963

"M" ITEMS - SHIPW FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
18-930-20156	M-397	DIESEL EXHAUST "3-WAY COCK" Freezes in position each time engine is run for a period of three hours or more. Increase clearance. DM261A-102-62			47	+15		62	21
-20157	M-398	OUTBOARD EXHAUST VALVE, INBOARD OPERATING GEAR LINKAGE Dismantle operating gear linkage and replace all bushings which seized. Also replace shaft and pins.				21		21	
-20158	M-406	M.E. THROTTLE LEAKAGE--CORRECT Inspect both astern throttles for leakage. Correct any noted leaks.							39
-20159	M-394	DIESEL S.W. PUMP--REPLACE The diesel salt water pump has twice failed in service and required replacement; once because the shaft failed and again because the impeller nut backed off. F.M. Co. representative will inspect for satisfactory installation in accordance with BUSHIPS direction (See M-398 and M-587)				11		11	15
-20185	M-719	EPM FOUNDATION The EPM foundation jumps approximately 1/8" when the field is energized. Investigate nature of difficulty to determine possible unbalance of field windings and/or damage to EPM foundation. This may be considered a result of shock damage.				6		6	3
-20197	M-548	PORT RE-ENTRY DRAIN--MAIN TURBINE The valve for operation of the port re-entry drain in the main turbine is inaccessible. Install a reach rod so that this valve may be operated from the upper level of the engine room. Design concurrence for locations.				16		16	13
-20198	M-681	b(3) 10 USC TURBINE BOOT Replace the b(3) 10 USC Turbine boot. Inspect b(3) 10 USC b(3) 10 USC 130 boots for evidence of similar deterioration. Determine the actual cause of deterioration of the boot. Clean melted residue from the upper tubes in the port condenser.							137

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-20199	M-547	BOAT SPRAY ISOLATION VALVES--MAIN STEAM TURBINES The boat spray isolation valves for b(3) 10 USC 130 turbines are highly inaccessible. Install reach rods so that these valves may be operated from the upper level in the Engine Room.				10		10	5
-20204	M-360	GLAND EXHAUST CONDENSERS--INSTALL VACUUM GAGES There are no vacuum gages installed locally at the gland exhaust condensers. The installation of these vacuum gages has been authorized by BUSHIPS ltr SS(N)593C1/9480 Ser 648D4592 of 3-27-62. DM261B-445-62.				36		36	34
-20327	M-287	PROPULSION SHAFT INFLATABLE SEAL RING INSTRUCTION PLATE; REPLACE Replace warning plate.	1					1	1
-20329	M-485	FWD MAIN SHAFT SEALOL--REPLACE Both sealol units on the propellor shaft leak excessively (6-8 GPM) and leakage rate is increasing with usage. Replace both sealol units. A deficiency report has already been submitted on the forward sealol unit.		22	+29			51	139
-20330	M-386	RESONANCE CHANGER--CORRECT LEAK A leak has developed in the resonance changer pistons. Repair the resonance changer as necessary to stop leaking past pistons. DM261A-108-62							39
-20406	M-290	DIESEL EXHAUST DOOR MBT #3 Test the sec tion of exhaust piping in #3 MBT and make repairs as necessary.	25			+73		98	134
-20414	M-575	SNORKEL HEAD VALVE FORWARD ELECTRODE REPLACEMENT Install new head valve electrode and cable assembly in snorkel mast.				14		14	
-20601	M-534	THROTTLE REMOTE CONTROL The main throttle gear box at the SPGB leaks oil along the shaft for the handwheels, thus causing the handwheels to be "slick". Inspect and determine cause for					5	5	42

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING SAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 4-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-20602	M-353	MAIN TURBINE THROTTLE SYSTEM Provide handwheels for local operation and accomplish necessary modifications to the throttle system to allow the ship to use these handwheels.		28				28	20
-20717	M-193	#2 SURGE TANK VACUUM DRAG CONTROL RELAY The #2 Surge Tank Vacuum Drag Control Relays operate at 290 gallons and 325 gallons vice 300 gallons and 500 gallons. Determine cause and repair as necessary DM261C-16-62		12				12	19
-20720	M-595	MAIN STEAM ROOT VALVE b(3) 10 USC 130 Repair subject valve.				75		75	75
-20723	M-610	H.P. STEAM FLANGES High pressure steam supply flanges from main steam strainers to gland seal regulators are very inaccessible for maintenance and have both developed leaks in the past. Repairs on one occasion delayed sailing. Replace flanged joints with welded joints.				16		16	30
-20801	M-42	HOTWELL LEVEL CONTROL VALVES Complete installation of Hammel Dahl valves. This item is CANCELLED and COVERED BY Item N-75.		31				31	3
-20807	M-58	MAIN CONDENSATE PUMP b(3) 10 USC 130 Repair subject pump							56
-20921	M-130	FLEX HOSES, SEA WATER Provide ship with replacement hose assemblies for each type of seawater installation per BUSHIPS msg 041732Z of Oct 1961.		37				37	6
-20922	M-131	AEROQUIP HOSE--SEA WATER SYSTEMS Replace all Aeroquip hose in seawater system in accordance with BUSHIPS msg 041732Z of Oct 1961		77				77	

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING SAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-20924	M-172	MSW PUMP DIFFERENTIAL PRESSURE GAGES Check pipelines sea suction and pump discharge line for damage and flow of water.	5					5	
-20925	M-308	HOSE IDENTIFICATION Replace all presently installed flexible hoses except NP items with properly identified and dated hose, so that ship can carry out proper inspection and replacement routines. BUSHIPS directives require hose which is not so identified to be replaced not later than 18 months after installation.		225		+369		594	811

NO OTHER ITEMS ON THIS PAGE.

CONTINUED ON FOLLOWING PAGE.

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

SUB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-20926	M-311	FREON AC CHILL WATER--BALL VALVES Provide gate or globe valves for chill water pump isolation.		15				15	10
-20930	M-408	COOLING COILS--AER-CLEAN All the cooling coils in the after end of the engine have a heavy coat of oil and dirt, thus greatly decreasing the efficiency of heat transfer surfaces. Pull the coils from the ship and steam clean.			78			78	102
-21101	M-20	b(3) 10 US DC/AC MOTOR GENERATOR Modification to lube oil SYSTEM	36					36	199
-21108	M-164	b(3) 10 US L.O. STRAINER Machine seat and plugcock of b(3) 10 US lube oil strainer or replace entire assembly. Uneven wear and cutting of plug cock seal will allow only one side to be isolated for removal and cleaning of strainer.	21					21	24
-21109	M-163	SSLO & SLO STRAINER TOPS Redrill and tap SSLO and SLO strainer tops to take larger sized pin. Stop pins presently installed are only half the size of the guide channel and have repeatedly bent or sheared.	5					5	1
-21110	M-183	b(3) 10 US COOLING WATER THERMO DIAL GLASS The b(3) 10 US cooling water thermometer dial glass is broken. Provide spare thermometer dial and gage glasses in ships allowance. Ship will replace broken glasses.	3					3	
-21112	M-320	L.O. PURIF HEATERS Acid clean heater casings and remove all remaining carbon scale.	4			+12		16	17
-21116	M-731	PLASTISOL AND ENGRAVE HANDWHEELS (LO) Plastisol and engrave 57 newly installed handwheels on L.O. system (Process Instruction 1007.1 applies)				11		11	9

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-21117	M-320	L.O. PURIFIER HEATER Modify piping and clean carbon scale from heater.							
-21204	M-93	SHIPS PROPULSION CONTROL PANEL GAUGE Main turbine head first stage compound duplex gage on SPCP has a broken spring. Ship's Force replaced with spare gage. Repair broken gage and return to ship.	1					1	1
-22003	M-352	BARTON DF GAGES FOR MSG-ASW AND RPFW PUMPS Using the manifolds presently installed at the SPCP and SPGB, and some additional tubing, the DP gages can be properly vented. It is also possible that this modification may correct the existing deficiencies reported on these gages.				37		37	6
-30017	M-567	DIESEL GENERATOR Check commutator V-ring, bolts tight and dress commutator. Install new brushes.			27			27	55
-30018	M-584	b(3) 10 USC 130 Dress commutator in b(3) 10 USC 130 set and renew brushes.			19	+24		43	28
-30020	M-599	b(3) 10 US OVERSPEED TRIP MECHANISM Install two new dowel pins. Ref Shock Item 5-7.				2		2	1
-30021	M-600	b(3) 10 US L.O. GAGE LINE HANGER b(3) 10 USC 130 Install one added hanger.				2		2	1
-30022	M-585	b(3) 10 USC 130 SLIP RINGS Dress slip-rings and install new brushes.			9			9	9
-30023	M-587	DIESEL GENERATOR AIR TEMPERATURE Increase cooling as necessary to reduce maximum air temperature to within acceptable limits.				26		26	72

JOB ORDER	W.L.#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-62	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-30104	M-45	NARROW RANGE FREQUENCY METERS b(3) 10 USC 130 Remove existing wide range meters in b(3) 10 USC 130 modify swbd to accommodate new meters, connect and install.	5					5	
-30108	M-382	AUTO DC RHEOSTATS Replace existing automatic DC voltage coarse rheostats in EPCP with Ward Leonard 6" rheostats in accordance with spec MIL-R-15109 to give finer voltage control.		5				5	5
-30110	M-301	ELECTRICAL METERS EPCP The electrical meters on the electric plant control panel, the trim and drain pump control panels and the diesel engine control panel are presently unreliable. Repair or calibrate all meters.			21	-5		16	17
-30210	M-189	PRECIPITATOR CONTROL MACHINERY SPACE--LOWER LEVEL Recommend complete overhaul of this unit and advice, if available, as to cause of failure.	20					20	38
-30212	M-514	TEST LEADS FOR TEST BENCH AMS--UL Manufacture four (4) test leads with plugs on one end and terminal board lugs, sized to fit TB's in instrumentation drawers, three feet in length.			3			3	3
-30213	M-515	STIFFENERS FOR RC-AS XTMR COVERS Re-fasten all stiffeners using self-tapping screws of proper length to prevent recurrence of this trouble. Nuclear Power concurrence required.			6			6	4
-30214	M-569	POWER CABLE--BRIDGE TRUNK LIGHTING Power cable for bridge trunk lighting was inadvertently burned thru by Ship's Force. The cable is now spliced to provide temporary usage. PNSY install new cable.			4			4	2
-30216	M-574	Incorporate latest revision of plan to the AN/WIC-2V system.				6		6	1

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-30217	M-654	115V AC OUTLETS NEAR AN/BQS-9 Provide two 115 VAC service outlets in area of BPS-9 radar for test equipment and maintenance equipment, i.e. soldering gun, lights, etc. See Ship's Force for desired location.				6		6	6
-30308	M-104	LIGHTING SYSTEM 3RD PLATFORM AFT FR 28 TO 51 Recircuit two lights located over F.C. console, Fr 37, stbd., to nightlight circuit.				3		3	
-30310	M-185	CHART TABLE LIGHT Install a shield along forward edge of light. Shield to be 5" high.	2					2	1
-30311	M-186	BATTERY BREAKER ROOM LIGHTING Put the battery breaker room lighting on a separate circuit so it can be illuminated without turning on lights in adjacent bunk room.	4					4	2
-30314	M-392	GALLEY RANGE--REWIRE Rewire with a wire whose insulation will be impervious to grease or reinsulate present wiring to prevent grease penetration.			17			17	10
-30315	M-684	LIGHTING FIXTURES--8W RADIO CENTER Two lights over typewriter desk are installed backwards. Reinstall correctly.				1		1	
-40031	M-102	FWD ANCHOR LIGHT PLUG Replace forward anchor light plug.			22			22	22
-40047	M-452	MK19 GYRO COMPASS LEVELING CKT Determine cause of malfunction and restore to normal operation.							32
-40048	M-524	AUTOMATIC MANEUVERING CONTROL SYSTEM Repair Depth Control System and modify system in a manner such as to correct the over sensitivity experienced at low speeds.			142	-94		58	11

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING SAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-330-40050	M-609	ALTIMETER--REPLACE Repair or replace maneuvering room altimeter which failed during shock trials.				1		1	
-40108	M-10	TRIM SYSTEM SEA VALVE (ID-1) POSITION INDICATOR Accomplish in accordance with DM273A-109-61, DM273A-112-61, and P1 1864185.	70					70	39
-40132	M-329	ENTERTAINMENT SYSTEM--TAPE RECORDER Improve the ventilation of the entertainment console by adding a vent supply duct or installing a blower. Remove the speaker above the AN/URR-3 and install the tape recorder in this space in its factory provided case. Install a locker for stowage of magnetic tapes in the location now occupied by the tape recorder.		31				31	3
-40137	M-187	IND LIGHT LENSES Provide. Ship's Force will install.		(MATERIAL ONLY)					
-40138	M-234	#2 SURGE TANK CAPACITANCE PROBE Find and remove ground.		7		+11		18	14
-40139	M-190	ITM 2 Replace RTD and/or cable as necessary to repair.	6					6	2
-40140	M-194	CAPACITANCE PROBES Completely checkout and calibrate the list of grossly inaccurate capacitance probes.		46	+23			69	123
-40150	M-195	SOUND ISOLATION, UNDERWATER LOG TRANSMITTER Modify foundation.	32			-20		12	2
-40152	M-205	PROTECTIVE CAPS, SP TEL SYS (Procurement of material)	10	+5				15	
-40153	M-192	SINS AUX NAV CONSOLE CKT LN Provide ground connection.	1					1	

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
13-930-40154	M-535	SALINITY INDICATOR CIRCUIT Investigate and determine cause of oil in salinity cell. Rectify this deficiency.			9			9	34
-40155	M-570	SP TEL SYS E-X1J Provide proper shielding or rerouting of the affected phone circuit cables.			5			5	4
-40157	M-559	X60J STA 8A--RELOCATION OF Reposition X-60J phone holder above phone selector box so it faces alley.			2			2	
-40166	M-364	BRIDGE CONTROL CABLE--REPLACE Manufacture a new replacement cable for spare.		10				10	11
-40168	M-411	DEFICIENCY The down haul cable for the forward and after messenger buoys became damaged by the hatch bails when hatches are opened. During submerged operation these cables also pull free of the rubber fairing. Redesign hatch bails and cable fairing.			22			22	23
-40171	M-421	HULL VLV IND CIR GROUND ISOLATION Install amphenol plugs.			2			2	9
-40174	M-527	SALINITY CELL PROTECTIVE COVERS Replace with stronger and sturdier covers.				7		7	2
-40175	M-571	BRIDGE SUITCASE MODIFICATION Modify in accordance with PL 1864050 which will permit the isolation of the external cable with the use of one switch at the ACO switchboard without affecting the use of the Bridge Suitcase Test Jack.				26		26	35
-40178	M-619	WRT #1 TANK LEVEL IND SYSTEM Investigate and re-zero transmitter.				27		27	19
-40180	M-633	WRT-2 XTMR AND CABLE HARNESS Replace shock mounts. Straighten drawer panels. Repair harness. Replace thermostats with non-mercury type.							2

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 15 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-40181	M-702	SUITCASE CABLE REPAIR Repair cable per DM273B-21-61 and provide spare cable.				11		11	
-40225	M-380	MK113 FCS VELOCITY CONVERTER Replace velocity converter with production model and provide adequate ventilation.				18		18	6
-40233	M-713	MODIFICATION OF SINS Install a modification presently available which will allow azimuth angle information when Alfa angles are inserted				119		119	18
-40401	M-647	TELETYPEWRITER REPAIR Realign and repair as necessary. Replace space bar.				6		6	9
-40627	M-23	CHANGE ORDER #46.2 Remove TBL-13, install TCS.	171			+369		740	525
-40631	M-28	AT317/BRR Accomplish in accordance with DM262B-369-61 and Design Div. instructions.	35			+90		125	37
-40636	M-256	FLOAT ANTENNA WIRE GUIDE Repair damaged section.							3
-40637	M-47	ECM MAST Repair hoist cylinders							199
-40646	M-316	PERISCOPE TYPE 8B Install new cable harness from E&E adapter to junction box.							182
-40648	M-335	FLOATING WIRE ANTENNA Manufacture antenna assembly, accomplished on N-118 JO 40655		10				10	
-40649	M-342	SHOCK MOUNT AN/BRR-3 RECEIVER With barry type NC-1035T4 mounts shock mount AN/BRR-3 receiver.		8				8	5

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15-930-40650	M-367	AT-317/BRR LOOP ANTENNA--REPAIR OR REPLACE Repair or replace as necessary.		33				33	29
-40651	M-414	UHF/IFF MAST FAIRING Add guides fore and aft near top to fit in guide rails. Guides should narrow at bottom to allow for misalignment when lowering.			19			19	7
-40652	M-656	SRA-12 ANTENNA PATCH PANEL Provide SRA-12 antenna patch panel in radio with capability of selecting 8-B stub selection.				6		6	10
-40654	M-657	8B-STUB ANTENNA SHORTEN Shorten and encapsulate 8-B stub antenna to conform to SS(N)593 fairwater specs.				5		5	3
-40708	M-248	LORAN SYSTEM AN/UPN-12 Investigate and repair.	20					20	12
-40709	M-284	SPA-4A RADAR Ship deficiency Item M-284 requested rearrangement of SPA-4A. Accomplish C.O. 277 FIELD CHANGE 5 incidental to rearrangement. Rotate the SPA-4A radar repeater 90° with the controls inboard.	32					32	30
-40713	M-634	BPS-9 WAVEGUIDE SW UNIT Inspect, adjust and repair as necessary.				3		3	4
-40714	M-655	REMOTE AUDIO JACK AT ECM CONSOLE Provide a remote audio jack from microwave intercept receiver in E&E adapter at ECM console.				4		4	2
-40715	M-658	SW POSITION PLATE Replace with metal plate engraved with proper lettering.				9		9	20
-40822	M-143	AN/BRA-3 COMPUTER RECORDING HEAD Replace recording head assembly.				4		4	2

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15-930-40827	M-250	SONAR CONTROL SYSTEM ELECTRICAL TIMER Relocate electronics timer in sonar control center presently located above BQG-2 to location above BQS-6 passive sonar stack. In present location, timer is useless because the required sonar operator cannot see it.		24				24	11
-40831	M-337	BQS-6 X-DUCERS REPLACE Replace transducers in the BQS-6 array with type TR-155A.		178	+2039			2217	1978
-40832	M-338	JUNCTION BOX COVERS--REPLACE Install 2 covers for BQQ-3 junction boxes.		2				2	1
-40833	M-339	TOPSIDE BQH X-DUCER--REPLACE Replace BQH transducers topside and bottomside.		13	+17			30	18
-40835	M-341	HYDROPHONES--REPLACE Repair or replace various hydrophones. Check-out prior to undocking.		22	+18			40	178
-40839	M-603	REPLACE #1 AND #3 OMA HYDROPHONES (TYPE XU-7564); FLOODED			34			34	20
-40840	M-604	REPLACE DUUG #1, 2, 3 AND 4, HYDROPHONES; FLOODED			28	-19		9	30
-40843	M-636	BQS-6 SECTOR SCAN INDICATOR Replace CRT, realign and adjust circuits as necessary				6		6	1
-40844	M-637	BQS-6 UNIT 20 REPAIR LEAK Repair leak in water plate, inspect, repair and replace components in unit 20 as necessary.							16
-40845	M-639	BQS-6 UNIT 11 VOLT. REG. Investigate and repair as necessary.				6		6	
-40846	M-640	REPAIR OF BURNED CABLES IN UNIT 5 OF AN/BQS-6 Repair burned wires in harness entering unit 5A3 by splicing with line connectors.				4		4	

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15-930-40847	M-641	BQS-6 UNIT 15 INTERFERENCE Investigate and repair as necessary.				2		2	
-40848	M-659	BQC-1 EMERG UNDERWATER TELEPHONES Replace present cables with longer (25 foot) cables.				2		2	4
-40849	M-637	AN/BQQ-1 SONAR Inspect, repair and replace components in Unit #20							
-40851	M-721	BQQ-3 HYDROPHONES (DM2728-78-62)				114		114	25
-50131	M-99	BOW & STERN CAPSTAN DECK CONTROL VLV; ACCESSIBILITY TO Improve accessibility to subject control valve.	37					37	
-50132	M-170	VENT HEATERS, PROVIDE ACCESS Provide proper access to the following ventilation heaters which are inaccessible or require excessive time to reach for maintenance.	32					32	18
-50133	M-272	OXYGEN SYSTEM VALVES Accomplish SHIPALT SSN-71		126				126	297
-50134	M-282	VENTILATION--ER Install permanent duct to supply ventilation to the head.	11					11	8
-50135	M-318	SHIPS VENTILATION SUPPLY COOLER Properly seal main supply cooler, design proper drainage, remove water presently circulating throughout the ventilation system, and investigate need for drainage in low points of supply headers. Seal bulkhead between IC transformer locker and ship's passageway.		60				60	38
-50137	M-614	REMOVE INTERFERENCES IN DR LINE Remove interference in drain line.				23		23	2
-50210	M-133	LITHIUM BROMIDE PLANT Conduct a full leak detection procedure during PSA. Repair all leaks found.	10					10	5

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15-930-50211	M-215	AIR COND CHILLED WATER PUMP Replace present gages with 0-30 psi gages.	4		+1			5	2
-50212	M-270	AIR COND S.W./CH. W - PUMPS (FREON) INSPECTION OF		34				34	5
-50213	M-301	LITHIUM BROMIDE METRIX VALVE Procure and install a metrix valve of a better design.		15	+23			38	232
-50215	M-307	SEALS ON FREON AC CHILL WATER PUMPS Install mechanical seals on Freon A/C chill water pumps.		5	+5			10	147
-50217	M-381	AIR CONDITIONING SYSTEM--CHANGES AND CORRECTIONS Investigate and correct conditions.			90			90	130
-50222	M-476	#2 AIR CONDITIONING PLANT Repair plant to run at stated capacity.							13
-50225	M-724	AIR COND. S.W. PIPING PLANTS Install six unions.				5		5	5
-50302	M-333	LITHIUM BROMIDE PLANT LAGGING Replace lagging with removable lagging which will fit under existing CRES lagging guards.		3				3	1
-50404	M-43	C.O. 216 OXYGEN SYSTEM Install oxygen system pressure regulator. MNS Z-621 and Z-622	13					13	34
-50405	M-119	RESUSCITATOR AND REPLENISHING PANEL OXYGEN SYSTEM Complete installation in accordance with BUSHIPS ltr SS/4730 Ser 648F-1685 of 15 Aug 1961							3
-50505	M-220	CREWS URINAL FLUSH VALVES Renew lagging but do not cover bonnet nuts.	3					3	
-50506	M-296	GALLEY RINSE SINK A rinse sink of a new design is needed for both the galley and the pantry and should be installed during PSA			120			120	142

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15-930-50507	M-299	PANTRY RINSE Relocate piping or install union takedown joints to provide proper access. Insure that all soldered joints are silver soldered as ordinary solder melts in close proximity to the heaters and leaks develop.	6					6	1
-50604	M-35	AUX S.W. SYSTEM HANDWHEEL ENGRAVING Accomplish in accordance with DM261B-163-61.	11					11	4
-50606	M-55	b(3) 10 USC 13 PUMP Repair motor.							70
-50607	M-288	HULL VALVES BALL TYPE BUSHIPS INST 9480.56 requires an inspection of all submarine hull valves, ball type, with elbowed inlets. Accomplish this inspection except N.P. valves, in accordance with above instruction during Post Shakedown Availability. Inspection of sample valve during the current drydocking revealed some pitting.	94					94	32
-50615	M-114	ASW PUMP WEAR RINGS Replace wear rings.				78		78	64
-50616	M-486	b(3) 10 U PUMP SEAL Replace the mechanical seal for b(3) 10 U Pump.				34		34	25
-50620	M-710	HYD COOLER S.W. PIPING INTERFERENCES Redesign saltwater piping to facilitate removal of zinc plug (after port side of after cooler)							7
-50811	M-152	EXPANSION JOINT, BRASS PLUG TRIM SUCTION HEADER Replace monel plug with a welded in plug of proper material.	2		+1			3	6
-50814	M-314	PRIMING LINE--TRIM SUCTION HEADER Install 1/2" valve per DLI #15037			4	-2		2	

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15-930-50815	M-313	DR PUMP GLAND SEAL REGULATOR--REPLACE Replace in ships spares (1) drain pump gland seal regulator, one priming ball and one gage.							1
-50819	M-410	BALL VALVES--S.W. SYSTEM--INSPECT AND REPAIR Inspect all ball valves, in seawater systems during PSA and repair or replace all corroded valves. Investigate feasibility of utilizing teflon-coated ball valves, which were developed by EB. See Item M-288.		728	+168			896	973

NO OTHER ITEMS ON THIS PAGE.
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15-930-50823	M-473	#2 MBT FREEFLOOD DRAIN LINE--REPAIR LEAK Repair leak.				24		24	37
-50824	M-478	PRIMING PUMP FOR TRIM PUMP, OVERHAUL OF Overhaul subject pump.		12				12	
-50825	M-537	SURGE TANKS FLOAT SWITCH DRAINS CONDENSATE SYSTEM Braze chain and plug to half unions and install on #2 and #2 surge tanks.				2		2	
-50826	M-558	BILGE DRAIN MSUL TO MSLL Install a suitable drain system consisting of required drains, eight in number, and headers to MSLL bilges as per sketch to be furnished by ship.				53		53	63
-50830	M-680	BILGE SUCTION STRAINERS Replace existing bilge suction strainers with totally enclosed, split strainers that may be removed in two pieces for cleaning.				14		14	18
-50831	M-704	MSW VALVES Correct valve deficiencies.				14		14	11
-50902	M-450	LINE STOPS--POTABLE WATER Provide line stops on hot and cold potable water lines under wardroom pantry sink.							2
-51320	M-39	HIGH PRESSURE AIR SYSTEM BALL VALVES, MODIFICATION OF Accomplish in accordance with BUSHIPS ltr SS(N)593 Ser 525-2261 of 10-25-61. DM264B-519-62		65				65	109
-51323	M-21	AIR CONDITIONING SYSTEM Pneumatic controls. Accomplish in accordance with DM247A-67-61.	6					6	7
-51328	M-122	H.P. AIR VALVES (CANCEL, ITEM 35C COVERS) Repair b(1) reducer.	20					20	111
-51330	M-262	H.P. AIR COMP MOTOR Remove, rewind and replace #1 & #2 motors and inspect controllers.							107

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15-930-51332	M-213	b(1) AIR TORP IMPULSE Rerun the air line to permit access to a union in the b(1) air to the torpedo impulse reducers.		16				16	
-51333	M-65.3	8000 GPD DIST. H.P. BRINE PUMP LEVEL CONTROLLER Repair controller.							3
-51336	M-22	MODIFICATION TO AIR SYSTEM Accomplish as per DM264B-381-61.	22					22	9
-51345	M-312	SHIPS WHISTLE Provide ship with a reliable whistle.		4				4	5
-51346	M-310	DIESEL STARTING AIR REDUCER--REPLACE							4
-51354	M-479	H.P. AIR #4 MAROTTA--REPAIR Repair valve to allow remote operation from B.C.P.				5		5	3
-51355	M-590	b(1) REDUCER Repair H.P. air reducer valves AHP 29 and 30.				4		4	1
-51356	M-596	H.P. AIR REDUCER MAROTTA VALVES Redesign vent poppet seats in two b(1) reducers to provide removable seats. AHP 29 and 30. MNS A-1045.							
-51408	M-662	FWDC DRAIN LINES Provide a funnel under each shortened drain line so that the drainage can be properly directed to the bilge. Leave enough space between the drain piping and the funnel to allow for sampling.				32		32	21
-51409	M-375	HPD-209 REPAIR Repair leak in valve bonnet seat.				22		22	13
-51503	M-332	M.B.T.VENT VLV HYD OPER. GEAR LATCH MODIFICATION Modify eight M.B.T. vent valve hyd operating gear in accordance with DM262B-112-62.			12			12	
-51706	M-231	DISTILLER AUTO DUMP VLV Replace present dump valves with others of more rugged construction.	30					30	21

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15-930-51710	M-324	H.P. BRINE PUMP REPAIR Repair presently installed pump. Provide an adequate HP brine pump.		69				69	35
-51712	M-530	8000 GPD DUMP VALVE Replace valve with one that is operative.				26		26	14
-51713	M-531	L.P. BRINE PUMP ACCESS, MODIFICATION OF To accomplish modification to deck Fr 76½ and 77½ make area portable.				17		17	
-51715	M-593	8000 GPD DISTILLATE PUMP MOTOR Rewind present motor.				27		27	27
-51716	M-538	SALINITY CELL--RELOCATE Relocate salinity cell and the salinity trip valve in the Lithium Bromide condensate drain line to allow access for maintenance.							15
-51717	M-539	8000 GPD STILL--ACID CLEAN Acid clean the 8000 GPD still.				33		33	38
-52618	M-125	FAIRWATER HYDRAULIC PUMP Replace spares used for the fairwater pump.				33		33	40
-52619	M-156	FLEX HOSE FOR STEERING PUMP RETURN LINE							3
-52626	M-126	FILTERS, INLET FOR SERVO VALVE CONTROL OIL Replace present filters with separately mounted filters similar to those installed throughout the remainder of the system.		13				13	11
-52627	M-229	LATHE--PIPING INTERFERENCE Rerun and install new pipe and fittings.	6					6	
-52628	M-226	OIL SEALS STERN PLANE Provide a more positive means of assuring that the seals for the D.C. local pumps cannot be subjected to main header pressure. Provide replacement seals.	15					15	1

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5-930-52629	M-265	INSTALLATION OF AIR VOL TK ON MAIN AND VITAL HYD SYSTEM	54			+4		58	50
-52630	M-266	STEERING--FLEX HOSES Install new hose assemblies.	6					6	
-52634	M-317	PERISCOPE HOIST CYL SEALS--REPLACE	6					6	8
-52635	M-349	FWTR PLANES HYD SYS FLANGE Investigate inadequacy of relief protection to protect against wave slap. Investigate system to insure that no other damage has been done. Provide access to all components and flanges of this and other hydraulic systems which are outside of the sound barrier. Supply ship with 24 each of size BENDIX valve bolt used on board and add them to the allowance for THRESHER Class ships.		84				84	35
-52641	M-415	EXT. HYD. PUMP--ELIMINATE NOISE Determine cause of noise and eliminate. Add D.C. local pump overhaul pumps. Covers Item M-477		2				2	
-52642	M-472	MAIN HYDRAULIC PLT--CHECK VALVES Install check valves in discharge lines for all hydraulic pumps just before relief valve tap offs. These are required for leak isolation.				25		25	15
-52643	M-474	PIPING TO ACCUM REDESIGN Redesign piping on top of accumulators to replace sprung sections.	30					30	
-52647	M-602	RESERVE HYD OIL TRANSFER PUMP Ref. Shock Item 4-89. Remove pump and motor, repair pump, shop check motor, reinstall. See SH-19.				33		33	14
-60003	M-372	REPAIR BROW SECURING DEVICE			6			6	7
-60004	M-691	RETRACTABLE CHOCK Replace chock to provide smooth fairlead.						—	11

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5-930-60005	M-523	TOPSIDE CLEATS Replace presently installed cleats.				119		119	154
-60404	M-253	FORMICA INSTALLATION IN SONAR CONTROL ROOM Complete formica installation in Sonar Control Room. Install matching formica on forward starboard bulkhead and underneath AN/UNQ-7 recorder on starboard side. Installation was not completed because of high priority work just prior to commissioning.	10					10	19
-60405	M-291	ELECTRONICS EQUIP SPACE; DOOR KNOB Replace knob on passageway side of door to E.E. space with drop ring type.	1					1	-
-60406	M-601	WARDROOM DOOR AND MOLDING Replace missing screws in brass molding in wardroom overhead, repair or replace door.				4		4	-
-60407	M-643	SONAR CONTROL ROOM DOORS Install latch type locks on 2 doors to enable locking Sonar Control Room from the inside.				4		4	4
-60408	M-641	CRYPTO SAFE Straighten door on crypto safe.				1		1	-
-60510	M-37	TANK PRESERVATION Complete three coat Devran system all areas in both WRT and Aux. tanks along with those in majority of other tanks throughout ship which have incomplete preservation. Includes Item M-134.	90					90	694
-60511	M-92	INSTALL NAMEPLATES ON 1SB PANEL "Reserve Feed Vaccum Drag Port" or "STBD"	2					2	4
-60521	M-171	WARNING PLATES; ENGRAVE Engrave 2 plates, 1 Bell Table, and 1 Maximum Astern	8					8	-
-60522	M-230	NAMEPLATES, BCP SWITCH Make and install 2 new nameplates.	2					2	-

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5-930-60523	M-245	TOPSIDE PAINT Touch up the topside paint during the Dec RAV and completely sandblast and represerve topside during PSA (Covers Item S-54.1)						-	961
-60524	M-251	IDENT. TAGS FOR SONAR Provide and install tags.	5					5	2
-60527	M-718	MSW STRS--ANTI-MARINE GROWTH TREATMENT Treat MSW wire mesh strainers with an antimarine growth treatment.				3		3	3
-60605	M-303	PLATFORM DECK COVERING Install covers and sills		9				9	-
-60606	M-440	RUBBER EXPANSION JOINT--TORPEDO ROOM DECK Replace rubber strip.				45		45	-
-60607	M-682	b(1) DIESEL GENERATOR ROOM Replace about 6 damaged b(1) and broken studs.						-	
-60808	M-98	STOWAGE OF DAMAGE CONTROL GEAR Construct accessible lockers for tool rolls. Install wing nuts on the brackets for the submersible pump and for suction hoses. Construct a bolted tubular frame on the port side of the diesel engine to which a number of damage control hoses can be strapped. Provide nylon straps with quick opening grips similar to the Aeroquip style used in other locations for retaining hoses.	45					45	9
-60810	M-110	DRY PROVISIONS STOREROOM Provide additional battens on the top shelves and replace present battens with 6" wide battens on other shelves.	40					40	41

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-60817	M-233	LOCKER IN ENGINE ROOM Make meter locker spray proof. If feasible, provide magnetic shielding in accordance with Par 69-131 of BUSHIPS Manual.	4					4	1
-60818	M-243	TORP ALCOHOL TANK--PADLOCK Remove H.A.T., alcohol and rust preventative tanks and install lockers for stowage.	8					8	66
-60819	M-297	STOWAGE FOR MK2 TEST SET Provide adequate stowage for MK21 test set on starboard side of torpedo tubes.	7					7	10
-60820	M-344	DRY STORES STOREROOM Rearrange shelving		80				80	-
-60821	M-351	DAMAGE CONTROL GEAR LOCKER--REPLACE		12				12	10
-60822	M-435	STOWAGE--EMERGENCY BREATHING APP--TORPEDO ROOM Provide stowage for emergency breathing apparatus in Torpedo Room.			8			8	6
-60823	M-436	TORPEDO TUBE WRENCH STOWAGE Manufacture spring clips for torpedo tube interlock wrench and stop bolt wrench.						-	
-60825	M-465	BENCH LKR SECURING DEVICES Install securing device that can be easily released to remove bench locker.			5			5	2
-60827	M-529	STOW FOR PACKING, DISCS, ETC. Manufacture and install locker; specifications for which will be supplied by Ship's Force.			8	+12		20	18
-60828	M-545	DECK WRENCH HOLDERS Fabricate and install wrench holders as located by Ship's Force. Design liaison.			16			16	13

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
5-930-60829	M-689	ADDITIONAL WRENCHES AND CLIPS Manufacture two of each of the above wrenches (Deck, capstan and salvage wrenches)				10		10	4
-60830	M-692	JACKSTAFF STOWAGE Provide stowage for jackstaff in fan room.				3		3	2
-60833	M-712	STOREKEEPER OFFICE RELOCATION Perform the portion of SS(N)593 Class Change Order #307 which relocates the storskeeper's office to the GSK storeroom. Install lockers in the space presently used for the storekeeper's office.				95		95	129
-60905	M-159	CLOTHES DRYER Install wider mesh filter at the machine and a large wire net type lint trap at the discharge of the exhaust line.	11					11	4
-60908	M-345	SHIPS BELL--PROVIDE Provide a suitable bell and bracket for mounting on the bridge.		6				6	6
-61004	M-528	BENCH GRINDER COVER Manufacture a protective covering for use over the bench-grinder. Make per template.			2			2	2
-61107	M-111	FREEZE BOX BATTENS Replace present thin battens with heavy battens similar to those installed in dry provisions storeroom.	45					45	25
-61109	M-204	PROVIDE MOUNTING FOR TOASTER Provide mounting for toaster in crews mess.						—	1
-61110	M-429	HAND LANTERN--GALLEY Move lantern to a safe location in the same area.			3			2	-
-61111	M-542	CONTACT FOR COFFEE URN Procure and install a new contactor of different design (for cylcing duty) and of proper rating.			5			5	5

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
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15-930-61112	M-540	CLOCK IN WRSR RELOCATE Remove or relocate clock.			3			3	1
-61205	M-275	ENTERTAINMENT SYSTEM TAPE STOWAGE Fabricate and install a suitable locker in the Crew's mess in the space available above ventilation heater controller 2-49.	7					7	11
-61207	M-283	REMOVABLE CURTAINS Provide removable curtains where required.	14					14	8
-61208	M-304	WARDROOM PASSAGEWAY DOOR--CLEARANCE Increase clearance about 1/8"		7				7	8
-61209	M-430	REMOVABLE DK PLTS--CREWS MESS--COVER Install leatherette cover with "snaps" in this section of the overhead.			8			8	2
-61210	M-454	NAUGAHYDE COVERING Replace naugahyde as approved by Type Desk, Code 213, only.				30		30	22
-61211	M-456	HINGES ON CREWS MESS BENCHES--REPLACE Replace all bench hinges with stronger hinges.			6			6	4
-61213	M-550	MATTRESS FRAMES--TORPEDO ROOM Fabricate mattress frames which will allow at least four (4) inches between webbing and any portion of the torpedo cradle while a man is on the mattress.				36		36	28
-61303	M-19	BLUEPRINT LOCKER Modify blueprint locker in accordance with DM253B-43-61 and DM253B-54-61	12					12	13
-61308	M-254	LEGS FOR COLLAPSIBLE TABLE IN RADIO SHACK Replace legs on collapsible table in forward part of radio shack with legs made of sturdier material.	7					7	5

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
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5-930-61309	M-255	LOCKER FRONTS--RADIO CENTER Install locker fronts without locks under both the primary and secondary operating stations in the radio shack in order to provide stowage for test equipment.		10				10	22
-61310	M-509	COLLAPSIBLE TABLE--PORT INSTRUMENT ALLEY Install a collapsible table in stbd instrumentation alley and one forward of RCMG #1			18			18	5
-61311	M-560	TECHNICAL MANUAL STOWAGE Fabricate two lockers and associated doors.			c	9		9	
-61312	M-563	INSTRUMENTATION STOWAGE Provide proper padded stowage lockers to accommodate ship's allowance of portable instruments including the sound level graphic recorder and 1554 sound level analyzer.				19		19	1
-61313	M-564	PANEL OPER. CHAIRS MAN. RM. Provide and install chairs of a sturdier design.				22		22	17
-61314	M-685	DRAWERS--SHIPS OFFICE Remove 5 drawers from ship's office for installation of sliding dividers.				10		10	
-61315	M-407	INSTALL BOOKCASE INBOARD OF #1 SSTG SET			8			8	
-61403	M-393	DEEP FAT FRYER HINGED LID Provide deep fat fryer in galley with a hinged lid as per plan.			6	-1		5	4
-70025	M-71	CONTROL BUTTONS--TT PLASTIC COVER	8					8	0
-70026	M-74	TORPEDO CRADLES, LOCK-TO-TRACK MECH. Modify cradles so that the various mechanisms have increased clearances, thus allowing easier and faster operation.	30					30	23

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
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LS-930-70027	M-34	TT INBOARD GREASING Accomplish in accordance with DM264B-179-61	20					20	24
-70033	M-259	#1 AND #2 EQUALIZING VALVES--TORPEDO TUBES Adjust and repair valves and make more accessible.	7					7	
-70037	M-401	TORPEDO SHIPPING Remove liner from under assembly 401 and install new liner.				10		10	
-70040	M-404	CANCEL COVERED BY ITEM M-243 GREASE MANIFOLDS ACCESS TO							
-70043	M-589	STARBOARD TORPEDO EJECT PUMP DOOR Door will not fully open. Repair. CANCEL, COVERED ON ITEM SM-71.				41		41	1
-70046	M-441	TORPEDO HANDLING GEAR Test and inspect all torpedo handling gear including cables, straps, chainfall, nose pieces, trunnion arms and air hoist for durability, strength and alignment.							1

NO OTHER ITEMS ON THIS PAGE.
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"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

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5-930-70101	M-81	CABLES IN HYD TORP HOIST Provide for adequate on-board spare parts support. Solve the kinking problem.	53					53	31
-70102	M-445	TORPEDO HANDLING REPAIRS Installation of cradle stacking clamps.				4		4	
-70202	M-80	LOCKERS; MODIFICATION OF Modify two damaged lockers on starboard side of uppper torpedo cradle.	8					8	
-70203	M-242	LOCKERS, SMALL ARMS AMMUNITION Install hasp-type locks on above lockers.	3					3	2
-70205	M-442	MISC TABLES AND LOCKERS Fabricate and install mine tables for port and starboard nests, with lockers.				20		20	29
-70206	M-629	LOCKER HOLD-DOWN SCREWS Provide larger, stronger screws.				2		2	1
-80120	M-1	DESIGN SERVICES FOR PSA	2841			+9522		7363	7472
-80400	M-1	REPRODUCTION SERVICES FOR PSA AND RAV							
-81922	M-1.1	CONOLOG, DESIGN SERVICES FOR INSTALLATION							
-86054	M-489	LATHE Repair lathe fdn lay				9		9	
-90268	M-3	DOCK AND SEA TRIALS							15
-90343	M-700	REPAIR PRECIPITRON (ASSIST S. F.) It is requested that PTSMH NAVSHIPYD personnel be provided to assist and instruct Ship's Force in repair of precipitron.							5

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"M" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

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15-930-30392	M-717	MISCELLANEOUS MOTORS--OVERHAUL Overhaul specified motors.				15		15	12
-30401	M-6	RIGGING SERVICES		600		+300		900	981
			4297	2958	851	1785	5	18085	20525
		Adds	0	5	2324	5860	0	0	0
		TOTAL	4297	2963	3175	7645	5	18085	20525

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

"N" ITEMS -- BUSHIPS CHANGE ORDERS AND DIRECTIVES AUTHORIZING WORK NOT ACCOMPLISHED PRIOR TO COMPLETION OF THE SHIP, AND AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	-- 10,428 MD
FINAL EXPENDITURE	-- 36,991 MD
RATIO OF GROWTH	255%
NUMBER OF ITEMS	115

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"N" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPPL W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
5-930-10016	N-37	C.O. #232 COVER WORK ON PL 2103257 (REF: NP49) Stiffen flat plate structure in various ballast tanks			1580	+1000	+750	3330	4717
-10051	N-25	HULL SURVEILLANCE Accomplish in accordance with BUSHIPS INST 9110.48.		318				318	1030
-11305	N-136	FDN FOR ITEM 148 (DM453-456-62) Install FDN for Temp. Monitor HPA. COMP.				6		6	3
-11306	N-147	FDN FOR CROSS OVER CONN. BOX Install FDN & cross connection box fr 12-13 FL1863623 DM253A-198-62				8		8	4
-11307	N-150	FDNS FOR INDICATORS W/C drain valve and #3 sam back-up and hull valves.				6		6	4
-11408	N-42	SUITCASE HULL FITTING Remove flooded suitcase hull ftg.(canceled)		12		-12		0	0
-11414	N-84	BHD 52 INTERFERENCES TO LEAD SHIELDING Accomplish non-nuclear work on BHD 52 per CO 212.				354		354	612
-11415	N-151	WING BHD 74 MBT 6A (REPAIR) Renew section of open flood BHD 74 and outer shell MBT 6A.			37			37	
-12101	N-146	LEAD BALLAST STOWAGE Remove excess lead stowage Per DM 251A-5-62				74		74	93
-20134	N-53	PROPULSION TURBINE EXHAUST SPRAY SYSTEM Install a vacuum pressure gage to be installed in the turbine spray system. If accessible, the gage should be installed downstream of the flow control valve, C190 and C191.		5		+6		11	22
-20139	N-129	COUPLING GUARDS MAIN TURBINE TO RED. GEARS Replace existing packing with neoprene packing and modify gland per G. E. Dwg. 961B992.				10		10	8

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5-930-20143	N-54	SECONDARY PROPULSION SYSTEM Assure that there is 1/4" minimum clearance in air between pieces 33 and 98 shown on plan Louis Allis Co. Dwg. 15S338A "Yoke and gear housing assembly, Mark II "		4				4	4

NO OTHER ITEMS ON THIS PAGE.
CONTINUED ON FOLLOWING PAGE.

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15-930-20163	N-10	MAIN STORAGE BATTERY Provide routine care and maintenance for Main Storage Battery.		70				70	105
-20184	N-109	(ITEM 193) b(3) 10 USC 130 Check and repair balance of unit, bearings, motor laminations, slots, brushes, poles and phase unbalance.			3	+40		43	6
-20192	N-81	SECONDARY PROPULSION MOTOR Install canned type motor.			34			34	45
-20196	N-95	CYCLE CELL 114 Remove cell 114 from ship Replace with new battery and cycle.			30	+90		120	0
-20224	N-17	CHANGE ORDER #256 Install an additional 3/4 inch main steam cross-over valve adjacent to the existing valve. One of these valves should be provided with a locking device to maintain it in a locked open position.			31			31	3
-20333	N-86	INSPECT PROPELLER Remove, inspect, repair propeller and reinstall on ship.				46		46	39
-20711	N-17	CHANGE ORDER #256 Install an additional 3/4 inch main steam cross-over valve by-pass valve adjacent to the existing valve. One of these valves should be provided with a locking device to maintain it in a locked open position. b(3) 10 USC 130		30				30	49
-20809	N-20	HANGERS FOR CONDENSATE SYSTEM Modify and install hangers in accordance with DM261B-4-62.		22				22	20
-20813	N-75	INSTALL b(3) NEW PUMPS AND MOTORS MAIN CONDENSATE SYSTEM Pumps and motors provided by MNS Z-129.				393		393	1542

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-930-20815	N-110	(ITEM 199 and 201) MN FEED PUMP b(3) 10 USC 1 Check and repair: balance and alignment of pump, motor slots, dynamic balance of motors.				11		11	4
-20928	N-64	ASW PUMP MOTORS Install b(3) 10 US new ASW pump motors. Motors ordered on MNS Z-132.		65	+38	+54	+39	196	400
-20931	N-82	INSTALL CARVER ELEX. COOLING PUMP Pump in DMI. Replaced carver cooling pump with Aurora pump. Carver pump defective.	170					170	469
-21106	N-22	#1 LUBE OIL PURIFIER MOTOR Remove, balance and reinstall subject motor.		3				3	
-21114	N-107	(ITEM 239) MAIN LO PUMP DC Check and repair: balance of pump rotor, motor fanblades, rotor and slots.				23		23	22
-21115	N-122	INSP SSTG SHAFT AND MN LO PUMPS Inspect and repair SSTG shaft and MN L.O. pumps.				26		26	44
-29001	N-157	TO CORRECT DEFICIENCIES FOUND ON COMPT AIR TEST			70			70	114
-30013	N-57	b(3) 10 L MOTOR GENERATOR TRIP SWITCH Remove the installed trip switch from the b(3) 10 US motor generator sets. Install new overspeed trip switches Electro-Dynamic Dwg #D73856 and connect in series with the under voltage device of the Motor Generator D. C. Circuit Breaker.		10				10	0
-30025	N-105	(ITEM 223) SSTG LO PUMP #1 Check and repair: rotor balance, fanblades on motor, motor laminations, poles, phase unbalance.			4	+8		12	3
-30027	N-115	DEFICIENCY MG Bus, ground. Shipyard to effect repair of this and any similar damage which S. F. may report.				2		2	4
-30028	N-145	INSPECTION OF SSTG EXPANSION JOINTS b(3) 10 USC 130 Remove b(3) 10 USC 130 and main turbine expansion joints, replace with new Pratt expansion joints.			128	+64		192	234

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15-9230-30105	N-40	INSTALL SHORE POWER TEST BLOCK C.O. #269.1 Accomplish in accordance with subject change order.		4	+10			14	20
-30106	N-58	CHANGE ORDER #146 Replace the ampere-hour meter with an approved non-mercury type meter. GFE.		38				38	22
-30107	N-65	ELECTRIC PLANT CONTROL PANEL NAMEPLATE Add additional engraving in accordance with DM272A-19-62.		2				2	1
-30209	N-21	RELOCATE SUBMERSIBLE PUMP OUTLET Accomplish in accordance with DM247A-305-61.		4				4	16
-30211	N-78	INSPECT CABLING FOR CELLULUBE DAMAGE Ship's force indicates areas of suspected damage.			26	+26		52	34
-30218	N-126	DEEP FAT FRYERS Add temp limit back-up thermostat plus fuse and indicator.				8		8	7
-30219	N-134	6SB SWITCHBOARD PHASE "A" BUS BAR Reference C. R. #51-593-92.				7		7	5
-30316	N-112	LIGHTING SYSTEM GROUND DETECTOR C.O. #298 DM272A-44-62. Provide properly protected circuits for LTG system.				9		9	15
-40028	N-18	ACCESS TO MASTER GYRO Provide access in accordance with DM252A-249-61.	11					11	5
-40046	N-91	PERISCOPE E&A ADAPTER Repair housing & cover.			16			16	32
-40049	N-83	SINS ALIGNMENT Align SINS in accordance with NAVSHIPYD NYK ltr 992:WAS:MM, 9240 of 9 May 1962.				35		35	26
-40172	N-72	COLLISION ALARM SYSTEM C.O. #246 Add self-locking manual release switch for collision alarm system in Man. RM and AMS.			46			46	22

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15-930-40228	N-71	AUXILIARY SINS CONSOLE Relocate auxiliary control console in accordance with PL 1864598 Alt 6 and DM247-253-61.	11		+193			204	198
-40229	N-79	MK113 MOD 2 FIRE CONTROL Assist Librascope representative in grooming for missile capabilities. Perform test memos S71-01-008 and S71-01-010.			102			102	86
-40230	N-80	PROVIDE SHIPS HEADING DATA TO F.C., CHANGE ORDER #302 Accomplish change order #302.			76	+27	+3	106	69
-40234	N-118	MK113 CABLE INSULATION CHECK AND MYLAR INSTALLATION Inspect and repair MK113 cable and MYLAR installation.			35	+176		211	162
-40235	N-128	WEAPONS HANDLING SYSTEM, MODIFICATION OF Ref PTSMH ltr 254A SS(N)593CL/9750(C-7309) of 17 Sep 1962.			186			186	201
-40236	N-131	MK113 FIRE CONTROL SYS (ASSIST LIBRASCOPE) (Assist Librascope Company Man)			10			10	28
-40641	N-35	MF/HF MAST INSTALLATION C. O. 229.1 Accomplish in accordance with subject change order.		205				205	442
-40655	N-113	INSTALL NEW RETRACTABLE FLOATING WIRE ANTENNA IN # 2 PUFFS WELL				310		310	327
-40656	N-114	DEFICIENCY LM frequency meter, mounts failed. Shipyard should repair and recalibrate as needed and install new mounts. Mounts considered faulty due to age and condition.				3		3	3
-40658	N-152	ACID CLEANING OF ELEX. COOLING SYSTEM Clean Elex. Cool sys for better operation.			250			250	322
-40711	N-88	INSTALL IMPROVED ECM MAST BASE COAXIAL FITTINGS Replace & test RC-9 B/V Cable for ECM/DF Mast			144			144	75
-40712	N-89	REPAIR OR REPLACE AS-523 BPX ANTENNA Replace AS-523 BPX Antenna with new Antenna			23			23	92

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15-930-40816	N-69	AN/BQG-2 INSTALL PUFFS in accordance with design instructions. Covers Item 13ER.		2290	+61	+4	+114	2469	6096
-40841	N-69.1	INSTALL PUFFS CABLE CONDUIT TO ELIMINATE INTERFERENCE			1957			1957	1518
-40842	N-69.2	REMOVE OLD PUFFS SYSTEM			500			500	785
-40850	N-124	AN/UQN COVER LEAKS Install new gasket.							
-50138	N-108	(ITEM 183 and 189) AMS RECIRC VENT FAN #2-70 and #2-64 Check and repair: balance of shaft and fanblades, slots on motors.			41	+12		53	50
-50139	N-100	(SOUND SURVEY ITEMS 105, 106, 255, 209) VENT FANS Overhaul, check and repair: ball bearings, phase of impellers, dynamic ball angle.				14		14	10
-50216	N-66	TEST CO_2 SCRUBBER PIPING Test P2 and P3 per DM263B-330-62.		6				6	0
-50221	N-74	LITHIUM BROMIDE INSTRUMENT PANEL Check air piping to panel, and, if necessary, correct per DM263A-198-62.				2		2	0
-50224	N-142	REPAIR FOUR 5" ELBOWS FOR HAMMERDAHL INSTALLATION			10			10	0
-50508	N-44	PLUMBING 3rd PLATFORM Accomplish in accordance with DM463B-55-62.		5				5	3
-50510	N-144	PLUMBING OFFICERS QUARTERS (DM263B-464-62)				2		2	1
-50608	N-41	LABEL PLATES Accomplish in accordance with DM247A-24-62.		4				4	2
-50609	N-46	ASW PUMP b(3) 10 USC 130 Accomplish inspection in accordance with DM261A-15-62.		6				6	1

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5-930-50612	N-60	SILVER BRAZED SEA WATER SYSTEMS Accomplish in accordance with BUSHIPS ltr 9480 ser 648K-728 of 7-14-62, PNS (71478). See M-228 and M-410.			1097			1097	31
-50614	N-63	C.O. #226.2 BRINE DILUTION SYSTEM, 8000 GPD DISTIL SYS. Modify change order 226 to specify brine dilution supply direct from the auxiliary sea water system to the brine tank. Consideration should be given to utilizing existing piping and strainers in sea water supply to the steam distilling plant. In this case, a cutout valve should be installed downstream of the brine dilution connection.		40				40	53
-50617	N-92	TRIM AND DRAIN BY-PASS ENG-RM Install By Pass Line per DM263B-399-62.				4		4	9
-50619	N-111	MN SEA WATER CIRC. PUMP IMPELLER CHANGE DM261A-80-62.				25		25	25
-50829	N-103	(ITEM 206) DRAW PUMP Check and repair: balance of pump shaft and impellers.			43			43	65
-50833	N-148	REPAIR b(3) 10 U PUMP				14		14	17
-51331	N-16	COMPARTMENT AIR SALVAGE VALVE Accomplish hydrostatic, hydraulic shock and hi-impact shock test.		15				15	19
-51357	N-106	(ITEM 143) H. P. AIR COMPRESSOR #2 Check and repair: balance of impeller, laminations, poles, phase unbalance.				16		16	11
-51361	N-149	STOP VALVES IN H.P. A.C. DISCHARGE LINE				13		13	10
-51407	N-61	DISTILLING PLANT 150# STEAM SUPPLY DRAIN LINE Reroute drain line P-143 to the high pressure drain system.		44				44	15

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"N" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
-930-51410	N-153	MOD. TO AUX STMN VLVS AS 14 and AS 48 Remove, modify & reinstall aux. stmn.vlvs.as 14 & as 48.				4		4	2
-52632	N-43	ELECTRO-HYDRAULIC REMOTE OPERATION FOR BILGE SUCTION VLVS Install hydraulic piping, valves and wiring for remote separating bilge suction valves.		462		-199		263	269
-52633	N-52	C.O. #280 Accomplish in accordance with subject change order. Install secondary propulsion mechanical locking gear.		59		+23		82	98
-52637	N-68	MODIFICATION TO PIPE LOCKER PORT Piping.				82		82	19
-52638	N-68.1	MODIFICATION TO PIPE LOCKER Structural.		54				54	6
-52639	N-68.2	MODIFICATION TO PIPE LOCKER Sheetmetal and lockers.		70				70	24
-52640	N-68.3	MODIFICATION TO PIPE LOCKER Ship's Control Panel.		844		+6		850	831
-52649	N-102	(ITEM 264 and 265) FAIRWATER PLANES HYD PLANT AND CENTRAL HYD PLANT Overhaul unit. Check and repair: motor balance and alignment, bearings on pump and motors.				5		5	2
-60708	N-140	REPAIR LOOSE CORK AND b(1) IN ENGINE ROOM				40		40	46
-60805	N-26	ESCAPE TRUNKS FL AND DR OPERATING GEAR Provide four shafts Pc #4 Dwg 1866902 Alt A. Relocate flood and drain operating wheels about 1" above the bubble line. Modification of foundation to suit relocation of wheels shown on DM253A-93-61.		18				18	11

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"N" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
-930-60834	N-127	LOCKER SURVEY Install lockers as requested by ships force.				255		255	624
-60904	N-23	OFFICERS AND CREWS WASHROOM REARRANGEMENT C.O. #272 Accomplish rearrangement. This item includes INSURV Item 58C and Ship Deficiency Item M-155.	352					352	954
-61005	N-158	RELOCATE LATHE SW Remove presently installed switches and rerun cables to new location.					8	8	2
-70045	N-85	INSTALL MK37-1 TORPEDO HEATER CIRCUIT Plan 1864226.				95		95	31
-70047	N-97	DM264B-74C-62 Torp. Firing Exhaust Muffler Replace Worn Parts.			3			3	6
-70048	N-135	TORP SECURITY ALARM SYSTEM (ASTOR)				290		290	267
-70049	N-156	TORPEDO TUBE BREECH DOORS Install launch gags on muzzle door shafting and install blanks in place of breech door. Conduct radiographic examination on three torpedo tube breech doors. Reinstall breech doors and conduct drop test and remove launch gags.				12	+8	20	
-70301	N-73	SUBROC LANYARD AND CABLE CLAMPS Accomplish change order #294.			20	+7		27	20
-90224	N-2	DOCK AND UNDOCK Furnish labor and material to dock and undock vessel for PSA availability.		280	+386			666	723
-90226	N-51	CORRECTION OF SHOCK DEFICIENCIES Correct shock deficiencies in accordance with design recommendations.							11
-90228	N-51.2	[illegible] SHOCK ITEMS Correction of shock deficiencies Code 232C items. Canceled.							39
-90230	N-51.4	CANCELLED SHOCK DEFICIENCIES Correction of shock deficiencies Code 231B items. Canceled.							1

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"N" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
5-930-90231	N-51.5	CORRECTION OF SHOCK DEFICIENCIES Code 233A items only.			5			5	2
-90274	N-3	DOCK AND SEA TRIALS Conduct all dock and sea trials for PSA availability.		138				138	114
-90275	N-4	POST SEA TRIAL DEFICIENCIES Correct items incident to PSA availability.		317				317	2061
-90276	N-11	ELECTRONIC SERVICES Provide electronic engineering services.		200	+150			350	53
-90329	N-5	TEMPORARY SERVICES Provide and maintain shore services, include fire extinguishers.		1372		+908		2278	2454
-90330	N-7	CARE AND PRESERVATION Provide care and preservation services during PSA availability except for reactor plant.		243				243	174
-90331	N-121	TO COVER ALLOWANCE ITEMS EXCLUSIVE OF HYD. SYSTEM SPARES			5			5	15
-90338	N-8	PRODUCTION SERVICES (Intra-shop)		480				480	580
-90339	N-9	PRODUCTIVE MINOR WORK Intershop.		345		+497		842	891
-90393	N-116	ULTRASONIC TEST OF SILBRAZE JOINTS ON SEA WATER, HYDRAULIC AND COMPRESSED GAS SYSTEM				325		325	410
-90394	N-117	PROVIDE FIRE WATCH SERVICE			660			660	484
-90396	N-125	SELF NOISE REDUCTION Installation of Chemfor, Ral, & Epoxy Also items listed for self noise reduction.				573		573	2152
-90398	N-143	SHORE STEAM Shore steam services for testing purposes.			85			85	177
-90402	N-6	RIGGING AND CRANE SERVICES		1800		+900		2700	2907

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963

"NP" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
			544	9884	7257	4102	8	26182	36991
		ADDS	0	0	838	2635	914	0	0
		TOTAL	544	9884	8095	6737	922	26182	36991

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

"S" ITEMS -- SHIP'S FORCE WORK REQUESTS NOT ACCOMPLISHED

DURING RAV 4 DEC 1961 - 8 FEB 1962 AND AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	518 MD
FINAL EXPENDITURE	--	975 MD
GROWTH RATIO		88%
NUMBER OF ITEMS		17

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"S" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-20908	S-48.1	MISC PIPE LAGGING Remove damaged lagging on various systems and repair.		10				10	20
-21703	S-64	MAIN FEED PUMP CUTOUT FLOAT SWITCH Repair the float switch on b(3) 10 USC tank. Relay cutouts are not held open with tape.		4				4	5
-21708	S-64	MAIN FEED PUMP CUTOUT FLOAT SWITCH b(3) 10 USC TANK The main feed pump cutout float switch on b(3) 10 USC tank is hung up in the low position. Repair the float switch on b(3) 10 USC tank. Relay cutouts are not held open with tape.		8				8	4
-30004	S-9	SSMG, COOLING OF REACTOR CABINETS Provide a ventilation duct extension from existing spot cooler to each cabinet.		8				8	9
-40131	S-61	ITml TEMP MONITOR Points #1 and #23 are grounded. Replace the FTD's at points #1 and #23.	10	+8				18	56
-40147	S-49	MESS BUOY Forward messenger buoy became loose and rattled. Readjust securing pads so that forward messenger buoy is secure and fairs properly.		10				10	10
-40803	S-33	AN/BQS-6 TRANSMITTER AN/BQS-6 transmitter is unreliable in operation. Check the 15,000 volt power supply and final amplifier stage is required		84				84	104
-40813	S-56	NOISE LEVEL MONITORING ELECTRONIC EQUIPMENT Repair noise level monitoring instrument NLM-1551-A.		2				2	1
-51404	S-51.1	COMBINED AIR INJECTOR AND GLAND EXHAUST CONDENSER DRAIN LINES Fabricate and install higher vacuum breaker lines to overcome back pressure from Fresh Water Drain and Connecting tank.							

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"S" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
5-930-52615	S56.2	PERISCOPE CONTROL VALVE Periscope drifts down. Investigate and correct. Remove, overhaul, Shop test and reinstall control valves.		4				4	4
-60520	S54.1	TOPSIDE PAINT (COVERED BY M-245) Topside paint unsatisfactory. Remove all peeling paint and represerve all rusted areas.	61					61	35
-60603	S47.1	VINYL DECKING, REPLACEMENT OF Replace vinyl decking throughout the ship upon completion of PSA. Accomplish temporary repairs until then.	420	+70				490	491
-60701	S-40	REMOVE RAL FROM SHIP RAL installation unsatisfactory in mechanical strength, Remove.		60				60	65
-60704	S50.1	HULL LAGGING Provide adequate hull and bracket lagging over reed valves.		6				6	6
-61204	S46.1	TABLES, SLIDING BENCHES IN CREWS MESS Redesign foldup tables without using cables and pulleys to fold table up. Realign inboard benches and tables.	27					27	28
-90306	S-60	PRODUCTIVE MINOR WORK Inter shop minor work		100				100	105
-90321	S-66	MINOR WORK (OVER 4 HOURS) Shop Assist work.		40				40	32
			518	336				932	975
		ADDS		78					
		TOTAL	518	414				932	975

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

"INSURV" P. A. T. ITEMS AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	16,458 MD
FINAL EXPENDITURE	--	18,462 MD
GROWTH RATIO		11%
NUMBER OF ITEMS		97

SHOWS ADVANTAGE OF HAVING ADVANCE PLANNING TIME

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-4-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
-230-10011	46C	REPLACE MAIN BALLAST TANK FLOOD COVERS WITH LOUVERS Ship indicates this item as partially complete.	200					200	102
-10301	66C	CROSS SHAFT WALKWAY Install cross shaft walkway aft of EPM as shown on engine room arrangement plan.	20					20	12
-11302	28C	BQN-4 AND UPN-12 Raise BQN-4 and UPN-12 foundations to give a 6" clearance from top of chart desk to UPN-12 support foundation.	17					17	37
-11403	11C	ELLIPT. BHDS--STRENGTHEN Strengthen impact resistance of ellipitical bulkheads in compliance with current BUSHIPS directives.	191					131	429
-11404	68C	ENGINE ROOM BHD ACCESS PLATES Filling voids Eng. Rm. Dk. on Horiz, Girder Bhd 74	39					39	31
-11501	31S	RESERVE FEED WATER TANKS b(3) 10 USC 130 MODIFY Modify reserve feed water tanks b(3) 10 USC 130	124					124	227
-12304	19C	REPLACE HATCH COVERS Replace hatch covers to increase impact resistance.	60					60	111
-20111	7E	MLO SYS INST ELECTRO. PRECIPITATOR	62					62	3
-20154	14S	DIESEL ENGINE DEFECTS 1. Inoperative field amp. meter (19 cal). 2. Inoperative crankcase manometer. 3. Blowers high temperature a near full load the differential temp. alarm point is quickly reached when engine is loaded while snorkeling.							3
-20183	10.1C	S.P.M. MOTOR Install instruction plate.	1					1	1
-20191	1.7S	1ST STAGE TEMP GAUGE #1 MAIN TURBINE Repair first stage Temp. Gauge.							0

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
5-930-20325	1.3S	SHAFT THRUST RESONANCE CHANGER Shaft Thrust Resonance Changer complete the installation (remote control, indication etc.,) of the shaft thrust, resonance changer. DM261A-79-62 and 261A-20-62.				120		120	66
-20403	43S	FLEX. EXH. CONN--REMOVE Remove spare flexible exhaust connections from allowance and from ship at first overhaul.	3					3	15
-20802	10.9C	b(3) 10 USC 130 FEED PUMPS Dynamically balance b(3) 10 USC 130 Feed Pump. In place balancing.	13					13	4
-20803	26S	DEMINERALIZERS Install demineralizers in vacuum drag lines from reserve feed tanks in compliance with BUSHIPS Change Order No. 178 (Cat. B). Spurious sounding of salinity alarms.	45					45	142
-20906	36S	MAIN CONDENSER HOT WELL--PROVIDE ACCESS Provide proper access to main condenser hotwells.	92					92	129
-20907	55C	ELECTRONICS COOLING SYS VALVE--RELOCATE Relocate valve in electronics cooling system which blocks top rung of ladder to electronics equipment space.	3					3	3
-20910	86.4C	CONSTANT VENT VALVES Provide spring check valves in constant vent valves so as to provide leak isolation.				74		74	147
-20912	13S	LAGGING Repair or replace damaged lagging except on Reactor piping in machinery spaces. Ship's Force has provided list. Include Ship Deficiency Item M-177.		30		+65		95	120
-21102	27S	SSTG L.O. PUMPS Install SSTG L.O. pumps per C.O.191. Pumps installed at E.B. Charges are for furnishing material.	70					70	6

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"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
5-930-21103	18S	IMPROVEMENT OF ACCESSIBILITY Improve accessibility to LO-92, LO-53, LO-76 and LO-42	7					7	0
-22001	23C	DEPTH GAUGES AND SEA PRESS IND Connect depth gages and sea pressure indicators to more than one sea chest. Depth gages and indicators shall be connected to sea as authorized in Change Order No. 198.	60					60	41
-30006	48S	b(3) 10 USC 130	90					90	191
-30009	17E	b(3) 10 USC 130 SETS FILTER Provide an air inlet filter on the b(3) 10 USC 130 sets. These machines must be cleaned twice a week to prevent failure of slip rings and overspeed devices due to steam and dirt in air.	7	+9				16	14
-30202	32S	ELEC HEATERS L.O. SUMP TANKS Provide high temperature cut-out features for electric heaters installed in the lube oil sump tanks in compliance with BUSHIPS Change Order #114.	134	+135		+7		276	424
-30205	23E	CONTROLLERS ON 5SB AND 6SB DISTRIBUTION PANELS	4			-2		2	2
-30207	31E	SSTG EXCITER SIGHT PORTS Provide SSTG Exciter sight ports in accordance with DM272A-44-61 to permit inspection of brushes and slip rings.	11					11	5
-30305	29E	AMPHENOL PLUGS FOR BATTLE LANTERNS Install amphenol plugs between emergency lanterns and sensing cables.							7
-40024	4E	ELECTRICAL TESTS Accomplish incompleted Electrical Tests listed: SS(N)593-S08-01-017 Magnetic Compass.	2					2	0

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"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-40025	14.1E	GYROCOMPASS SYNCHRO AMPLIFIERS Replace gyrocompass system synchro amplifiers with quiet units. Recommend cancel - "Quiet Units" not available.	20			+23		43	22
-40109	5E	BILGE FLOODING ALARM SYSTEM Provide a bilge flooding alarm system to cover all wet bilges not presently provided with a bilge flooding alarm system in compliance with BUSHIPS C.O. #198.	47	+30		+55		132	135
-40110	19E	27MC; SEPARATION OF Install switch to separate 27MC into two circuits during battle stations.				23		23	16
-40112	12E	AUTO DEPTH & COURSE CONTROL VISUAL INDICATOR Correct wiring of indicated speed input to automatic depth and course control and adjust visual indicators.	5					5	2
-40119	13.1E	CKT 7 VS SWITCH Replace position switches CKT 7VS, make waterproof.	23					23	2
-40120	9.1R	NOMOGRAPHS The air pressure sea pressure nomograph is incorrectly printed. The air pressures designated at the various depths are not in accordance with current directives. Replace with correct nomograph.	2					2	1
-40129	29C	TANK LEVEL INDICATING SYSTEM Provide satisfactory tank level indicating system.		197	+149	+224		570	544
-40130	9E	M. C. SYSTEM TORPEDO ROOM Properly wire M.C. Systems at torpedo room F.C.C.			11			11	14
-40134	31.1S	CKT "4TK" Modify Ckt "4TK" to agree with modification of feedwater tanks.	70	+91	+140		+61	362	299

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXTENDED MD
15-930-40142	19ER	**SHIPS ENTERTAINMENT SPEAKERS** Change mounting of ships entertainment speakers to allow changing the gain controls and routine maintenance. Present gain controls do not have enough range. Correct cause of warpage of records in record player.				22		22	22
-40146	26.1E	**ANNUNCIATOR BELL** Provide an annunciator bell in maneuvering room which will sound consistently.	3			+11		14	2
-40163	44.4C	**PLASTIC SUPERSTRUCTURE ON MESS BUOYS** Provide and install plastic superstructures on messenger buoys. Change Order #158 applies.	110					110	251
-40204	9.2R	**INSTALL MISSILE PORTION OF MK113 F.C. SYS.**			200	+100		300	340
-40206	22R	**MK21 MOD 0 IND PANEL** Provide ship with Mk 21 Mod 2 Indicator Panel to replace MK21 Mod 0 Panel.	5					5	0
-40218	17R	**MK8 POSITION IND DIALS** The bearing and range dials on the MK8 position indicator are of very inferior construction and are difficult to read. Replace dials.	16			-7		9	8
-40601	7ER	**AN/SRR-11** Eliminate beat note interference in AN/SRR-11 when using loop antenna	236	+78				314	297
-40607	44.5C	**REPLACE ANTENNA MASTS WITH MONEL MASTS** Repair aluminum IFF/UHF Mast. (Monel masts not available)	363					363	145
-40608	3ER	**FOUNDATIONS AND CABLES FOR RADIO FACILITIES** Install foundations and cables for supplementary radio facilities in compliance with BUSHIPS C.O. 127	114					114	50
-40609	15ER	**CANCEL (PROVIDE AN/BRA-4)** **Install AN/BRA-4 furnished by Type Commander. (Cancelled. Equipment not available)**	18					18	1

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"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1963

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-40610	20ER	ECM MAST Install standard ECM mast and encapsulate antenna per BUSHIPS C.O. 187.	795					795	835
-40624	13.1ER	TEST EQUIPMENT Provide the following missing test equipment (Electronics) CCTY-501, AN/USN-105A, CBPM-7150.	20					20	2
-40625	16ER	SUPRAD Provide SUPRAD Equipment and install.	61				+3	64	98
-40806	12ER	ULTIMATE SONAR DATA CORRECTION COMPUTER Install ultimate sonar data correction computer. Change Order No. 137.1 applies.	27	+84				101	138
-40809	11ER	AN/URQ-9 Change Order No. 40 applies.	33					33	16
-40811	27ER	INSTALL AN/WLR-1 AND AN/BLA-2 Install AN/WLR-1 ECM and AN/BLA-2. Change Order No. 40 applies.		477				477	515
-50113	33C	FLAPPER AT BHD 28, ACCESSIBILITY Improve accessibility of the flapper at bulkhead 28-port side.	24					24	31
-50128	43C	3000 PSI OXYGEN REPLEN. LINES Provide emergency means of automatically or remotely closing the fwd and after 3000 psi oxygen replenishment lines where they penetrate the hull. C.O. 216.1	183		-80			103	110
-50129	60.3C	ELECTROSTATIC PRECIPITATOR SYSTEM Investigate operation of electrostatic precipitator system in galley. Repair as necessary.	20					20	7
-50204	23S	AIR COND PLANT, LITH BROM LOW-FLOW INTERLOCK Provide low flow interlock (chill water) on Lithium Bromide Air Conditioning Plant.	15					15	20

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"LEGEND" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF. W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD.	EXPENDED MD
-930-50603	41S	MISSING VALVE WHEELS Repair or replace damaged or missing valves. Ship's Force has provided list. Except Reactor Plant.	26					26	10
-50801	44.6C	AUXILIARY DRAIN SYSTEM Install an auxiliary drain system for performing bilge drainage functions in accordance with including (a) improved drainage from midships machinery space via drain pipin g to torpedo room wet bilge, (b) adequate means of pumping battery well. BUSHIPS C.O. 146 Cat. B	136					136	314
-50804	81C	VALVES AND PIPING, TRIM AND DRAIN Modify valves and piping to improve accessibility to trim and drain valves.	60					60	35
-50805	85C	CANCEL (NEG TANK DRAIN TO WET BILGE) Run neg tank vent to wet bilges. Completed by Ships Force	29					29	13
-50817	96C	TRIM FLOW METER Install trim flow meter in line to sea connection to meter input to var. bal. tanks when flooding from sea. Covers Item M-412.			70			70	64
-50901	76C	FIL & PRESS CHILL WATER EXP TANK							0
-51101	74C	PROTECTION OF NO. 1 NFO TANK SAMPLE LINES Installation of pipe hangers.		3				3	
-51312	35C	H. P. AIR MANIFOLD Modify H.P. Air Manifold in air regenerating room to permit removing various components and sections for repair and maintenance.		144				144	11
-51314	21S	#1 and #2 AIR COMPRESSORS Separate #1 and #2 Air compressors to provide accessibility for maintenance.		148				148	44

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-51315	25S & 22S	CONV H.P. AIR COMP FOR USE WITH PETROLEUM LUE. Provide for removal section of piping in the high pressure air system to permit inspection to determine the adequacy of the filtration system to extract any oil carry over.	903					903	909
-51319	30.1S	b(1) AIR BLOWDOWN EMERG COOLING Modify b(1) air blowdown emergency cooling per DM264B-392-61 (accomplished at EB) Charges are for manufacture and shipping material.	10					10	1
-51324	15C	REPLACEMENT OF APEX STOP VALVES IN SERVICE AIR SYSTEM To provide reliable service air system stop valves.	204					204	
-51325	36C	SERVICE AIR SYSTEM--TIGHTNESS TEST Accomplish 6-hour tightness test of service air system.	135					135	153
-51401	10S	STEAM SUPPLY TO LITHIUM BROMIDE PLANT Provide a separate steam supply to lithium bromide plant or to the 8000 GPD still.				233		233	433
-51813	10.3C	STEERING AND STERN PLANE ELECTRIC OPERATION Provide means of controlling the electric motor for steering and stern plane electric operation in vicinity of hand control valve.	9	+11				20	11
-51814	65C	STEERING AND DIVING STUFFING BOX RETAINER BOLT Replace steering and diving stuffing box retainer bolts that will not fail at full cylinder load if piston rod jams in retainer.	26					26	21
-52201	38C	PERISCOPE HOIST CONTROL Install a ring-type actuator for the periscope hoisting control that is readily accessible from all bearings.	53					53	49
-52601	7C	HYD SYS CONV TO PETROLEUM BASED FLUID Provide reliable electro hydraulic controls for non-vital components.	10260			+206		10466	7242

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"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 -8 FEB 1962

JOB ORDERS	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
15-930-52608	9S	HYDRAULIC OPERATION OF MAIN STEAM ROOT VALVES Install relief valves in lieu of accumulator for hydraulic operation to main steam root valves.	67		+22			89	62
-52612	67C	PROVIDE RESERVE HYD OIL TANKS Provide reserve hydraulic oil tanks which can be cleaned properly. Stiffeners and baffles prevent reaching all parts of the tanks. This should be done in conjunction with fluid conversion.		27				27	9
-52616	26C	PERISCOPE HYDRAULIC PIPING Alter periscope hydraulic piping to clear packing gland on periscope	17					17	52
-52617	7C	ELECTRO-HYDRAULIC CONTROL Provide reliable electro hydraulic controls for non-vital components.	8					8	0
-60509	10.5C	CLEANUP OF SHIP Complete general clean-up of ship, complete interior and exterior painting.	145					145	169
-60518	9R	LABEL PLATES Provide label plates for valves TD-158 and TD-159 at the forward pyro stowage sprinkling system.	4					4	0
-60702	8.3C	INSULATION IN MOISTURE TRAPS BEHIND STIFF. Install suitable insulation in moisture traps behind stiffeners in bridge access trunk.	5					5	0
-60902	31C	TRASH EJECTOR OUTER DOOR Replace trash ejector flapper-type outer door with ball valve. Change Order #99 applies.	764			+231		995	1227
-61102	56C	MINOR WORK--PANTRY, GALLEY, WARDROOM Modify silver drawer in WR so that silver can be removed easily. Provide exhaust ventilation over griddle in WR pantry. Provide wooden deck grating in crews galley. Provide a torque wrench for garbage ejector.	6					6	2

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
5-930-61103	73C	REFRIGERATOR CREWS GALLEY Repair refrigerator in crews galley.	14					14	0
-61105	13.4E	#2 HOT WATER HEATER ELEMENT Replace #2 hot water heater element which is grounded. Increase allowance of space elements from 1 to 3	4					4	3
-61201	59C	RECORD PLAYER, REPAIR CATCHES AND SEAL DOOR Repair catches and seal door to the record player.	2					2	1
-61401	71C	LOCKERS, MEDICAL INFLAMMABLE ITEMS Provide and install locker for stowage of medical inflammable items.	6					6	3
-70013	3R	MUZZLE DOORS Correct the condition whereby muzzle doors and barn doors do not open promptly because of slow equilization time. See Item M-259.	56	-13			+5	48	269
-70020	10.9C	TT SHUTTER Fair Hull at #3 TT shutter.	8					8	3
-70023	14R	TT FIRING RAMS Investigate and correct reason Torpedo Tube Firing Rams #1 and #2 failed to return to battery properly after water slug firing at test depth. N-22 covers piping part of this job.	16	+12				28	8
-70024	15R	TORPEDO SHUTTER MODIFICATION Correct sticky operation of torpedo tube outer doors at test depth.				513		513	870
-70201	11R	PYROTECHNIC STOWAGE Enclose valve in locked box. Change flood valve handled to work properly (i.e. inline when open) Label flood valve as "Flood" vice "Drain" Furnish revised instrument plate. Supply test plug, spanner wrench and container for test plug.	20					20	10

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"INSURV" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING SAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-90223	41C	NOISE DEFICIENCIES Correct noise deficiencies in contractor furnished material, except Reactor Plant.				365		365	63
-90264	10C	CONTR FURN. REPAIR PARTS--PROVIDE Provide missing contractor furnished repair parts.		50				50	79
-90272	64C	REMOVE INSTRUMENTATION Complete removal of all temporary instrumentation.		71				71	67
			16458	1147	281	1350	0	20886	18462
		ADDS		437	231	913	69		
		TOTAL	16458	1548	512	2263	69	20886	18462

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

SHOCK TRIAL ITEMS

FIRST ESTIMATE 8/3/62	-- 2,984 MD
FINAL EXPENDITURE	-- 2,651 MD
GROWTH RATIO	-11%
NUMBER OF ITEMS	109

SHOWS CAREFUL PRODUCTION CONTROL

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
[illegible] - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST MD	EXPENDED MD
25-930-40852	SM-99	PRESSURE TRANSDUCERS Replace three pressure transducers (DM273A-52-62)			65			65	22
-81616	SM-76	MSW COOLING PUMP Supporting head casting examination.							
-86001	SE-1	FEED-BACK SYNCHROS--PLANES Feed Back shifted zero setting in its mounting. Install stronger clamps.			9			9	11
-86002	SE-2	DEUTSCH CONNECTORS - TO MICROSWITCHES Replace GE magnetic controllers with Cutler Hammond Controllers			15	+20		35	64
-86003	SE-3	GE CONTROLLERS			500	+63		563	530
-86005	SE-9	CAGES (SPCP) Provide a positive means of fastening gages to steam plant control panel.				4		4	7
-86006	SE-12	TRIM FLOW METER Provide locking for all screws in clamping ring of sparling transmitter			1			1	2
-86007	SE-14	DISTRIBUTION PANEL b(3) 10 USC 130 Repair distribution box 2-41-4			1			1	1
-86008	SE-15	BATTERY EXHAUST FAN Replace 3500 ohm resistor and add combination adjusting and jam nut			10			10	8
-86011	SE-21	AN/BQS-6 SONAR EQUIPMENT SPACE Install ground strap.							
-86012	SE-22	ELECTRONIC COOLING Provide additional hangers			5			5	8

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"SHOCK" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-86013	SE-23	IND BULBS (S P GA BD) Replace lenses for indicator lights			7			7	5
-86014	SE-24	MAIN TURBINE THROTTLE REMOTE CONTROL Install stronger clamps (See SE-1)							
-86016	SE-27	EMERG PLANE ANGLE INDICATOR Replace defective switches (DM273A-51-62)			14			14	5
-86017	SE-28	BATTLE LANTERN Inspect and repair battle lanterns			14			14	14
-86019	SE-31	TANK LEVEL IND. CIRC. 4TK Inspect and repair all meters for loose dial faces or sticky needle movement, all transformer retaining pieces.			5			5	2
-86020	SE-32	HYD CONTROL RELAY PANEL--LEAD BROKEN Repair and secure lead in panel			1			1	
-86021	SE-33	8000 STILL RELAY MODULE Provide shock mounting 8000 GPD controll			4			4	1
-86023	SE-37	BATT AMM OUT OF CAL. Recalibrate battery ammeter.			1			1	1
-86027	SE-39	b(3) 10 USC 130			3			3	2
-86028	SE-40	(CANCEL) LIGHTING FIXTURE MTG BOLTS SHEARED Replace bolts			1			1	1
-86030	SE-42	PWR SWITCH PORT T.T. CONTROL PANEL Replace defective switch with new switch			3			3	4
-86031	SE-43	MK 19 GYRO COMPASS TABLE Install clear plastic window in table top.			3			3	

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"SHOCK" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
5-930-86032	SE-44	LIGHTING FIXTURES TORP. RM. Change shock mount clips to steel			2			2	2
-86033	SE-45	ATMOS ANALYZER LOCKING DEVICE Manufacture new hinges and replace molding screws			15	+10		25	30
-86034	SE-46	SSTG CIR. BRKRS RACK OUT DEVICE Westinghouse furnished new parts for repair of frames.			14			14	10
-86035	SE-47	PANEL A3-96-2 BROKEN BUS BARS Repair broken bus bars distribution panel.			6			6	5
-86036	SE-48	POWER SWITCHES Replace damaged switches with same type as presently installed.				3		3	
-86037	SE-49	HOT WELL LEVEL ALARM Replace adjusting screw			2			2	2
-86051	SH-1	ACCESS HATCHES (SUPERSTRUCTURE) Provide more positive latching device and strengthing devices.			100	+20		120	123
-86052	SH-3	CHILL BOX DOOR Provide stronger door latch			8			8	16
-86057	SH-13	PORT NITROGEN BOTTLE Replace bolts in foundation							
-86058	SH-14	CRES COVER (HYD LINE) TORP RM. Improve hold down arrangement			1			1	4
-86059	SH-15	E.R. DECK PLATE Provide stronger screws in deck plate			3			3	3

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15-930-86060	SH-16	FREON BOTTLES Replace straps and bolts			10			10	9
-86061	SH-17	LOCKERS Reinforce locker fdns and supports as necessary.			4			4	23
-86062	SH-18	PIPE BKTS Replace bolts in pipe bkts.			30	+10		40	36
-86063	SH-19	RES HYD TRANSF PUMP Install fdn in accord with pl 1865450 and revise adjacent piping.			2			2	1
-86064	SH-20	CAP FOR FW DRAIN COL TANK LEVEL PROBE Secure with 3/8" dia bolts.			1			1	1
-86065	SH-22	CHART LOCKER Replace spot welds on chart locker.							
-86066	SH-23	MAIN HYDRAULIC SUPPLY TANK SUPPORT Foundation replaced.							
-86067	SH-24	BOILER PLATE M. H. COVERS Strengthen and improve securing arrangement			65	+10		75	82
-86068	SH-25	ATTACK CONSOLE SWITCH MTG BOLTS Provide stronger mtg bolts.			10			10	12
-86069	SH-26	COVER TO EMERG BREATHING APP Provide a keeper type latch which will permit easy removal of cover.							
-86070	SH-28	VENT SUPPORT Replace mounting bolts with larger size.			2			2	3
-86071	SH-29	FIRE EXTINGUISHER Provide retainer at top hook of holder.			15			15	15

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15-930-86072	SH-30	WRT MANIFOLD Replace mounting bolts.							
-86073	SH-31	DISHING OF MN BAL TKS Repair dent in outer shell of MBT3B			10			10	19
-86074	SH-32	COVER FOR HIGH SALVAGE Provide heavier lugs and drill and tap for one mach screw. Silbraz in conjunction with lugs.			10			10	9
-86076	SH-34	DISHING OF ESCAPE TRUNK COVERS Strengthen fairing plate and provide vent holes in cover.			1			1	3
-86078	SH-36	HYDRAULIC SYSTEM AIR FLASKS Modify straps to clear upper foundation.							
-86080	SH-38	DIESEL GENERATOR GAGE BOARD FOUNDATION Remove one mount center bolt. Check for correct material and reinstall.							
-86081	SH-39	CONDENSATE SURGE TANK Provide stronger bolts			10			10	10
-86083	SH-41	WARDROOM DESK DRAWERS Replace w/new furniture			40			40	48
-86084	SH-42	SHEETMETAL COVERS LIGHTING TRANSFORMERS Provide additional screws.			10			10	9
-86085	SH-43	HAND RAIL FOUNDATION AMS UPPER LEVEL Modify per DM252B-36-62.							
-86089	SH-47	FDN PRESS FILTERS Reinforce brackets to reduce vibration and improve method.			5			5	4

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15-930-86090	SH-48	60 CYCLE PWR 1 CKT DIST PNL (SHOCK MT) Shock mount breaker located on starboard side in center area of Sonar Equipment Space.			4			4	3
-86091	SH-49	CHARCOAL FILTER Reinstall filters and redesign brackets to properly support filters.			10	+2		12	7
-86092	SH-50	CANCEL. COVERED ON M-671, SIDE LIGHT BOXES.			10			10	7
-86093	SH-51	TORP RM. BUNKS--HOLD DOWN SCREWS Provide positive locking screws in place of present camlock screws.			14			14	5
-86094	SH-52	MOD TO TILTING TYPEWRITER DESK - S. OF. Put locking devices on typewriter wells.			4			4	8
-86095	SH-53	SPARE PARTS CABINET Replace retaining bar			6			6	4
-86096	SH-54	MAIN HYDRAULIC ACCUMULATOR FOUNDATION Inst'l bolts in accord with Dwg. 1863765							0
-86098	SH-76	STEAM PLANT GAGE BOARD Replace screws. Ref Condition Report #51-593-68.							0
-86101	SM-2	BPS-6 ANTENNA HOIST Provide support on fwd side of base & modify stb track			71	+43		114	138
-86102	SM-7	TORP TUBE IMP AIR LINE Relocate brzd joint and change fab method			15	+10		25	32
-86103	SM-9	#4 TORP TUBE MUZZLE DOOR Provide pos. stop to prevent switch overtravel			10			10	9
-86104	SM-10	GAGES shock-proof and improve shock mtg of various gages			815			815	150

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15-930-86105	SM-11	MN S.W. DISCH. HULL VALVE INDICATOR Stiffed fdn and provide flex. conn.			17			17	16
-86110	SM-23	TORP HDLG SYS PORT TRACK Increase clearance between portable & fixed track in both directions.			33	+10		43	77
-86111	SM-26	ECM MAST FAIRING Redesign plastic crown for added strength			65			65	51
-86112	SM-27	TORP HDLG SYSTEM RAMMER ROLLERS Replace tires in rollers. Ships force remove teflon sleeves.							
-86114	SM-29	RELIEF VALVE LIFTED Inspect and repair SSLC-12			7			7	2
-86115	SM-31	TORP HDLG SYS SKID Provide stronger locking pin conn.			185			185	207
-86116	SM-32	TORP TUBE BREECH DOOR - LATCH PINS Deepen snap ring grooves or provide cotter pins			20	+5		25	47
-86117	SM-33	TORP TUBE MUZ DR OP GEAR SAFETY COVER Provide larger screws			5			5	5
-86118	SM-34	b(3) 10 USC 130 VALVE INDICATOR Redesign switch to eliminate linkage			6			6	7
-86119	SM-35	IONIZER Provide more flexible connection for cover			20			20	22
-86120	SM-37	TORP TUBE LOADING RAM TRUCKS Increase bolt size			58			58	109
-86123	SM-44	THREADED FITTINGS Replace piping and add hanger			8			8	13
-86125	SM-46	HOT WELL DIFF PRESS. SWITCH Shock mount switch			6			6	6

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SHOCK ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	W/L#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-18-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-9[illegible]-86126	SM-48	SHAFT REVOLUTION INDICATOR Install belts around shaft.							
-86127	SM-49	WEAPONS CONSOLE COVERS BROKEN Replace rivets with screws							0
-86129	SM-53	#3 SANITARY OVERBOARD DISCHARGE LINE Replace connectors and end fittings.							
-86131	SM-56	CONST VENT FOR #1 AIR EJECT. Provide additional pipe hangers.			5			5	4
-86134	SM-59	VENT DIFFUSERS Provide stronger fastenings for ring			14			14	12
-86136	SM-62	8B PERISCOPE DECEL. VALVE CAM Provide wider face and install larger screws							1
-86138	SM-65	STERN HYD PUMP SUCTION VALVE Install mass balanced handles			20			20	0
-81645	SM-73	DC LO PUMP RELIEF VALVE Renew worn parts, clean, test, replace.							
-86146	SM-74	SHUTTER POSITION INDICATOR Install additional collars and pins			18			18	17
-81647	SM-75	TORPEDO SHUTTER EJECT PUMP Install New hinge brkt fairing and repair			70	+15		85	105
-86148	SM-76	M S W PUMP SUPPORTING HEADS Replace with new design heads.			27			27	24
-86150	SM-78	ALIGN TUBES & FC SYSTEM Bore sight TT and realign all equipments			84			84	93

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JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-86152	SM-36	TRASH EJECTOR BREACH AND INTERLOCK MODIFICATION Remove breach and interlock mechanism. Reinstall after modification. (See J.O. 15-930-60902 for modification.)							
-86153	SM-51	SALVAGE VALVES Replace Babbitt seats with nylon.			68			68	125
-86156	SM-82	L.O. PRESS SWITCH Replace switch.			55			55	1
-86161	SM-87	MN TURBINE VLV GEAR ASSEMBLY Provide longer bolts with lockwashers.			5			5	4
-86163	SM-89	HULL OPENING IND. SYS CKT "TR" Redesign the system for reliability under shock			57			57	27
-86166	SM-92	REPAIR OF LK JTS. ON LINES TO OXY. ANALR. Repair sil-brazed joints. Repair and hydrostatically test oxygen sampling lines and return lines to sump from MLO strainer.			12			12	10
-86168	SM-94	BOW CAPSTAN HEAD ASSEMBLY--INSPECTION OF Investigate and correct.			5			5	9
-86171	SM-79A	BREECH DOOR ARM SUPPORTS Redesign supports on all tubes for greater strength.			61			61	52
-86172	SM-97	ECM MAST WAVEGUIDE SPACER ASSEMBLY Modify plates, add brackets of NiCu to waveguide sections.							
-86253	SE-65	FRESH WATER DRAIN TANK Test tank level system and repair.							
-86255	SE-67	DIGITAL DEPTH DETECTOR			10			10	4
-86256	SE-68	BATTERY DISCONNECT ENCLOSURE Increase size of 1/4" tap holes to 3/8"--16.							

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"SHOCK" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-930-86261	SE-73	BPS-9 RADAR Replace bearing syncros			10			10	23
-86263	SE-75	DRAI SYS CKTL (DM271B-31-62) Repl connector assembly.			13			13	2
-86264	SE-4	REMOVE AND REPLACE EXISTING BOLTS, STUDS ON LIH. BROMIDE PLANT CONDENSER AND ABSORBED HEADS.			23			23	38
					2984	7		3209	2651
		ADDS			0	218		0	0
		TOTAL			2984	225		3209	2651

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

MISCELLANEOUS NON-NUCLEAR CUSTOMER ORDERS

INITIAL ESTIMATE --	4,525 MD
FINAL EXPENDITURE --	10,470 MD
GROWTH RATIO	31%

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963

"MISC. NON NUCLEAR C. O." ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

	TITLE AND C.O.	INITIAL W/L of 2-8-62	PRE-ARR. CONF W/L of 7-3-62	POST-ARR. CONF W/L of 8-3-62	FINAL WORKLIST of 1-15-63	SUPP W/L AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
BUSHIPS								
	PROJECT DEVELOPMENT (10-937)	2025	1000	300			3325	4449
	DESIGN SERVICES INCIDENT TO HYDRAULIC CHANGE OVER (14-937)	1000					1000	1011
	PROJECT PRESSURE (15-935)	1500		1563		306	3369	2303
	RESONANCE CHANGER (77-103)					522	522	119
	SHOP 22 REPRODUCTION SERVICES							825
	SUB TOTAL	4525	1000	1863	--	828	8216	8707
DCSL								
	SRD-7 FEASIBILITY STUDY (25-544)					15	15	16
	ASSIST SHIPS FORCE (25-930)			303			303	240
	SUB TOTAL			303		15	318	256
BUWEPS (NOL)								
	EVALUATION OF MK-113 FIRE CONTROL INSTALLATION (82-556)		177		267	40	484	346
	DESIGN OF HYDROPHONE FAIRINGS FOR PUFFS ORDALT (82-557)		130				130	847
	INSTALLATION OF LORAN C RECEIVER (87-434)				224		224	314
	SUB TOTAL		307	--	491	40	838	1507
	TOTAL	4525	1307	2166	491	883	9372	10,470

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

NP ("M") ITEMS -- SHIP'S FORCE WORK ITEMS REQUESTED SUBSEQUENT

TO COMPLETION OF 4 DEC 1961 - 8 FEB 1962 RAV

AND AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	5,955 MD
FINAL EXPENDITURE	--	7,585 MD
GROWTH RATIO		27%
NUMBER OF ITEMS		20

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-12307	NP-41 (M)	TUNNEL WATERTIGHT DOOR -- LATCH OPERATING ARM PIN Latch operating arm pin on auxiliary machinery space to tunnel watertight door broke. Ships force machined and installed replacement. The door then operated satisfactorily. Ships deficiency 228 requested that PNS verify that new piece meets requirements of this latch. Inspection indicated need for replacement of various components of the latch assembly, which was done in accordance with plans. Authority for repair; NP Superintendent.		5				5	18
-20814	NP-78 (M)	FEEDWATER REGULATOR VALVES Overhaul and repair of feedwater regulator valves. Authorized by Nuclear Power Superintendent as requested by Ships deficiency 511-533.			36			36	30
-20927	NP-32 (M)	b(1) LAGGING Ships deficiency reported that b(1) lagging cOvered the bonnets and bonnet bolts. This condition was corrected by re-lagging subsequent to hull valve inspection, test, and repair (NP-42 and NP-84). Se NP-44.		0				0	0
-21401	NP-38 (M)	b(3) 10 USC 130 PUMP Ships deficiency No. 363 reported that pump noise monitor cable to b(3) 10 USC 130 Pump has a broken lead. A spare lead within this cable is presently being used. Replace cable from junction box to b(3) 10 U noise monitor transducer. This work is authorized by the Ship Superintendent.		21				21	10
-21507	NP-36 (M)	PRIMARY SAMPLE SINK Ships deficiency No. 359 and A88 reported that valve CS-14, located in the primary sample sink, leaks past its seat. In addition, the valve handle comes loose and is difficult to fix. CS-15 handle turns on steam. Repair or replace presently installed valve. This work is authorized by the Nuclear Power Superintendent.		10				10	8

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-40177	NP-87 (M)	AMPHENOL CONNECTORS Install amphenol connectors for the salinity cells in accordance with plan 1864075 Alt K. This was requested as a ships deficiency item No. 503 and authorized by the Nuclear Power Superintendent.			0			0	8
-60525	NP-14 (M)	TOUCH PAINTING--REACTOR COMPARTMENT Reactor Compartment touch-up painting will be accomplished as required. This item has been authorized by the Nuclear Power Superintendent.	32					32	49
-90371	NP-11 (M)	CHEMISTRY AND POWER PLANT WATER HANDLING. Shipyard function will be to provide chemistry coverage for all primary plant shore water provided to the ship and in addition provide Nuclear Power Plant Chemistry services for unusual chemical analysis not normally carried out by the ships force. This work is authorized by the Nuclear Power Superintendent.	82					82	168
-90372	NP-12 (M)	NUCLEAR POWER DIVISION SERVICES Nuclear Power Division services during the availability as authorized by the Nuclear Power Superintendent.	1000					1000	1346
-90373	NP-13 (M)	TO COVER NPEA To cover NPEAs approved by NP Supt. issued for correction of minor deficiencies found in the reactor plant as a result of inspection a and BUSHIPS request, but not identifiable to a specific work item.	360					360	167
-90374	NP-15 (M)	RADCON SERVICES RADCON services will include the operation of the decontamination center, Bldg. 238, and the RADCON barge. This item has been authorized by the Nuclear Power Superintendent.	2458					2458	2870

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-90375	NP-16 (M)	REACTOR PLANT TESTING Major reactor plant testing or operations such as draining and filling the primary loops, cold-hydro, hot-operations, criticality and sea trials shall be performed in accordance with NPD test schedules. This item is authorized by the Nuclear Power Superintendent.	360					360	1128
-90376	NP-17 (M)	DISPOSAL OF CONTAIMINATED MATERIAL SOLIDS Provide services for the disposal of contaminated and radioactive material solids as authorized by the Nuclear Power Superintendent.	84					84	22
-90377	NP-64 (M)	CLEANING Cleaning and clean areas, including material, X72	600					600	1086
-90378	NP-65 (M)	RIGGING SERVICES FOR NUCLEAR ITEMS	600					600	205
-90379	NP-39 (M)	SIGNS FOR RADIATION CHECK POINTS Replace signs for radiation check points #3 and #4 with engraved CRES plates. This work is authorized by the Ship Superintendent.		6				6	6
-90385	NP-77 (M)	PLASTIC COVERS FOR RCP, PPIP AND SGWL Manufacture and installation of plastic covers for RCPs, PPIPs and SGWL panels. Authorized by Nuclear Power Superintendent as requested by Ships deficiency 510.			10			10	3
-90388	NP-83 (M)	WEEPS			342			342	181
-90389	NP-88 (M)	EQUIPMENT TEST BENCH--AMSUL Manufacture (4) test leads with plugs for the equipment test bench in the AMSUL, aft as requested by ships deficiency Item No. 514. Item is authorized by the Nuclear Power Superintendent.			3			3	1

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-90405	NP-13.1 (M)	PREPARATION OF REACTOR COMPARTMENT FOR WORK This includes removal and replacement of spare part boxes, providing protective covering, establishing communications (from RADCON to RC) and ohter preparations necessary to support work. This item has been authorized by the Nuclear Power Superintendent.	379	—	—	—	—	379	279
		TOTAL	5955	42	391	0	0	6388	7585

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

NP ("N") ITEMS -- BUSHIPS CHANGE ORDERS AND DIRECTIVES

AUTHORIZING WORK NOT ACCOMPLISHED PRIOR TO

COMPLETION OF THE SHIP, AND AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	6,966 MD
FINAL EXPENDITURE	--	6,470 MD
NUMBER OF ITEMS		37

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-10019	NP-49 (N)	STIFFENED FLAT PLATE STRUCTURE Limited fatigue testing of stiffened flat plate structure in the form of hard tanks has shown evidence of failure at a relatively low number of cycles. Strengthen the hard tank in accordance with the design criteria and authorization contained in C.O. #232.	470					470	438
-20704	NP-10 (N)	b(3) 10 USC 130 -BYPASS VALVES FOR Three-way bypass valves will be installed for b(3) 10 USC 130 to correct deficiencies indicated in BUSHIPS ltr Ser 468K4-2005 of 13 Sep 1961. Telecon memo CDR Leutz, PNS, and CDR Woolston, Code 525, BUSHIPS, of 7/20/61 authorizes the accomplishment of this work. (Includes NP-40)	159					159	188
-20721& -90390	NP-90 (N)	WELDED PIPE JOINTS Radiograph carbon steel welded pipe joints in accordance with BUSHIPS ltr 1500I-1752 of 20 Aug 1962			420			420	428
-20924	NP-54 (N)	REMOTE HYDRAULIC OPERATORS Provide remote hydraulic operators for hull valves b(1) (Not accomplished; plans not available)		0				0	3
-20932	NP-74 (N)	COOLANT SAMPLING GAGE Remove the ships installed coolant sampling gage CS-76-GA-866 in accordance with requirements and authorization of BUSHIPS ltr Ser 1500D-0580 of 25 Jul 1962.			3			3	3
-20933	NP-86 (N)	COOLANT CHARGING PUMPS Remove the crankshafts of each coolant charging pump and ship to Pittsburgh Testing Lab., Pittsburgh., Penna., for metallurgical inspection. Reinstall in accordance with procedure and authorization contained in BUSHIPS ltr 1500L-3276 of 15 Aug 1962.			116			116	41

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-21202	NP-9 (N)	b(3) 10 USC 1 FLOW D/P CELL Relocation of the b(3) 10 USC 1 flow D/P cell is required to permit accessibility in alignment of the D/P cell. In addition improved support of the D/P cell piping is required by BUSHIPS ltr 1500K-2243 of 3/23/61 b(3) 10 USC 130 This work is authorized by the Nuclear Power Superintendent.	152					152	153
-21205	NP-89 (N)	b(3) 10 USC 130 GAGE GLASS Modify the b(3) 10 USC 130 gage glass illuminators in accordance with the requirements and authorization contained in BUSHIPS ltr Ser 1500-4131 of 27 Aug 1962. The b(3) 10 USC gage glass has been modified by EB Division prior to shock testing.			35			35	1
-21402	NP-52 (N)	MAIN COOLANT PUMP TROLLEYS The main coolant pump trolleys contain cast iron parts which have previously failed during construction. Remove the existing trolleys and replace with new trolley design. This work is authorized by C.O. #273.		148				148	140
-21403	NP-56 (N)	COOLANT CHARGING SYSTEM The coolant charging system shall be modified to preclude the use of stored water plant charging water to supply equipment outside the reactor compartment. This is authorized by C.O. #273.		38				38	59
-21405	NP-93 (N)	CHV-39 AND CHV-40 CHV-39 and CHV-40 found defective on test. Replaced with valves modified per NP-25 by authority of Nuclear Power Superintendent.				74		74	39
-21504	NP-19 (N)	b(3) 10 USC 130 This work is authorized by BUSHIPS ltr 1500-287 of 17 July 1962.		412				412	463

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-21505	NP-29 (N)	PACKING The reactor plant modification No. S5W-F-1024 requires replacement of oil impregnated packing with Teflon packing. Replace all impregnated packing with Teflon. This work is authorized by the Nuclear Power Superintendent.	62					62	16
-21509	NP-42 (N)	BALL TYPE HULL VALVES Inspection of ball type hull valves was requested by ship's deficiency #288. BUSHIPS INST 9480.56 requires an inspection of all submarine hull valves, ball type, with elbowed inlets. This instruction was extended to the Reactor plant by telecon Leutz/Young (1500) on 8/30/62. Inspection of b(1) during drydocking revealed some pitting. Repairs and teflon coating was accomplished on the basis of the 2305 report.		62				62	89
-21510	NP-53 (N)	UNION CAPS Union caps downstream of MC-17 and MC-18 have been redesigned to provide for integrity at the needle valves attached to the caps. Install modified union caps as authorized by BUSHIPS ltr Ser 1500D-3161 of 4 Jul 1962.		32				32	26
-21511	NP-57 (N)	COOLANT SAMPLING VALVE CS-8 Replace coolant sampling valve CS-8 with a ball type valve. (Minor repiping around CS-8 will be required) This work authorized by C.O. #273.		13				13	44
-21602	NP-2 (N)	b(3) 10 USC 130 This work has been authorized by C.O. #212.	166					166	137

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUESTS NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-21611	NP-55 (N)	PRIMARY SHIELD TANK The air blowdown connection of the primary shiels tank shall be deleted in accordance with C.O. #286. This precludes the possibility of developing leaks in the primary shield tank due to overpressuriza-tion.		6				6	3
-21612	NP-91 (N)	WET LAYUP CHEMICAL ADDITION PIPING FOR RPFW-STEAM GEN. Minor alteration of wet layup checmical addition piping for RPFW-steam generator cooldown was required to conform with class plans. This work was authorized by the Nuclear Power Supt. on the basis of 23015/Code 1500 telecon 10/3/62.				24		24	13
-21710	NP-80 (N)	TEMPERATURE DETECTORS Remove the "Bailey"type resistance temperature detectors and install the "CCC" well-type resistance temperature detectors. Installation of these detectors is to insure continued satisfactory operation of primary plant instrumentation. BUSHIPS ltr Ser 1500-287 of 17 Jul 1962 authorizes the accomplishment of this work.		530				530	526
-21714	NP-84 (N)	MAIN COOLANT PUMP HEAD D/P CELL During alignment of primary plant instrumentation, the b(3) 10 USC main coolant pump head D/P cell was found to be defective. Replacement of the cell was authorized by the Nuclear Power Supt.					0	0	5
-21715	NP-96 (N)	b(3) 10 USC 130 b(3) 10 USC 130 FRESH WATER PUMP Fresh Water Pump required replacement. A new pump was installed by authority of the Nuclear Power Superintendent.					41	41	23
-21901	NP-1 (N)	BULKHEAD 52--SHIELDING Installation of additional shielding on bulk-head 52 required as a result of the shield survey conducted during initial criticality of the SS(N)593. This work is authorized by C.O. 212.	558					558	251

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
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JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-50141	NP-92 (N)	VANEAXIAL FANS Remove and overhaul vancaxial fans (2) lower level (1) tunnel. NOTE 2302C memo 13 Nov 1962 limited overhaul to (1) fan in tunnel.				0		0	9
-50618	NP-84 (N)	HULL VALVE TEST Hull valve test and repairs. Authorized by Nuclear Power Superintendent.			0			0	39
-50803	NP-3.1 (N)	BRAZED JOINTS Eliminate brazed joints in all reactor compartment through piping which is subjected to submergence pressure. This change has been authorized by C.O. #212.	202					202	207
-86201	NP-63 (N)	REACTOR PLANT FOUNDATIONS Modify reactor plant foundations in accordance with increase shock hardening requirements determined by the shock tests. This work, listed below is authorized by C.O. 286.		543				543	1177
	NP-63a	b(1)							
	NP-63b								
	NP-63c								
	NP-63d								
	NP-63e								

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
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15-939-86201	NP-63	CONTINUED:							
	NP-63f	b(1)							
	NP-63h								
	NP-63j								
	NP-63o								
	NP-63q								
	NP-63s								
	NP-63t								
	NP-63v								
	NP-63w								
	NP-63x								
	NP-63y								
	NP-63z								
	NP-63aa								
-90313	NP-5 (N)	C.O. 159 requires a change to petroleum base hydraulic fluids. As a result of this change all affected gasket material in the reactor air and coolant charging valve operating systems required material replacement compatible with the new oil. Authority for accomplishing this work is obtained from C.O. 159.		34				34	23

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
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15-939-90328	NP-18 (N)	NON-ISOLABLE JOINTS Accomplish radiography of non-isolable joints (CRES) in accordance with BUSHIPS ltr Ser 1500I-1730 of 25 May 1962 on a NDV basis.		2924				2924	683
-90381	NP-51 (N)	SHOCK TEST PROGRAM The special instructions for the THRESHER shock test program requires that the following be accomplished by PNS: 1. Components and bulkheads shall be restored to normal in accordance with Special Instruction No. 9 2. Primary and secondary system pressure detectors and D/P cells shall be checked for calibration in accordance with Special Instruction No. 6-A, 6-B, 6-C, and 6-D. 3. Reactor plant equipment foundations shall be inspected in accordance with special instruction No. 6-E 4. The reactor compartment shall be air tested in accordance with Special Instruction No. 6-G, after removal of test equipment and instrumentation. 5. PNS assist S.F. in the test of primary and secondary relief valves. The above work has been authorized by BUSHIPS (Conf.) letter C-SS(N)593 Ser 423-048 of 16 Mar 1962		489				489	539
-90382	NP-81 (N)	UTILIZATION OF CHARLESTON PERSONNEL		0				0	1
-90383	NP-76	CORRECTION OF SHOCK TEST DEFICIENCIES Correct all shock test deficiencies listed below in accordance with BUSHIPS ltr 1500D-0580 of 25 Jul 1962 and authorization by the Nuclear Power Superintendent:			289			289	543
	NP-76a	Ship deficiency item No. 504 reported that PF #9 thermocouple of the 4TM system (regenerative HX water box wall) broke loose. Remount the thermocouple. (Item accomplished)							

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JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-90383	NP-76	CONTINUED:							
	NP-76b	Ships deficiency item No. 505 reported that the indicator drive motor for 2TM was loosened and the mounts were broken. Replace existing 2TM unit with a new unit as authorized by the above BUSHIPS ltr (Accomplished)							
	NP-76c	b(1)							
	NP-76d	b(1)							
	NP-76e	b(1)							
	NP-76f	Repair lead shielding as requested in ships deficiency Item No. 541. (Accomplished)							
	NP-76g	Ships deficiency Item No. 576 reported a broken detector cable for the spray line flowinstrument. Repair and replace spare leads. (Accomplished)							
	NP-76h	Replace or repair the 2 RC bilge alarms as requested by the ships deficiency items. (This item investigated. Bilge alarms are operable).							
	NP-76i	Repair leaks resulting from soap test of reactor air systems. (Work accomplished). This is required by the Special Instructions issued for shock inspections (NP-50). (Repairs accomplished).							
	NP-76j	The swivel pin on the SG manhole handling device should be reoriented to have the solid collar on top. This pin broke loose during shock tests. (Accomplished)							
	NP-76k	All RC vieweing windows suffered damage during shock. Replace the 4 windows. (Accomplished)							
	NP-76l	Repair the broken brackets and screws on the valve operating water flask gage glass scales.							

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JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-90383	NP-76	CONTINUED:							
	NP-76m	Remove and replace b(3) 10 USC 130 to permit examination for shock damage. (Accomplished. New foundation installed per NP-63).							
	NP-76n	Replace regulator on the b(3) 10 USC 130 which sustained damage during shock. New foundation for this valve provided by NP-63 (Accomplished).							
	NP-76o	Dye check volute of M.C. pump b(3) 10 to provide information required by the Special Instructions for shock tests. (Accomplished)							
	NP-76p	Replace the amber glass covers on the PPI panel lights which were cracked during shock. Replacement covers to be obtained from Navy Stock. (Accomplished)							
-90384	NP-18.1	WELDED JOINT DEFICIENCIES							
	(N)	Welded joint deficiencies revealed by radiography conducted under NP-18 were correct and are summarized in PNS ltr SS(N)593/4730 (78947) dated 4/15/63.		0				0	30
-90387	NP-82	STEM ADAPTERS							
	(N)	Stem adapters M, M, and M valves. Authorized by Nuclear Power Superintendent.			20			20	9
-90399	NP-90.1	CARBON STEEL JOINTS							
	(N)	Repair of defective carbon steel joints revealed by NO-90 was authorized by BUSHIPS letter 1500I-1752 of 20 Aug 1962. Repairs are summarized in PNS ltr 2302W SS(N)593/4730 (78947) dated 4/15/63							
		TOTAL	1769	5197	883	232	41	8122	6470

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

NP ("S") ITEMS -- SHIP'S FORCE WORK REQUESTS NOT ACCOMPLISHED

DURING RAV 4 DEC 1961 - 8 FEB 1962, AND AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	51 MD
FINAL EXPENDITURE	--	80 MD
GROWTH RATIO		57%
NUMBER OF ITEMS		2

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
15-939-20703	NP-7 (S)	HAMMEL-DAHL VALVES Due to the poor welding found in some Hammel-Dahl valves (MS-63, 64, and SG-10 for the SS(N)606 & SS(N)605), remove these valves from the SS(N)593 for radiographic inspection and repair as required. This work is authorized by the Nuclear Power Superintendent.	17					17	27
-21604	NP-8 (S)	RPFW VALVES As a result of leak test conducted by T/P 788-2 the following RPFW valves require replacement: RC-25, 26, 27, 28, 29. This work is authorized by the Nuclear Power Superintendent.	34					34	53
		TOTAL	51					51	80

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

NP ("INSURV") P. A. T. ITEMS AUTHORIZED FOR P. S. A.

INITIAL ESTIMATE	--	210 MD
FINAL EXPENDITURE	--	32 MD
NUMBER OF ITEMS		2

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP. AFTER 1-15-63	TOTAL EST. MD	EXPENDED MD
77-167-34401	NP-55 (Misc)	STEAM GENERATOR WATER LEVEL CONTROL SYSTEM BUSHIPS ltr 1500K-1045 of 17 Jan 1963 called for replacement of the steam generator water level control system by a new (Copes-Vulcan) system, on a NDV basis. Since complete replacement and testing may have caused delay, the work was limited to installation of foundations, panels, and certain cable runs; the new system was not connected.					64	64	43
78-817-54970	NP-62 (Misc)	b(3) 10 USC 130 MODIFICATION Accomplish the b(3) 10 USC 130 modification in accordance with Field Change Order S5W-E-268.		30				30	28
79-817-54965	NP-67 (Misc)	b(4) NOISE SUPPRESSION RESISTORS Install noise suppression resistors shielding and ground wires to eliminate electrical noise in start-up-rate circuitry as required and authorized by field change S5W-e-222.			6			6	3
79-817-54967	NP-75 (Misc)	PRIMARY PLANT INSTRUMENTATION CIRCUITRY Modify the primary plant instrumentation circuitry to be compatible with the installation of the new well type RTD's (see NP-50) in accordance with field change order S5W-E-270.			36			36	33
79-817-54968	NP-60 (Misc)	S5W INSTRUMENTATION Simplify the S5W instrumentation and control system by elimination of instruments indicated by Field Change Order S5W-E-260.		14				14	36
79-817-54969	NP-61 (Misc)	RPCP 1-SR, SLEEVE Install a sleeve on the RPCP 1-SR size spring return switch operating shafts in accordance with requirements of Field Change Order S5W-E-262.		4				4	4
		TOTAL	0	48	42		64	154	147

USS THRESHER (SS(N)593)

POST SHAKEDOWN AVAILABILITY

MISCELLANEOUS NUCLEAR CUSTOMER ORDERS

INITIAL ESTIMATE	--	48 MD
FINAL EXPENDITURE	--	147 MD
GROWTH RATIO		206%

USS THRESHER (SS(N)593) POST SHAKEDOWN AVAILABILITY 16 JULY 1962 - 11 APRIL 1963
"NP" ITEMS - SHIPS FORCE WORK REQUEST NOT ACCOMPLISHED DURING RAV 4 DEC 1961 - 8 FEB 1962

JOB ORDER	WLI#	TITLE AND DESCRIPTION	RAV ITEMS HELD FOR PSA	PRE-ARR. CONF W/L of 6-6-62	POST-ARR. CONF W/L of 8-22-62	WORK ACCEP. PRIOR TO 1-15-63	WORK ACCEP AFTER 1-15-63	TOTAL EST. MD	EXPENDI MD
15-939-21606	NP-43 (INSURV) b(1)			0				0	7
-21607	NP-44 (INSURV)	DAMAGED LAGGING Accomplish repair of damaged lagging as listed by the ship's force damaged lagging list. This item was reported as an INSURV IA-130 and authorized by the Nuclear Power Superintendent.		210				210	25
			TOTAL	210				210	32

USS THRESHER SS(N)593 PSA WORK LIST

SIGNIFICANT WORK ITEMS ACCOMPLISHED

N Items	- Change Orders and Local Request
M Items	- Ship Deficiencies
INSURV	- C - Hull S - Mechanical E - Electrical ER - Electronics R - Ordnance
Shock Items	- SM - Machinery

EXHIBIT (92) 10 PAGES

JOB ORDER 15-930-	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM. M/D EST.	% GROWTH	REMARKS
10016	8/8/62	N-37	2/8/62	Stiffen flat plate structure in variable ballast tanks per change order #232 dated 1-29-62. Reason: Limited fatigue testing of stiffened flat plate structure in hard tanks has shown evidence of failure at a low number of cycles.	4717	1491	316%	Tanks involved fwd trim negative torp imp b(1) san #1,2 & 3 Aux. #1 & #2 aft trim WRT #1 & #2 trash eject sea chest Safety item
10051	6/12/62	N-25	10/13/60	Hull Surveillance. Accomplish in accordance with BUSHIPS INST 9110.48 dated 13 Sept 1960.	1030	318	324%	safety item
11414	8/2/62	N-84	6/6/61	Remove piping, sheetmetal, electrical and mechanical interferences to install additional lead shielding to Bhd 51 per Change Order 212 dated 26 June 1961.	832	349	238%	
20813	10/3/62	N-75	5/21/62	Install b(3) 10 USC 130 pumps. Ref: BUSHIPS ltr SS(N)593/9400 ser 525-1285 of 15 May 1962.	1542	1066	145%	Includes opening & replacing (1) access patch in Eng. Rm.
20815	10/10/62	N-110	8/31/61	Dynamically Balance main feed pump motors and make necessary corrections. Code 213 Type Desk decision based on INSURV item 10.8C BUSHIPS SS(N)593 ser 525-1183 of 25 Aug. 1961	4	11	0	Balanced in place on board ship.

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM M/D EST.	% GROWTH	REMARKS
15-930-20928	9/13/62	N-64	5/21/62	Install b(3) 10 USC 130 pump motors and controllers for b(3) 10 USC 130 Ref: BUSHIPS ltr SS(N)593/9400 ser 525-1285 of 15 May 1962 (73121)	399	277	124%	Fdn's modified to receive new motors
40655	10/5/62	N-113	4/6/62	Install floating wire antenna Mfr and install floating wire antenna and line wiper, and associated cables, fittings and piping. Ref: BUSHIPS ltr C-SS(N)593C1/9670 ser 525-0111 of 4 April 1963 C-7089	327	364	0	#2 puffs well has nothing to do with floating wire ant.
40816	7/12/62	N-69	5/30/62	Install puffs (AN/BQG-2) includes cable penetrations. Ref: BUSHIPS C-SS(N)593C1/9670 ser 525-0132 of 27 April 1962 (C-7180)	6096	1981	308%	
40841	8/2/62	N-69.1	5/30/62	Puffs Cable Shielding. Mfr hangers and bhd tubes. L/O and install (shielding conduit) cabling per on the job instructions from design. Remove and replace interferences as reqd. Fwd Compt. Midship Compt. Reactor Compt. AMR Eng. Rm. Ref: BUSHIPS C-SS(N)593C1/9670 ser 525-0132 of 27 April 1962 (C-7180)	1518	1975	0	Air blank ET hull & back up valves means nothing.

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM. M/D EST.	% GROWTH	REMARKS
15-930-40842	8/3/62	N-69.2	7/23/62	#2 Puff Hydrophone Removed. #3 puff hydro phone and all associated components removal. (Inserts, housing, hoists). Patch hull. Removal of #1 and #4 puff hyd.	785	485	161%	
50224	11/13/62	N-142	11/13/62	Repair (4) elbows reported defective by Dwgs. Ref. Dwgs report 726. Code 213 Type Desk Approval.	9	9	0	Elbows could not be repaired and were replaced
50612	6/11/62	N-60	4/25/62	Ultrasonic test of silver-braze joints in S. W. System. Ref: BUSHIPS ltr 9480 ser 648K-728 of 4/17/62. SEE JO 90393 ALSO	31	1451	0	Safety Item
50609	6/12/62	N-46	7/20/62	b(3) 10 USC 130 Open and Inspect and submit report. Ref: Arrival Conference 20 July 1962	1	6	0	
50617	8/13/62	N-92	7/20/62	L/O, Template and install trim and Drain Bypass line in Eng. Rm. Ref: Arrival Conference 20 July 1962	9	4	225%	
50803	12/8/61	NP-3.1	-	Modification to piping banks in Reactor Compt. NPD Cog.	457	101	452%	Safety Item

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM M/D EST.	% GROWTH	REMARKS
15-930-70049	3/7/63	N-156	1/4/63	Radiograph Torpedo Tube Breech Doors. Ref: Fonecon Between CDR Woolston BUSHIPS 525 and CAPT Heller PTSMH 240 of 4 Jan 1963.	29	9	322%	Safety Item
90329	5/18/62	N-5	7/20/62	Open and replace 2 access patch in hull Engine Room. Ref: Arrival Conference 20 July 1962.	2454	1327	185%	This also covers Shore Services
90393	9/25/62	N-116	4/25/62	Visual and ultrasonically inspect 2" and above all silver braze joints subject to sea pressure. Replace defective fittings. Ref: BUSHIPS Ltr 9480 ser 648K-728 of 4-17-62	404	34	1190%	Safety Item
90405	7-19-62	NP-13.1	-	Open and Replace Access patch through shell In R. C. NPD Cog.	277	261	106%	

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM. M/D EST.	% GROWTH	REMARKS
15-930-20329	7/17/62	M-485	7/20/62	Replace main propulsion shaft seal. All units leak excessively (6-8 GPM) and leakage rate is increasing with usage. Ref: SSN593/ve 4700 ser: 336 of 7-20-62.	139	164	0	
20925	8/27/62	M-308	2/15/62	Replace all flexible hoses. Accomplished per PNS Process Instruction 1004.5. Ref: SSN593/rn 4700 ser: 95 of 2-15-62.	811	313	259%	Safety Item
50607	3/2/62	M-288	2/2/62	Inspect all elbow inlet hull ball valves. Inspect and test. Ref: BUSHIPS INST 9480.56 244A Memo of 2-2-62	32	97	0	Teflon coating on J.O. 50819. Safety Item
50610		M-321	2/15/62	ASW Pump Seal. Replace the mechanical seal and demonstrate ability to install emergency packing in place. If unable to do so, then redesign piping to provide capability for installing emergency packing. Ref: SSN593/rn 4700 ser: 95 of 2-15-62	0	0	0	Cancelled. Accomplished at E.B.
50819	8/13/62	M-410	6/15/62	Ball Valves. Inspect all ball valves in sea-water sys. Repair or replace all corroded valves. Investigate feasibility of utilizing teflon-coated ball valves which were developed by E. B. Remove, disassemble, teflon coat, reassemble, test and reinstall. Ref: SSN593/ve 4700 ser: 299 of 6-15-62	973	816	119%	Safety Item

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM M/D EST.	% GROWTH	REMARKS
15-930-50814	9/26/62	M-314	2/15/62	Install 1/2" valve in priming line to trim suction header. Ref: SSN593/rn 4700 ser: 95 of 2-15-62.	2	2	0	

JOB ORDER 15-930-	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D'S EXPENDED	PRELIM. M/D EST.	% GROWTH	REMARKS
11403	1/12/62	11C	8/31/61	Strengthen impact resistance of elliptical pressure bulkheads at fwd and aft ends of ship. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961.	429	283	152%	Safety Item
11501	6/12/62	31S	8/31/61	b(3) 10 USC 130	227	121	188%	Includes piping and lableplate changes
12304	11/17/61	19C	8/31/61	Replace hatch covers to increase impact resistance. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961	111	63	176%	Safety Item
20802	8/10/62	10.8C	8/31/61	Dynamically balance b(3) 10 USC 130 pump and motors. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961	4	14	0	Balancing to be done in place on board. b(3) 10 USC 130 on WLI 8110 J.O. 20815
20910	3/26/62	86.4C	8/31/61	Provide spring check valves in constant vent lines so as to provide leak isolation. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961.	142	72	197%	Safety item
22001	11/3/61	23C	8/31/61	Connect depth gagues to more than one sea chest. Change Order 198. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961	41	74	0	Safety item

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM. M/D EST.	% GROWTH	REMARKS
15-930-40129	3/20/62	29C	8/31/61	Install Gems tank level indicating system. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug. 1961	544	524	104%	Safety Item
50817	7/27/62	96C	8/31/61	Install trim flow meter in sea connection to meter output. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961	64	67	0	Safety Item
14-930-52601	1/25/61	44.1C	8/31/61	Change from phosphate-ester hydraulic fluids to petroleum base fluids in sub hydraulic s stems. Phosphate-ester fluids are considered a safety hazard on electrical equipment. Change Order #159. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug 1961	6866	12205	0	
15-930-60902	12/22/61	31C	8/31/61	Replace trash ejector flapper type outer door with ball valve. Change Order #99. Ref: BUSHIPS ltr SS(N)593 ser 525-1883 of 25 Aug. 1961	1227	764	160%	Safety Item

JOB ORDER	J.O. ISS. DATE	W/L ITEM	AUTH DATE	TITLE AND DESCRIPTION	M/D EXPENDED	PRELIM. M/D EST.	% GROWTH	REMARKS
15-930-86171	9/26/62	SM79A	1/15/63	Strengthen breech door arm supports on all torpedo tubes. Ref: Code 213	51	45	117%	

RFS

200
25 Apr 1963

Unclassified

Subj: USS THRESHER (SS(N)593), Post Shakedown Availability (PSA) --
16 July 1962 - 11 April 1963 -- Repairs, Alterations, Tests and Trials

Ref: (a) PTSMH NAVSHIPYD spdltr SS(N)593/4710 of 25 May 1962
(b) PTSMH NAVSHIPYD msg 072011Z of June 1962
(c) BUSHIPS msg 121846Z of June 1962
(d) DEPCOMSUBLANT spdltr Ser 402/0687 of 18 Jun 1962
(e) PTSMH NAVSHIPYD ltr Ser 0161-62 SS(N)593/4710 of 26 Jun 1962
(f) COMSUBLANT msg 022146Z Jul 1962
(g) CINCLANTFLT msg 111556Z Jul 1962
(h) CNO msg 122013Z Jul 1962
(i) PTSMH NAVSHIPYD msg 171817Z Oct 1962
(j) BUSHIPS ltr Ser 525-0310 of 7 Sep 1962
(k) BUSHIPS 172218Z Oct 1962
(l) DEPCOMSUBLANT 191716Z of Oct 1962
(m) CINCLANTFLT msg 242052Z Oct 1962
(n) PTSMH NAVSHIPYD msg 032025Z Jan 1963
(o) CINCLANTFLT msg 042344Z Jan 1963
(p) DEPCOMSUBLANT msg 041810Z Jan 1962
(q) PTSMH NAVSHIPYD msg 182129Z Jan 1963
(r) DEPCOMSUBLANT msg 191750Z Jan 1963
(s) CINCLANTFLT msg 292230Z Jan 1963
(t) BUSHIPS msg 252250Z Jan 1963
(u) PTSMH NAVSHIPYD msg 072055Z Feb 1963
(v) BUSHIPS msg 201710Z Feb 1963
(w) PTSMH NAVSHIPYD msg 212141Z Feb 1963
(x) DEPCOMSUBLANT msg 251935Z Feb 1963
(y) CINCLANTFLT msg 271920Z Feb 1963
(z) PTSMH NAVSHIPYD msg 112227Z Mar 1963
(aa) PTSMH NAVSHIPYD msg 211703Z Mar 1963
(bb) DEPCOMSUBLANT msg 221500Z Mar 1963
(cc) CINCLANTFLT msg 231728Z Mar 1963
(dd) CO THRESHER ltr 9080 Ser 158 of 8 Apr 1963
(ee) CO THRESHER NOTE 9080 dtd 2 Apr 1963

Unclassified

Exhibit (93)

A/A

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
C-SS(N)593 C1/9080
Ser 525-074

CERTIFIED MAIL

8 March 1962

From: Chief, Bureau of Ships
To: Commander Submarine Force, U.S. Pacific Fleet
Deputy Commander Submarine Force, U.S. Atlantic Fleet

Subj: USS THRESHER (SS(N)593) Stability and Control Trials; comments on

1. THRESHER conducted stability and control trials under the technical direction of David Taylor Model Basin during the period 20-29 November 1961. As is usual with these trials, a final technical report will be issued in due course; however, some of the information that can be extracted from the data is of current interest to the fleet.

2. During the trials difficulties occurred in the fairwater plane control mechanism which caused inaccuracies in the indicated plane angle; this casualty has been corrected and is no longer a matter for concern, but does cast doubt on some of the trial results. Preliminary observations follow:

a. Meander tests indicate that THRESHER is dynamically stable in the vertical plane and appears to follow the pattern predicted from model tests at speeds up to about 15 knots. About 20 knots she appears to be neutrally stable and at higher speeds slightly unstable. This apparent instability may be caused by fairwater plane deflections; however, additional tests should be conducted to resolve this matter. The effect of instability is merely to require more attention to depth keeping at high speeds than is required below 20 knots.

b. There is a reversal of fairwater plane action at speeds above 20 knots after the plane angle has been held for some time. With stern planes at neutral angle and fairwater planes at dive the submarine will assume a dive angle and start going deeper; after approximately a minute the effect of the planes reverses and she takes an up angle and rises. Since this effect is only noticeable at speeds above 20 knots, requires the holding of the plane angle for approximately a minute, and can be corrected by use of the stern planes, it is not a matter for concern. This effect should be rechecked on later tests without the fairwater plane casualty complication.

c. The rough sea periscope depth controllability tests were intended to be run in a sea-state five condition, but a hindcast by the hydrographic office indicated that the actual sea-state was a fully developed six with 15 foot significant waves. Depth control at periscope depths between 50 and 60 feet was poor; variation of 26-72 feet were recorded: at 70 feet this variation decreased to 61 to 82 feet. It is impossible to state how much of the depth variation was actual and how much was caused by the waves themselves

Exhibit (94)
1

Unclassified

as they affected the depth indicator reading. In any case discussions with THRESHER officers indicate that depth control becomes unsatisfactory beyond sea state 3. The Bureau of Ships is investigating this problem and desires to run various tests on THRESHER and PERMIT (SS(N)594) to define better the controllability. Model tests are being run at David Taylor Model Basin also. This is considered to be the only significant control problem for this class submarine. The importance of the recently emphasized surveillance requirements for these submarines is realized fully by the Bureau of Ships and every effort is being exerted to arrive at a satisfactory and timely solution to the problem. Currently, USS SKIPJACK (SS(N)585) performance at periscope depth is being used as the standard of satisfactory controllability. If some other standard is considered mandatory by the submarine forces, the Bureau of Ships should be so advised.

d. At approach speeds of 20-25 knots when making turns using 35° rudder, the submarine depth cannot be maintained; specifically, with left rudder the submarine takes a dive angle and goes deeper, and with right rudder she takes a rise angle and starts going up. Use of both the fairwater and stern planes does not correct this effect for left rudder but depth control can be maintained for right rudder. An effect to this extent has not been encountered previously in submarines. Differences of the effect of right and left rudder are frequent, but the strong reversal is unique. It is considered that further tests should be run on THRESHER and/or other submarines of the class to define this phenomenon better. There is nothing detrimental in these effects in themselves, but caution should be exercised to assure that the improper rudder is not applied when the submarine is in extremis.

e. Due to the fairwater plane casualties the emergency recovery tests were not completed on THRESHER, but all tests that were run indicated good recovery.

3. Due to the questions raised by the fairwater plane casualty in THRESHER and the desire to complete the emergency recovery tests and to explore the controllability phenomena further, it is highly desirable that additional tests be run in PERMIT. Specifically, it is requested that Commander Submarine Force, U.S. Pacific Fleet authorize a six-day trial availability for PERMIT for this purpose. It would be advantageous to schedule two days at the range in Dabob Bay for submerged turning tests when PERMIT will be in the area in late May and early June 1962. A detailed agenda will be forwarded on approval of this request.

(b) (6)

FLOYD B. SCHULTZ
Assistant Chief of Bureau
for Design, Shipbuilding,
and Fleet Maintenance

Copy to:
DATMCBAS 410
NAVSHIPYD PTSMH 420
NAVSHIPYD MARE 440
COMSUBDEVGRUTWO 442
CO USS THRESHER 525(2)
OIC PERMIT

Prepared by (b) (6), X-65156
Typed by (b) (6), 3/1/62

Unclassified

Exhibit (94)
2

SSN593 cf/9080

DEPARTMENT OF THE NAVY
DAVID TAYLOR MODEL BASIN
WASHINGTON 7, D.C.

IN REPLY REFER TO
09080/THRESHER
(546.PSC:jw)
01285

14 DEC 1962

1- Buships SSN) 593 cf/9080 Ser 525-043 of 21 Feb 1961 to PCO SSN593 via Plant NSY. Predicted performance data from model studies -
2- Our ltr SSN593 cf/9080 Ser 525-074 of 8 Mar 1962 to Sub Pac & Dep Cmd Hawaii. Stability and control Trials

From: Commanding Officer and Director, David Taylor Model Basin
To: Chief, Bureau of Ships (Code 525)(in duplicate)

Subj: USS THRESHER (SSN 593), USS PERMIT (SSN 594) Emergency Recovery Trials; Results of

Ref: (a) BuShips ltr C-SS(N) 593/9080 Ser 436-095 of 9 August 1961 to DATMOBAS
(b) BuShips CONF Msg DTG 031818Z to DATMOBAS

Encl: (1) Table 1 - Results of Emergency Recovery Tests of USS THRESHER (SSN 593)
(2) Table 2 - Results of Emergency Recovery Tests of USS PERMIT (SSN 594)
(3) Figure 1 - Maximum Pitch versus Speed for 10 Degrees Stern Plane Jam
(4) Figure 2 - Depth Change versus Speed for 10 Degrees Stern Plane Jam

1. In accordance with reference (a), Stability and Control Trials were conducted on USS THRESHER (SSN 593) in November 1961 Emergency Recovery Tests were on the agenda but because of a malfunction of the fairwater planes it was not possible to complete the tests. In accordance with reference (b) the tests were then conducted on USS PERMIT (SSN 594) in October 1962.

2. The procedure for conducting the tests is as follows:

621221-0046

(a) The stern planes are deflected to the angle listed in the agenda.

(b) When the pitch angle reaches the prescribed execute angle recovery measures are initiated.

(c) The recovery measures utilized are backing, deflection of rudder, and deflection of fairwater planes to maximum angle in the opposing direction to the stern plane jam.

(d) The test is continued until the depth change in the direction of the emergency has reached its maximum value.

SSN 593

Exhibit (95) — 6 pages

1

09080/THRESHER
(546:PCC:jw)
01285

3. Enclosures (1) through (4) present the results of the Emergency Recovery Tests. The results obtained on the THRESHER trials are tabulated in enclosure (1) and similar results from the PERMIT trials in enclosure (2). Curves of maximum pitch angles versus speed, for various execute pitch angles and a simulated 10-degree stern plane jam for both submarines are shown in enclosure (3). Similar curves of maximum depth change versus speed are shown in enclosure (4). The differences between the rise and dive depth-changes are probably attributable to the sinking effect caused by the large rudder angles which tend to reduce the rise and increase the dive depth changes. Although the differences may seem large, it may be seen from enclosure (2) that the magnitudes of both rise and dive depth changes are very much larger when large rudder angles are not used to check the speed of the submarine.

(b) (6)

K. E. SCHOENHERR
By direction

Copy to: (w/encl)
BuShips (Code 440)
COMSUBDEVGRP 2
COMSUB FLOT 1
CO, USS THRESHER (SSN 593)
CO, USS PERMIT (SSN 594)
CO, USS PLUNGER (SSN 595)
PCO, BARB (SSN 596)

621221-0046

Exhibit (95)
2

ENCLOSURE 1

Exhibit (S-3)

TABLE 1

Results of Emergency Recovery Tests of USS THRESHER (SSN 593)

Test No.	Speed knots (nominal)	Initial Conditions		Recovery Measures		Depth Change feet	Maximum Pitch Angle degrees
		Stern Plane Angle degrees	Execute Pitch Angle degrees	Engine Order rpm	Rudder Angle degrees		
5000	15	9.5 D	5.5 D	Stop	30.0 L	76.5	14.3
5010	15	10.0 R	5.4 R	Stop	Rec. Out	64.5	14.9
5040	15	9.5 D	6.0 D	Stop	32.0 R	85.5	15.0
5061	15	10 D	6.1 D	Back 1/3	30.0 L	72	14.5
5071	15	10 R	5.4 R	Back 1/3	30.0 L	63	15.4
5080	15	9.5 D	6.5 D	Back 2/3	30.0 L	57	13.1
5090	15	10 R	5.5 R	Back 2/3	30.0 L	60.5	14.8
5100	15	9.0 D	6.5 D	Back Full	30.4 L	63.5	14.3
5110	15	10.8 R	6.7 R	Back Full	29.5 L	54	13.8
5120	15	14 D	5.8 D	Back 2/3	30.2 L	74.5	17.0
5130	15	14 R	5.5 R	Back 2/3	29.9 L	78.5	20.4
5140	15	9.5 D	11.0 D	Back 2/3	30.2 L	105	18.4
5150	15	10.5 R	10.5 R	Back 2/3	29.6 L	104	18.5
5160	15	9.5 D	15.8 D	Back 2/3	29.9 L	150	22.4
5170	15	10.5 R	15.5 R	Back 2/3	29.5 L	158.5	23.0
5180	20	11.0 D	6.2 D	Back 2/3	30.0 L	114	18.2
5190	20	9.5 R	6.3 R	Back 2/3	29.5 L	68	15.2
5200	20	8.5 D	5.4 D	Back 2/3	30.8 R	105	14.3
5210	20	10.0 R	6.4 R	Back 2/3	30.5 R	163	29.0
5220	20	10.0 D	10.5 D	Back 2/3	30.3 L	150.5	21.7
5230*	20	10.0 R	11.6 R	Back 2/3	30.3 L	121	20.7

Note: Bow planes deflected to maximum angle as recovery measure on all tests.

* Sail planes jammed; tests ended.

S221-1/046

ENCLOSURE 2

TABLE 2

Results of Emergency Recovery Tests of USS PERMIT (SSN 594)

Test No.	Speed knots (nominal)	Initial Conditions		Recovery Measures		Depth Change feet	Maximum Pitch Angle degrees
		Stern Plane Angle degrees	Execute Pitch Angle degrees	Engine Order rpm	Rudder Angle degrees		
500 A	15	10.1 D	8.5 D	Stop	29 L	143	19.7
501	15	8.5 R	7.8 R	Stop	30.0 L	82	16.3
502	15	10.3 D	6.5 D	Stop	0	545	27.5
503 A	15	9.7 R	6.0 R	Stop	0	681	31.8
504	15	9.0 D	5.0 D	Stop	30.2 R	76	15.4
505	15	10.8 R	5.3 R	Stop	30.0 R	71	16.7
506	15	9.3 D	7.0 D	Back 1/3	29.9 R	80	14.7
507	15	10.1 R	7.0 R	Back 1/3	29.7 R	66	16.2
508	15	9.6 D	6.5 D	Back 2/3	30.0 R	67	15.1
509	15	10.7 R	6.5 R	Back 2/3	29.3 R	58	15.7
510	15	9.1 D	6.7 D	Back Full	30.2 R	62	14.4
511	15	10.5 R	6.5 R	Back Full	30.3 R	65	16.1
512	15	14.5 D	7.0 D	Back 2/3	30.4 R	89	18.2
513	15	14.8 R	7.5 R	Back 2/3	30.2 R	89	21.1
514	15	9.1 D	13.0 D	Back 2/3	31.2 R	130	19.2
515	15	10.3 R	11.8 R	Back 2/3	30.3 R	102	19.3
516	15	9.3 D	18.0 D	Back 2/3	30.5 R	174	22.8
517	15	10.1 R	16.8 R	Back 2/3	29.9 R	155	23.3
518	20	11.5 D	6.7 D	Back 2/3	30.0 L	136	21.6
519	20	9.4 R	5.0 R	Back 2/3	30.2 L	93	18.3
520	20	10.5 D	10.5 D	Back 2/3	30.2 R	145	20.9
521	20	10.5 R	11.5 R	Back 2/3	29.4 R	119	21.0
522	20	9.0 D	14.0 D	Back 2/3	35 7 R	182	23.2
523	20	10.5 R	16.7 R	Back 2/3	35.2 R	122	22.0
524	20	8.9 D	18.8 D	Back 2/3	35.5 R	197	24.7
525	20	10.5 R	17.5 R	Back 2/3	29.6 R	178	25.8
526	20	14.3 D	9.0 D	Back 2/3	30.0 R	110	19.5
527	20	16.0 R	7.0 R	Back 2/3	30.2 R	105	23.0
528*	20	9.5 D	15.0 D	Back 2/3	30.2 R	240	25.6
530	25	3.3 D	7.7 D	Back 2/3	29.8 L	82	12.9
531 A	25	5.9 R	8.0 R	Back 2/3	29.5 L	111	16.0
532	25	4.0 D	7.5 D	Back 2/3	30.2 R	89	11.7
533	25	5.5 R	7.5 R	Back 2/3	30.0 R	71	13.3
534	25	10.1 D	8.5 D	Back 2/3	30.1 R	227	17.2
534 A	25	8.0 D	8.5 D	Back 2/3	31.0 R	219	17.1
535	25	10.7 R	7.5 R	Back 2/3	29.8 R	94	19.2
536	25	9.3 D	13.5 D	Back 2/3	30.1 R	330	27.6
537	25	10.3 R	11.0 R	Back 2/3	29.4 R	148	24.0
538 A	25	9.8 D	19.7 D	Back 2/3	30.2 R	404	30.7
539	25	10.3 R	19.5 R	Back 2/3	30.5 R	224	29.7

Note: Bow planes deflected to maximum angle as recovery measure on all tests.

* Blew forward ballast group

Exh. 6, 7 (SS)
4

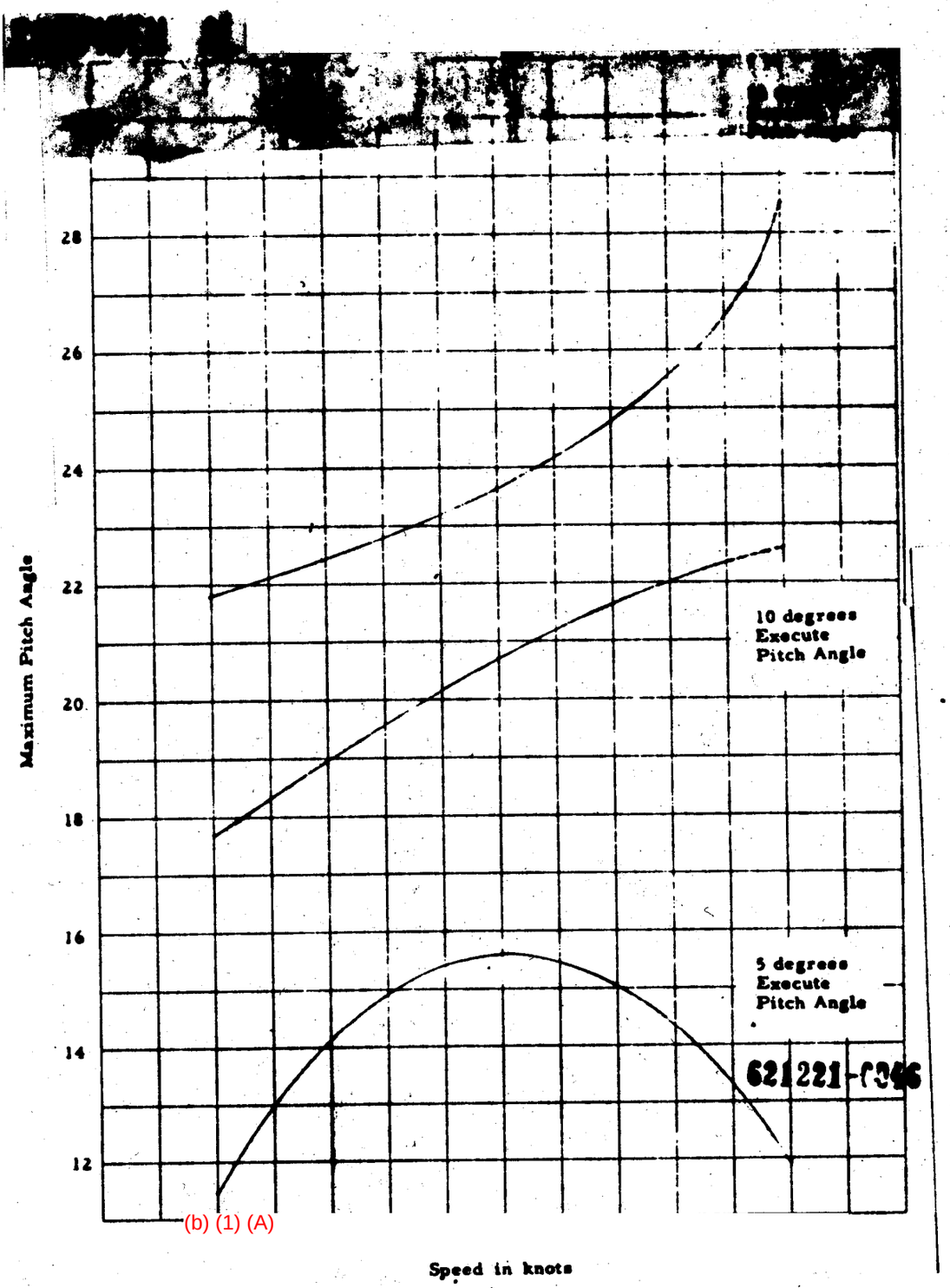

Figure 1 - Maximum Pitch versus Speed for 10 Degrees Stern Plane Jam

Exhibit (95)
5

ENCLOSURE 3

Unclassified

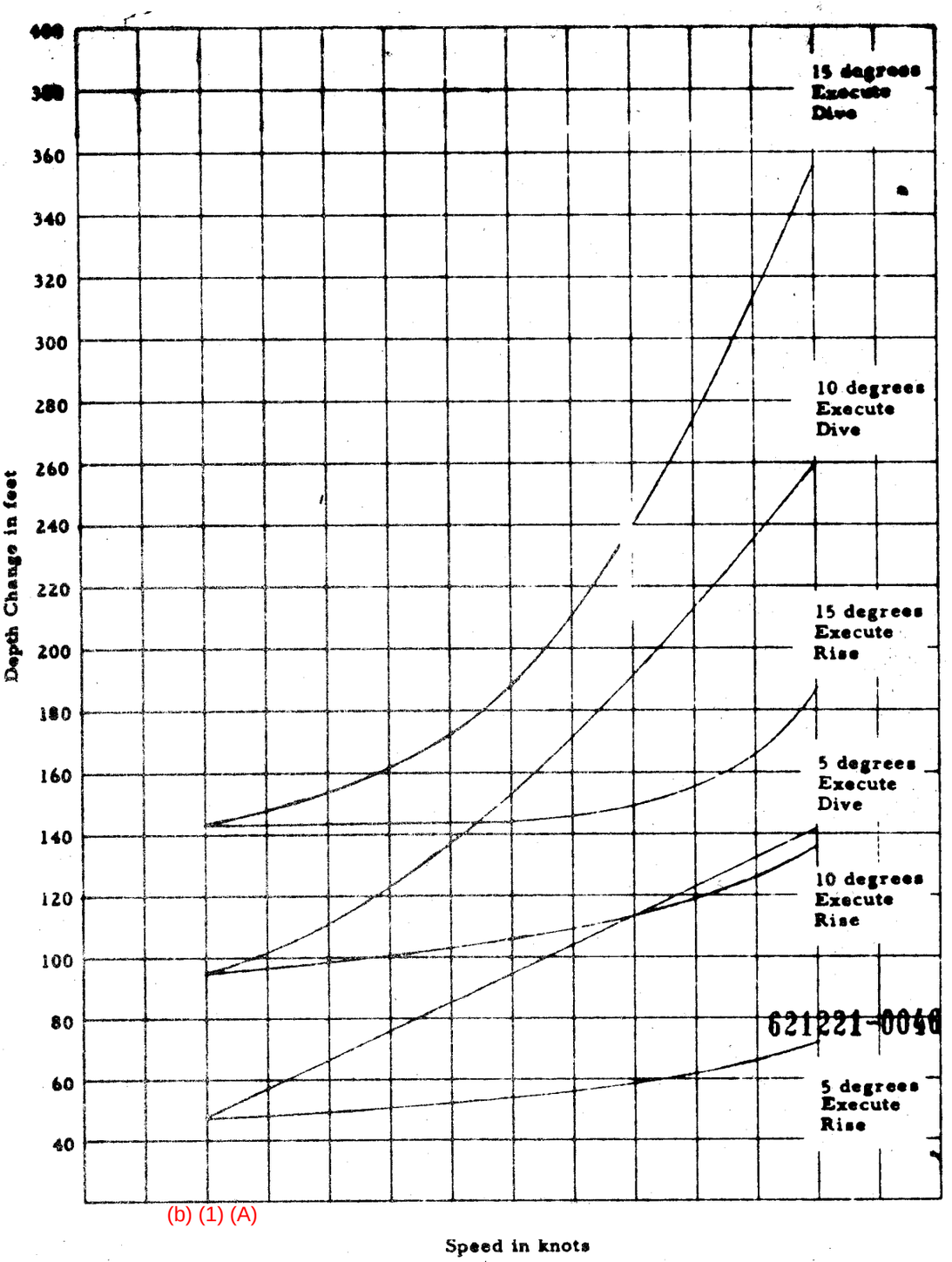

Figure 2 - Depth Change versus Speed for 10 Degrees Stern Plane Jam

Unclassified

ENCLOSURE 4

Exhibit (95)
6

USS THRESHER (SS(N) 593)
c/o Fleet Post Office
New York, New York

SSN593/ww1
4700
Ser: 146
MAR 2 6 1963

From: Commanding Officer, USS THRESHER (SSN 593)
To: Commander Portsmouth Naval Shipyard, Portsmouth, N.H.

Subj: Ship Deficiencies

1. The "Alongside Training Cruise", started at 2000, 23 March 1963, had to be aborted after only 60 hours because of the magnitude of the deficiencies uncovered.

2. As of the time of this letter the ship considers that 456 deficiency items are incomplete and that 186 of these are required to be completed before sea trials. The list below is composed of some of the more significant of the latter:

Deficiency Number	Brief
G-98	After Escape Hatch will not shut hydraulically.
G-144	a. #3 torpedo tube breech door will not shut hydraulically. - Jumbo -
	b. #2 torpedo tube breech door electrical indicator does not operate.
G-152	MK 8 Bearing Position Indicator transmission is inoperative.
CRS-41	AN/ARC-27 radio receiver is inoperative.
E-83	Battery hatch will not dog shut.
E-106	b(3) 10 USC 130
E-130	Engine Order Telegraph is inoperative.
E-139	Magnesyn compass is inoperative. (Repaired)
E-141	After Group MBT High Pressure Air Blow is inoperative.

Exhibit (96)
1

Deficiency Number	Brief
M-44	Shaft revolution counter transmits loud thumps to hull.
M-125	Unable to obtain flow of water through Battery Water and Electronics Cooling fill line.
A-395	UHF/IFF mast does not operate properly.
A-398	New depth sensor not installed leaving single ball valve protection from sea.
A-448	Chief Petty Officer water closet flapper valve is inoperative.
~~A-450~~	Hull ventilation exhaust valve will not remain open hydraulically.
A-458	Crew's and Officer's water closets are periodically inoperative because sanitary drains clog easily in horizontal pipe runs.
A-460	Negative tank flood valve is inoperative.
Various	Torpedo shipping hatch, bridge hatch, after escape trunk and outboard induction valve indications are erroneous on Ballast Control Panel.

3. The deficiencies uncovered, as illustrated above, not only affected the capacity to house the crew on board but so severely restricted the accomplishment of the team training events of the Alongside Training Cruise that many items of the agenda could not be satisfactorily accomplished.

4. It is anticipated that the ship will be able to complete the remainder of its Alongside Training Cruise in only 24 hours vice the remaining 36 hours upon completion of the presently known deficiencies.

J. W. HARVEY

Copy to:
DEPCOMSUBLANT
COMSUBDEVGRU TWO

Exhibit (96)
2

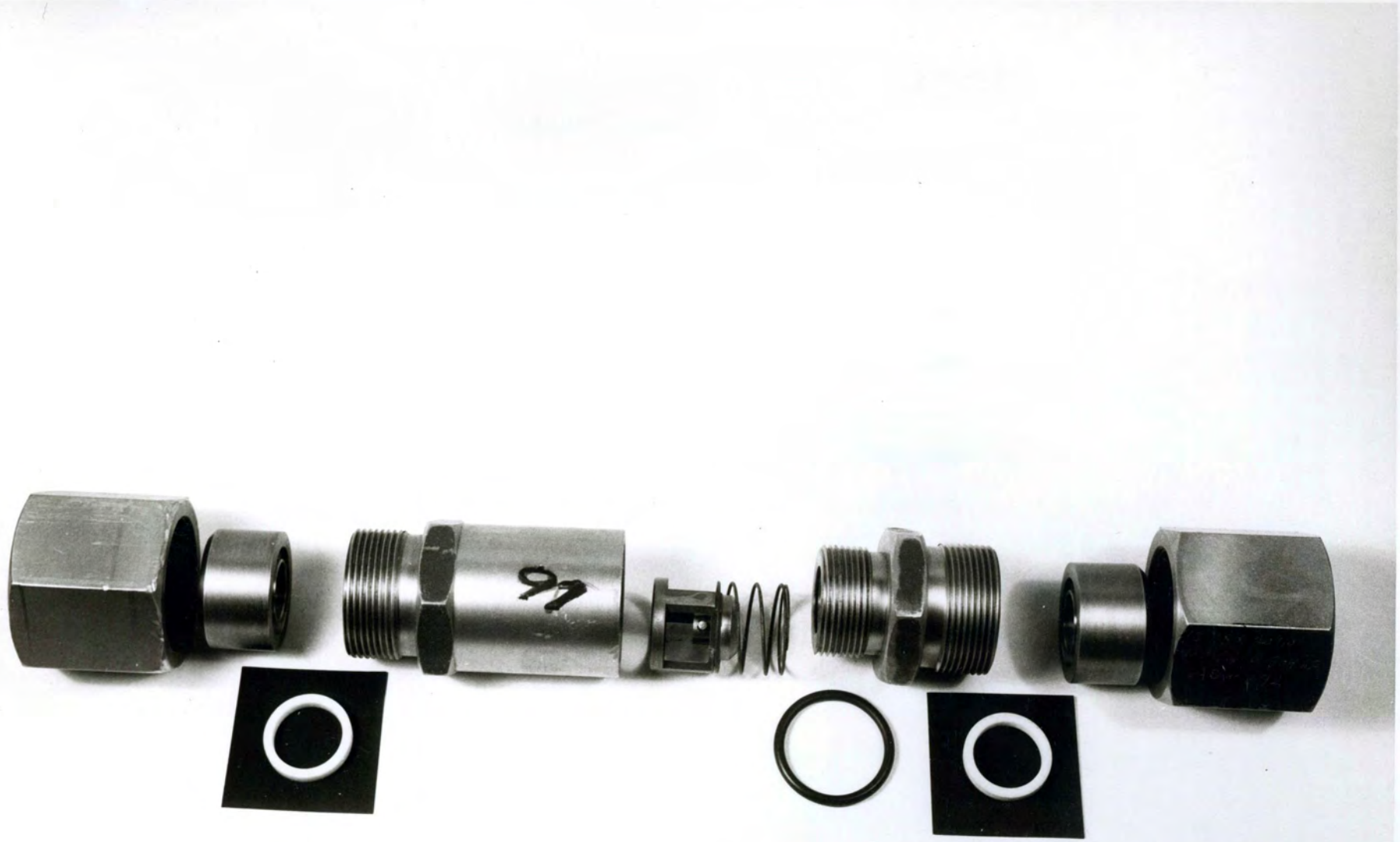

Exhibit (97)

OFFICIAL USE ONLY PHOTO

Unclassified

NO. 1567-03 DATE

UNIT 752

MADE FOR

SUBJECT

Exhibit (97)

OFFICIAL U.S. NAVY PHOTO
Not for Publication
Unless Officially Released

NO. 1568-63 DATE

UNIT 433

MADE FOR

SUBJECT

Exhibit (98)

1569-63

USN A53

Exhibit (98)

NO. 1570-63 DATE

UNIT AIB

NAME FOR

SUBJECT

Exhibit (99)

OFFICIAL U.S. NAVY PHOTO

Not for Publication

Unless Officially Released

NO. 1565-68 DATE

UNIT AIB


SPRINKLER CO.
NO. V-2972
4"60
3000
STYLE 6/4
CONTR. NO. N
INSP
1/2 TS
VITON
OIL

Exhibit (99)

NO. 1566-63

UNIT [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

INSPECTION REQUEST
IND-PNS-771 (Rev. 11-61)

FILE NO.	JOB ORDER	ITEM
	50612	

TEST NO.

To: INSPECTION BRANCH, Code 303B, Bldg. 174

From:

Ship

USS Thresher SS 593

1. The Cutaway ASW AFT. system on above Ship is ready for:

☐ INSPECTION	☑ TEST	☐ COMPLETE	☐ PARTIAL	☐ REPEAT	DATE
SIGNATURE KEY SHOP	(b) (6)				3/7/63
OTHER SHOP					
OTHER SHOP					
OTHER SHOP					

10

SHOP COMMENTS

1862582 D.A. ITEM #1 b(3) 10 USC 130
Cutaway ASW including all cooling & Constant tests. This also includes #3 Pump.

INSPECTION COMMENTS

Inspection of #3 pump only. Satisfactory TRM 303B-2
O-ring seal #1 ASW discharge, #2 ASW suct, #1 & 2 SSTG L.O. coolers
VALVES - #2 hyd. oil cooler drn., EPM I.B. vent, #1 & 2 TG L.O. cooler I.B. vent, #1 TG L.O. cooler drn.

(b) (6)

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY
REJECTED		REJECTED		EX. 103
FINAL ACCEPTANCE		FINAL ACCEPTANCE		DATE

Exhibits jump from 99 to 103. Exhibit 100 is picture of tank. Exhibits 101 & 102 are test/system diagrams.

JOB ORDER

IND-PNS-1714 (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
	377	(b) (6)	2BD	SS(N) 593	15-930-50612

DATE SCHEDULED	PHONE	DATE PREPARED	PHONE
8-1-62	1365	7-31-62	206

AUTHORITY	P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)
N-60	B 213	213 8/1/62

JOB TITLE

INSPECTION & TEST OF SEA WATER SYSTEMS 8-1-62

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE		REF.
							NOTE: THIS IS A CONTIN-	
							UATION TO J.O. ISSUED 7-28-62	
							AND CONTAINS SYS. BOUNDARIES	
							AND VALVE LINE UPS FOR	
							PLUMBING SYS., TRIM & DRAIN SYS.,	
							ASW SYS. (AFT) AND F.O. & COMP. WTR.	
							GENERAL INSTRUCTIONS PREVIOUSLY ISSUED APPLY.	
10	5607		160	A	[redacted] 16-1962		PLUMBING SYSTEM	

REFERENCES:

1. BUSHIPS DWG. SS(N)593-505-1862757-H PLUMBING SYS. - DIAGRAM
2. BUSHIPS DWG. SS(N)593-845-1862944-F PRESSURE SCHEDULE
3. BUSHIPS DWG. SS(N)593-513-1862813 SERVICE AIR SYS. - DIAGRAM
4. BUSHIPS DWG. SS(N)593-501-1862731 CO_2 REMOVAL - DIAGRAM

PREPARATION:

1. SHUT: PL-1, 9, 11, 47, 48, 61, 62, 77, 79, 100, 101, 103, 104, 105, 107 AND 126 ALP-36 AND 212 ON REF. 3, COS-11 AND COS-33 ON REF. 4.
2. OPEN: PL-49, 102, 106, 108, 127, 128, 7 AND 8.
3. GAG: ALP-29, 35 AND 214 ON REF. 3
4. TEST HYDROSTATICALLY TO ITEM 5 OF REF. 2

	PRODUCTION DEPT.			STRUCT.		OUTFG	ELEC.	MECHANICAL			SERVICE		NUCL. PWR.		PLANNING SUPPLY & COMPTROLLER DEP									
DISTR.	303C	303D	340	11	17	38	51	06	31	37	64	71	2302	63	2344B	227	228	229	231	232	233			051
40	340A	376	377	23	26	56	67	81	94		72	99	2306	66	245A	239	507	609	565	650				213

WORK COMPLETED	DATE	LABOR (DOLLARS)	OVERHEAD (DOLLARS)	MATERIAL (DOLLARS)	TOTAL (DOLLARS)
				100.	

EXH 104-1

JOB ORDER CONT

IND-PNS-1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
	377	(b) (6)	2BD	SS(N) 593	15-930-50612
DATE SCHEDULED	**PHONE**	**DATE PREPARED**	**PHONE**		
8-1-62	1363	7-31-62	206		
AUTHORITY			**P & E SUPVR. (UNIT CODE DATE)**		**TYPE DESK (UNIT CODE DATE)**
N-60					

JOB TITLE

INSPECTION & TEST OF SEA WATER SYSTEMS

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE	WORK DESCRIPTION	REF.
11	5607		320	A	7-30-62	10-15-62	A.S.W. SYS. - AFT.	

REFERENCES:

1. BUSHIPS DWG. SS(N) 593-209-1862582-G
   A S W SYS. - DIAGRAM
2. BUSHIPS DWG. SS(N) 593-545-1862944-F
   PRESSURE SCHEDULE
3. BUSHIPS DWG. SS(N) 593-517-1862895-L
   2000 GPD DISTILLING SYS. - DIAGRAM
4. BUSHIPS DWG. SS(N) 593-517-1862889-N
   8000 GPD DISTILLING SYS. - DIAGRAM
5. BUSHIPS DWG. SS(N) 593-511-1862[illegible]
   F.O. & COMP. WATER SYS. - DIAGRAM
6. BUSHIPS DWG. SS(N) 593-505-1862757-H
   PLUMBING SYS. - DIAGRAM
7. BUSHIPS DWG. SS(N) 593-209-1862579
   MAIN S.W. SYS. - DIAGRAM
8. BUSHIPS DWG. SS(N) 593-502-1862711-J
   AIR CONDITIONING SYS. - S.W. DIAGRAM

PREPARATION:

AUX. MACH. SPACE

b(3) 10 USC 130

ENGINE ROOM

b(3) 10 USC 130

"INFO. ONLY"

JOB ORDER CONT
(NAVSHIPS 1714A (REV. 4-62))

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	28D	SS(N) 593	15-930-50612
DATE SCHEDULED	PHONE	DATE PREPARED	PHONE		
		7-31-62	206		
AUTHORITY			P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE		REF.
							b(3) 10 USC 130	

Red lines
Valves that are
difficult to find
went back and found
valve or circuit

11. TEST HYDROSTATICALLY TO ITEM 1 ON REF. 2.

12	5607	40	A	7-30-62	10 HRS	TRIM & DRAIN SYSTEM

1. REFERENCES:
1.1 PNS SAFETY INSTRUCTIONS
1.2 U S NAVY SAFETY PRECAUTIONS, OPNAV 34 P1
1.3 BUSHIPS DWG. SS(N) 593-508-1862774-H TRIM & DRAIN SYS. - DIAGRAM
1.4 BUSHIPS DWG. SS(N) 593-545-1862944-F PRESSURE SCHEDULE

JOB ORDER CONT
IND-PNS- 1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	280	SS(N) 593	15-930-50617
DATE SCHEDULED	PHONE	DATE PREPARED	PHONE		
		7-31-62	206		
AUTHORITY			P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE		REF.
							1.5 BUSHIPS DWG. SS(N)593-509-1862582-C A.S.W. SYS. - DIAGRAM	
							2. ALIGNMENT OF SYSTEM FOR TEST	
							2.1 DRAIN MAIN	
							2.1.1 SHUT THE FOLLOWING VALVES: TD-31, 41, 259, 247, 49, 105, 123, 56, 62, 63, 276, 157, THE TWO INDIVIDUAL VALVES AT TD-28 SERVING DRAIN PUMP DISCHG. TO TRIM DISCHG. MAIN (P-51) AND DRAIN PUMP SUCTION FROM TRIM SUCTION MAIN (P-56). (THE REMAINDER OF TD-28 SHALL BE LEFT OPEN) SHUT TD-164, 153, 29, 154, 130, 84 AND ASW-284 OF REF. 1.5.	
							2.1.2 OPEN THE FOLLOWING VALVES: TD-187, 188, 189, 39, 42, 193, 34, 181, 44, 176, 86, 177, 50, 52, 54, 64, 66, 74, 255, 233, 163, 222, 72, 70, 82, 76, AND 217. DRAIN PIPE	
							2.1.3 UPON COMPLETION OF PARA. 2.1.1 AND 2.1.2, FILL THE DRAIN MAIN PIPING WITH FRESH WATER AND HYDROSTATICALLY TEST AT THE PRESSURE SPECIFIED AS ITEM 1 OF REF. 1.4. MAINTAIN PRESSURE FOR A PERIOD OF NOT LESS THAN ONE HOUR. INSPECT FOR LEAKAGE AT PIPING DOWNSTREAM OF TD-187, 188,	

EXH 104-4

"INFO. ONLY"

JOB ORDER CONT
IND-PNS-1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	2BD	SS(N) 593	15-930-50612
DATE SCHEDULED	PHONE	DATE PREPARED	PHONE		
		7-31-62	206		
AUTHORITY		P & E SUPVR. (UNIT CODE DATE)		TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE

INSPECTION & TEST OF SEA WATER SYSTEMS

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE	WORK DESCRIPTION	REF.

TD-189, 42, 193, 34, 44, 176, 181, 86, 50, 177, 52, 64, 66, 74, 70, 72, 76, 82, 217. UPON COMPLETION OF INSPECTION, SHUT THESE BILGE SUCTION CHECK-BACK UP VALVES AND CONDUCT DROP TEST.

2.2 TRIM DISCHARGE MAIN

2.2.1 SHUT THE FOLLOWING VALVES:

(14) TD-[illegible], [illegible], (13), (22), (11), (3), (24), ALL

(9?) EIGHT INDIVIDUAL VALVES AT TD-(27),

(7) TD-(151), (23), (10), (8), (103), 90, 91, 92, 93,

168 BLANK TD-160, TD-159, 25, 5, 301, 156, 1, 2, 26, INDIVIDUAL VALVE AT TD-28 PROVIDING DRAIN PUMP DISCHG. TO TRIM DISCHG. MAIN (P-51), TD-16, 294 AND ASW-285 OF REF. 1.5.

Crew wanted these valves checked?

2.2.2 OPEN THE FOLLOWING VALVES:

TD-19?, [illegible], 12?, 8, [illegible], 167, 6, 17, 158, ?, [illegible], [illegible] AND [illegible]

2.2.3 AFTER ALIGNING THE SYSTEM BY OPENING AND SHUTTING THE VALVES AS CALLED FOR IN PARAGRAPHS 2.2.1 AND 2.2.2, FILL THE TRIM DISCHARGE PIPING, THE FWD. TRIM, AFTER TRIM, AUX. NO. 1, AUX. NO. 2, W.R.T. #1 AND W.R.T. #2 TANKS WITH FRESH WATER. HYDROSTATICALLY TEST AT THE PRESSURE SPECIFIED AS ITEM 5 OF REF. 1.4.

EXH 104-5

JOB ORDER CONT
IND-PNS- 1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	2BD	SSG(N) 593	15-930-50612
DATE SCHEDULED / PHONE		DATE PREPARED / PHONE			
		7-31-62 / 206			
AUTHORITY			P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE		REF.

MAINTAIN PRESSURE FOR A PERIOD OF AT LEAST 1 HOUR AND THOROUGHLY INSPECT THE PIPING BETWEEN THE SUBJECT TANKS AND THEIR CUTOUT VALVES FOR ANY LEAKAGE. NOTE: IF ANY OF THIS PIPING IS LAGGED, DO NOT REMOVE LAGGING BUT INSPECT CLOSELY FOR SIGNS OF LEAKAGE.

2.2.4 AT SATISFACTORY COMPLETION OF PARAGRAPH 2.2.3, MAINTAIN THE VALVE ALIGNMENT AS IN PARAGRAPHS 2.2.1 AND 2.2.2, EXCEPT SHUT VALVES TD-14, 9, 7, AND 168 TO ISOLATE TANKS FROM SYSTEM PRESSURE ALSO OPEN TANK VENTS. TEST THE DISCHARGE SYS. PIPING AT THE PRESSURE OF ITEM 1 OF REF. 1.4, FOR A PERIOD OF NOT LESS THAN ONE HOUR.

2.3 TRIM SUCTION MAIN

2.3.1 SHUT THE FOLLOWING VALVES: TD-20, 15, 11, 250, 267, FOUR INDIVIDUAL VALVES AT TD-27 ASSOCIATED WITH P-188, TD-152, 10, 8, 117, 2, 147, 148, 5, 111, INDIVIDUAL VALVE AT TD-28 ASSOCIATED WITH P-56 AND TD-16.

JOB ORDER CONT
IND-PNS- 1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	28D	SS(N) 593	15-930-50612
DATE SCHEDULED / PHONE		DATE PREPARED / PHONE			
		7-31-62 / 206			
AUTHORITY			P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE	WORK DESCRIPTION	REF.
							2.3.2 OPEN THE FOLLOWING VALVES: TD-3, 220 AND 221.	
							2.3.3 HYDROSTATICALLY TEST THE SYSTEM SUCTION PIPING AT THE PRESSURE OF ITEM 1 OF REF. 1.4 FOR A PERIOD OF NOT LESS THAN 1 HOUR.	
							2.4 TORPEDO IMPULSE SYSTEM	
							2.4.1 SHUT THE FOLLOWING VALVES: THE FOUR INDIVIDUAL VALVES OF TD-27 ASSOCIATED WITH P-187, TD-141, 142, 304 AND 307.	
							2.4.2 OPEN THE FOLLOWING VALVES: TD-101, 102 AND 305	
							2.4.3 FILL THE TWO TORPEDO IMPULSE TANKS AND THE ASSOCIATED PIPING WITH FRESH WATER. HYDROSTATICALLY TEST TO ITEM 3 OF REF. 1.4. MAINTAIN PRESSURE FOR AT LEAST 1 HOUR.	
							2.5 TORPEDO TUBE EQUALIZING SYS. AND TRASH EJECTOR	
							2.5.1 SHUT THE FOLLOWING VALVES: TD-107, 109, 159, 105, 103, 108, 205, 206, 207, 208, 90, 91, 92 AND 93.	
							2.5.2 OPEN THE FOLLOWING VALVES: TD-106, 306, 99, 100, 178 AND 179.	
							2.5.3 FILL THE FOUR TORPEDO TUBES, THE TRASH EJECTOR AND ASSOCIATED PIPING WITH FRESH WATER. HYDRO. TEST TO ITEM 4 OF REF. 1.4.	

EXH 104-7

JOB ORDER CONT
IND-PNS- 1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	28D	SS(N) 593	15-930-50612
DATE SCHEDULED	PHONE	DATE PREPARED	PHONE		
		7-31-62	206		
AUTHORITY			P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE	WORK DESCRIPTION	REF.
							MAINTAIN PRESSURE FOR AT LEAST ONE HOUR.	
13	5607		160	A	7-30-62	10-19-62	F.O. & COMPENSATING WATER SYS.	
							1. REFERENCES:	
							1.1 PNS SAFETY INSTRUCTIONS.	
							1.2 USNAVY SAFETY PRECAUTIONS OPNAV 34P1	
							1.3 BUSHIPS DWG. SS(N) 593-511-1862803-G F.O. & COMP. WATER - DIAGRAM	
							1.4 BUSHIPS DWG. SS(N) 593-545-1862944-F PRESSURE SCHEDULE	
							1.5 BUSHIPS DWG. SS(N) 593-508-1862774-H TRIM & DRAIN SYS. - DIAGRAM	
							2. PREPARATION AND TEST PROCEDURE:	
							2.1 ALIGN THE SYSTEM AS FOLLOWS:	
							2.1.1 SHUT FO-6, 7, 8, 5, 19, 15, 13, 40, 10, 11, 21, 35 AND 39.	
							2.1.2 OPEN FO-14, 2, 31, 17, 18, 32, 3, 37, 28, 29 AND 36.	
							2.1.3 OPEN FO-66, 25 AND 26 (TO VENT NFO #1 TANK)	
							2.1.4 OPEN TD-243 AND 244 OF REF. 1.5 (TO VENT COLLECTING TANK)	
							2.1.5 AFTER ALIGNING THE SYSTEM AS IN PARAGRAPHS 2.1.1 THROUGH 2.1.4, FILL THE SYS. PIPING, NFO #2 AND EXPANSION TANK WITH FRESH WATER. HYDROSTATICALLY TEST THE PIPING AND TANKS AT THE PRESSURE SPECIFIED AS ITEM 5 OF REF. 1.4.	

JOB ORDER CONT
IND-PNS-1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	2BD	SS(N) 593	15-930-50612
SCHEDULED	PHONE	DATE PREPARED	PHONE		
		8-1-62	206		

AUTHORITY	P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)
N-60		

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE	REF.

MAINTAIN PRESSURE A SUFFICIENT LENGTH OF TIME (AT LEAST 1 HOUR) TO PERMIT A THOROUGH EXAMINATION FOR LEAKAGE OF PIPING AND JOINTS BETWEEN THE SUBJECT TANKS AND THEIR CUTOUT VALVES.

NOTES: DURING FILLING, VENT TANKS AND PIPING THOROUGHLY.

IF CONVENIENT, FILLING OF THE SYSTEM MAY BE ACCOMPLISHED BY REMOVING FO-16 AS SPECIFIED IN PARAGRAPH 2.2.4.

2.2 TEST P-30, 23 AND 20 AS FOLLOWS:

2.2.1 SHUT FO-35, 21, 31, 14 AND 15.

2.2.2 OPEN FO-17, 19, 39, 25 AND 26 (TO VENT ~~EXPANSION TANK~~) NFO

2.2.3 CONNECT A HOSE TO FO-26 AND DISCHARGE OVERBOARD.

2.2.4 REMOVE FO-16

2.2.5 CONNECT TEST PUMP, RELIEF VALVE SET TO 105% OF ITEM 4 OF REF. 1.4, AND TEST GAGE b(1) AT THE BROKEN FLANGE CONNECTION OF P-20. TEST THE PIPING WITHIN THE ABOVE BOUNDARIES TO THE PRESSURE OF ITEM 4 OF REF. 1.4. HOLD PRESSURE FOR 1 HOUR AND CHECK ALL JOINTS FOR LEAKAGE. ALLOWABLE LEAKAGE - NONE.

EXH 104-9

JOB ORDER CONT
IND-PNS-1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	28D	SS(N) 593	15-930-50612
DATE SCHEDULED	PHONE	DATE PREPARED	PHONE		
		8-1-62	206		
AUTHORITY			P & E SUPVR. (UNIT CODE DATE)	TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE
INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE		REF.
							2.2.6 AFTER SATISFACTORY COMPLETION OF TEST, REPLACE FO-16. LEAVE HOSE ATTACHED AT FO-26 FOR FURTHER USE.	
							2.3 TEST P-39, 1, 2, 3, 9 AND 4 AS FOLLOWS:	
							2.3.1 SHUT FO-6, 5, 10, 32 AND 3.	
							2.3.2 OPEN FO-1 AND 2.	
							2.3.3 OPEN FO-39, 25 AND 26 (TO VENT NFO #1 TANK)	
							2.3.4 OPEN TD-243 AND 244, REF. 1.5 (TO VENT COLLECTING TANK)	
							2.3.5 OPEN FO-36 AND 30 (TO VENT NFO #2 TANK)	
							2.3.6 ATTACH HOSE TO FO-30 TO TAKE CARE OF ANY DRAINAGE.	
							2.3.7 CONNECT THE TEST PUMP SET UP TO THE F.O. FILL CONN. AND TEST THE PIPING WITHIN THE ABOVE BOUNDARIES AT THE PRESSURE OF ITEM 4 OF REF. 1.4. HOLD PRESSURE FOR 1 HOUR AND CHECK ALL JOINTS FOR LEAKAGE. ALLOWABLE LEAKAGE - NONE.	
							2.4 TEST P-28 AND 26 AS FOLLOWS:	
							2.4.1 SHUT FO-19 AND 18.	
							2.4.2 REMOVE FO-17.	
							2.4.3 OPEN FO-39, 25 AND 26 (TO VENT NFO #1 TANK)	
							2.4.4 OPEN FO-36 AND 30 (TO VENT NFO #2 TANK)	

EXH 104-10

"INFO. ONLY"

JOB ORDER CONT
IND-PNS- 1714A (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
		(b) (6)	280	SS(N) 593	15-930-50612
DATE SCHEDULED / PHONE		DATE PREPARED / PHONE			
		8-1-62 / 206			
AUTHORITY		P & E SUPVR. (UNIT CODE DATE)		TYPE DESK (UNIT CODE DATE)	
N-60					

JOB TITLE

INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE		REF.
							2.4.5 CONNECT THE TEST PUMP SET UP AT THE BROKEN FLANGE CONNECTION OF P-28. TEST THE PIPING WITHIN THE ABOVE BOUNDARIES TO THE PRESSURE OF ITEM 4 OF REF. 1.4. HOLD PRESSURE FOR 1 HOUR AND INSPECT ALL JOINTS FOR LEAKAGE. ALLOWABLE LEAKAGE- NONE.	
							2.4.6 AFTER SATISFACTORY COMPLETION OF TESTS, REPLACE FO-17, REMOVE HOSE FROM FO-26 AND FO-30, AND RESTORE ENTIRE SYSTEM TO NORMAL.	

EXH 104-11

Kieserbier
Grayson & Hudson
on line ups.

Crew opened & close by crew in
Presence of X56 test man (b) (6) 1 15362)

A.S.W. aft Chief Arsenault
inspected entire system with (b) (6)
and instructed (b) (6) to sign off
test slip marked "10" for entire
system.

EXH 104-12

2760 T. b(1) (working items 153-154)

383 A. ~~Sensing line hangar~~ Sold

M 167 Seal weld plug Main hyd R.C.

M-87 ~~Drain on~~ TNSN Sold

2746 T b(3) 10 USC 130 bearing drain (holes) Solid

Resonance changer (hydro Sold nitrogen) refill with oil

TM 45-01-012 Drain installed Completed

A615 Sounding rod Sold

24A - ~~Strainer~~ Sold

M 168 b(3) 10 USC 130 Install plug Sold

M 169 b(3) 10 USC 130 Furnish funnel Sold

M 170 ~~Silencer on~~ 8000 GPD dust plant Leaks Sold

Exp 105-1

Apr 5th 593 Conference 1 o'clock

Flooding dock 9 o'clock Monday 9 to 11 c.

Go to Sea at 11 o'clock Tues

Completion Apr 11th

A-625 Periscope jet air working discontinued pipes we are hanging ~~well complete 1600~~ Sold.

~~A-614 Ammi tank level indication does not work (not authorized)~~

Supply 9 need their faucetts: Have temporary. Supply have ordered will notify progress (Langille) when available.

Supply 5 GDU piping loose having hangar made on DLI 16799 x37 making hanger.

A608 Wash pipe from Elec Sobig pump needs hangars (will wind up approx 1600. Sold.

133A Leak on CFO.

EXH 105-2

QSW off Chief Arsenault
inspected entire system with
(b) (6) and installed. (b) (6)
to sign off test

EXH 165-3

EXTRACTS FROM "Portsmouth Naval Shipyard Shop 56 Shift Book for the 593" covering period of 3 March 1963 to 7 April 1963

3/7/63

Moulton to day shift.

Fair water planes - putting lines back in ship. Compartment test slowed this down. We should be completed by end of shift.

After puff relief on hydro - slip in book. Gauge lines will have to be sold separate no fittings & hook them up. They are portable & can be tested in shop.

Testing on H.S.W. Valve 166 shaft L.O. cooler (aft) was replaced with a modified valve. Replaced brass plug near pump with correct one. Drain line Starboard pump leaking. Looks as if the wrong bonnet was forced on & crossed threads. K3F working on it now.

Reserve feed water tanks full. Want samples taken by crew this morning.

Puffs in H.M.S. M.L.P. 460 valve is just a regular globe valve & it should be a globe check. We didn't braze it - should be replaced.

Illegible copy provided

Continue Drop test on 2x4 Bank to Lawson out 1300 ft.
15-930-31325 No 01

Continue Flight Line magnetics Langdon
15-930-20925 No 05
Working

Continue changes to Ordinance Bay Obey
15-930-20913 Working No. 47

Continue Test Tone Signaling line. Lab
15-930-60902 No 19

Exhibit (106) - 2

* Bilge stripping Pump
on Lowmor. Working

(b) (6)
b(1)

Continue air on
Top. Tanks.
(b) (6)
15-930-51314-K008

* Continue flight on
Reserve Fuel tanks.
we are on b(3) 10 USC
Working

15-930-20513-47

Continue hangers on
Brine dilution Working
15-930-50614 K002

b(1)

Continue air in
air Regulator as
discussed. Working
15-930-51315-40 08.

Install new Lub
Exchanger in Elec cooling
system. To replace one
which leaks. Bottom
flange is broken. Done
15-930-86119 404 Valve installed

Original complete Shift Book
available from:

Legal Officer
Portsmouth Naval Shipyard
Portsmouth, New Hampshire

Exhibit (106) - 3

"Portsmouth Naval Shipyard
Shop 56 Shift Book for 593"
covering period of:

7 FEB 1963 to 2 MAR 1963

Original Book in custody of the Legal Officer,
Portsmouth Naval Shipyard, Portsmouth, N. H.

EXHIBIT (107)

"Portsmouth Naval Shipyard
Shop 56 Shift Book for 593"
covering period of:

19 JUL 1962 to 26 SEP 1962

Original Book in custody of the Legal Officer,
Portsmouth Naval Shipyard, Portsmouth, N. H.

EXHIBIT (108)

"Portsmouth Naval Shipyard
Shop 56 Shift Book for 593"
covering period of:

16 DEC 1962 to 7 FEB 1963

Original Book in custody of the Legal Officer,
Portsmouth Naval Shipyard, Portsmouth, N. H.

EXHIBIT (109)

"Portsmouth Naval Shipyard
Shop 56 Shift Book for 593"
covering period of:

26 SEP 1962 to 15 DEC 1962

Original Book in custody of the Legal Officer,
Portsmouth Naval Shipyard, Portsmouth, N. H.

EXHIBIT (110)

0267-2

USS THRESHER (SS(N)593)
Care of Fleet Post Office
New York, N. Y.

SSN593/DLA:cmd
3000
Ser: 086
16 November 1962

Unclassified

From: Commanding Officer
To: Chief, Bureau of Ships

Via: (1) Commander Submarine Development Group TWO
(2) Deputy Commander, U. S. Atlantic Fleet

Subj: Comments on operation of THRESHER during her first year in commission

Ref: (a) BUSHIPS ltr 9020 ser 525-2308 of 19 Sep 1962

Encl: (1) General Evaluation
(2) Sonar
(3) Ship Handling
(4) Armament
(5) Operations and Navigation Equipments
(6) Engineering
(7) Miscellaneous

1. Reference (a) requested a written evaluation of THRESHER after her first year of service in commission. The general comments given in enclosures (1) through (7) constitute the requested report.

2. THRESHER's employment was such that it is considered that she has been well evaluated from a material standpoint but only slightly evaluated from the tactical standpoint. The following are the operational highlights of the first year during which THRESHER steamed over 37,000 miles:

a. Builder's Trials

b. Preliminary Acceptance Trials

c. Shakedown Training

d. TOTO Noise Trials

e. BUSHIPS Special Trials

f. Torpedo Tube Acceptance Trials

g. Multiple Test Firings of:

(1) MK 37-0 Torpedoes at various speeds

(2) SUBROC Shapes

Unclassified

EXHIBIT (111)- 1

C 9602 A-1(N)593/4210

h. Side by Side Noise Comparison Tests

i. NuSubEx 3-61 and NuSubEx 2-62

j. Operations with ASW Carrier Task Forces to evaluate experimental tactics

k. Full-Scale Shock Acoustical Trials

l. Administrative and Operational Readiness Inspections.

DEAN L. AXENE

Copy to: (w/encls)
BUWEPS
COMNAVSHIPYD PTSMH
CO USS PERMIT (SSN594)
OIC USS PLUNGER (SSN595)
PCO USS BARB (SSN596)
PCO USS TINOSA (SSN606)
PCO USS DACE (SSN607)
PCO USS POLLOCK (SSN603)
PCO USS JACK (SSN605)
PCO USS HADDO (SSN604)
CO USS TULLIBEE (SSN597)

Ref(a) - CSL Ser Dab 402/FC926 of 9/25/62 and
End on CO SAE Board PCO DAE ltr of 8/27/62

GENERAL EVALUATION

1. THRESHER is, in my opinion, the best ASW submarine afloat today. Noise quieting features have in general been very effective. This, coupled with the improved sonar, improved fire control and deeper operating depth, makes THRESHER a very potent attack submarine.

2. The ship is, however, (again in my opinion) overly complex in many areas and needlessly so. Specifically:

a. The acoustic barrier is far too fancy and expensive.
DESL: Concur. Reduced in size and practically eliminated in 637 Cl.

b. The hydraulic system is too complex with alternate modes of operation that aren't essential.
DESL: Concur. Ref b furnishes comments. Action has not been req'd.

c. There is too much fire control.

d. The BQS-6 active sonar is more flexible and more complicated than is necessary.

3. I realize that THRESHER was designed and built to be an ASW submarine and that surface and near surface characteristics were deliberately sacrificed to this end. Here again, however, I believe we went too far. It is still essential that we get in and out of port. It is still essential at times to operate on or near the surface. These operations are difficult and dangerous with this ship.
DESL: Performance should be minimized on 637 by various shipbuilding contracts [illegible]

4. Habitability in nuclear submarines has been quite good. I believe, however, that we have retrogressed in this regard in THRESHER. In general, individual accommodations are satisfactory, but we suffer from inadequate numbers of accommodations. I believe the officers have been particularly hard hit in this respect.

5. In my opinion, the most dangerous condition that exists in THRESHER is the danger of salt water flooding while at or near test depth. The danger, I believe, centers around the literally yards of salt water piping and flexible hoses of all sizes which make up the ASW system. The danger is heightened by the fact that the system cannot be quickly isolated from a single station. With the expectation of operating at deeper and deeper depths, I consider it of the utmost importance to get these potential leak sources out of the ships by some means or another. Salt water piping that sees full submergence pressure must be minimized, particularly where sil-brazed pipe joints and rubber hoses are employed. Further, a central station which will permit immediate and total isolation is essential.
DESL: Ref(c) furnished CSL's position. Correctly Ref(b) req'd.

(b) Def 402/F7273 of 10/6/62. 3rd Endon CO 593 ser 369 of 9/11/62

Unclassified

Enclosure

SONAR

1. General. The overall performance of the AN/BQQ-2 Integrated Sonar System has been truly gratifying. The system performed very well with relatively very few major maintenance problems. THRESHER is one of the quietest if not the quietest submarine in the world today. Experience during exercises has shown that THRESHER is essentially immune from detection by a snorkelling submarine and with care is immune from detection by a battery operated submarine. These statements are supported by actual experience and with THRESHER rigged for normal running. When transiting, THRESHER is also probably immune from detection by a battery operated SSK provided active sonar search is not employed and provided a reasonable SOA (20 knots maximum) is observed. Not as many echoes have been obtained at long ranges as was desired and expected. This has been partially due to transmitter troubles at high power.

THRESHER does not know how best to use eventually the BQS-6 active sonar; presently it seems to give out more information than it receives. A multitude of repairs and changes are now being incorporated into the system by the manufacturers while the ship is undergoing Post Shakedown Availability. THRESHER is looking forward to a vastly improved AN/BQQ-2 system upon completion of PSA in early 1961.

2. Spherical Passive (AN/BQS-6). The AN/BQS-6 passive is an outstanding sonar. Passive sonar capability does not appear to be significantly degraded by speeds up to (b) (1) except against a very quiet battery operated submerged submarine. This sonar with its bearing accuracy is the main bearing source during a fire control problem. One significant deficiency worthy of comment is that during a fire control problem, bearings from BQS-6 passive DRT reveal time delays of almost two minutes in time during an own ship maneuver.

At high speeds (over 20 knots) surface contacts have been tracked at ranges above 30,000 yards in ASW. During an exercise, THRESHER was able to consistently maintain passive contact on a submerged battery operated submarine when own ship's speed was at ten knots or below.

The capability of being able to track contacts by use of bottom bounce signals is very useful in determining passive ranges.

Illegible copy provided

3. Spherical Active (AN/BQS-6). The major problem with the BQS-6 active has been an inability to echo range at full power without electronic failure. This is due to many problems which are still being investigated. On rare occasions, ranges of 35,000 yards at low power levels have been experienced. At other times no echo has been received from a known contact at 2000 yards. This may be due to the small bearing width of the outgoing signal (single ping) at close ranges. When operating in the listen mode, it has been found that a noise spike on a surface contact normally appears on the active PPI scope at a range of 15,000 yards. With a remote PPI in the attack center, this has proven very advantageous

Unclassified

3000

to the conning officer.

4. Conformal Passive Array (AN/BQR-7). This equipment has not been as reliable as is desired. It has not been consistent in picking up long range passive contacts. Contacts have been tracked out as far as 50,000 yards in range; however, this has been only with excellent sonar conditions. Bearing accuracy is very poor. Own ship's noise at speeds above 8 knots render the conformal array useless. Operators cannot distinguish a contact in the mass of noise unless own ship is at a slow speed, a quiet condition, or hovering. The water plate has been replaced once and ship's force cleans the water plate routinely at least once a day; although improved, the BQR-7 does not live up to its expectations. (Dependable range on surface contacts is 15,000 yards). Noisy pre-amplifiers have been the cause of many additional hours of maintenance by ship's force.

5. Bottom Bounce Passive. Operating the BQS-6 passive in the D/E (Depression/Elevation Angle) mode of operation has been very advantageous and successful in determining a fairly accurate passive range by applying the formula "2 times depth of water (in yards) divided by the cosine of D/E angle equals the approximate horizontal range". The contour of the bottom has a lot to do with the accuracy of the passive range. Past experience has proven that for contacts within 20,000 yards, range accuracy has been within ± 20% of actual range.

6. PUFFS (AN/BQG-2). Since its installation, the BQG-2 has been inoperable. Attempts to check out the installation during Builder's Sea Trials were completely unsuccessful due to excessive noise pick-up in the hydrophones. An attempt was made to correct this situation by blanketing areas of the hull around the PUFFS hydrophones with RAL. This fix resulted in an even noisier installation. During P.S.A. an entirely new installation, AN/BQG-3, is being installed. Reports of recent operational tests made on a submarine with an installation similar to that which is being installed on THRESHER, sound very encouraging. It is anticipated that this new installation will pave the way to a new concept in passive anti-submarine warfare.

7. Classification Sonar (AN/BQQ-3). Primarily this equipment is designed to classify sonar contacts by detecting noise levels in the 10 to 5000 cycle band. To date, THRESHER has had very little opportunity to use this equipment for its primary purpose. Its main function so far has been to use it as a means of detecting and monitoring own ship's radiated noises. During the various sound trials the BQQ-3 was exclusively used to detect noisy machinery during various quiet conditions. Materially, this equipment performed very well with a minimum amount of maintenance.

By direction W. E. Gear

8. Graphic Indicator (AN BQA-3). Very little use of this equipment has been experienced in the past year. It has been used occasionally, with accuracy, to check own ship's speed through the water. It has been noted that with a short pulse duration (about 70 milleseconds or below) no return echo will be displayed on the CRT Indicator. It has been very accurate during a fire control problem in determining range and range rate; however, as noted in the summation of the BQS-6 active, this equipment is not frequently used tactically.

9. BQA-2 (SESCO). Due to the few SESCO equipped ships, there has been little opportunity to operate this equipment. Only once during the past year has any attempt been made to operate this equipment in the coded or voice modes of operation. Both THRESHER's and TARGET's SESCO appeared to be operating properly; however, successful long range underwater communication could not be established. Single side band for voice communications is now being installed in THRESHER.

10. Bathythermograph (AN/BQH-1). The BQH-1 has been very reliable. Having both a topside and a bottomside head has been advantageous. Depth indication is very accurate from 100 feet on down to test depth. Temperature indication is accurate from surface to test depth.

11. Sonar Intercept and Direction Finding Set (DUUG-1B). The DUUG-1B is capable of receiving sonar signals within the frequency range of 10 KC to 40 KC. In general this equipment is operationally excellent; however, THRESHER has not been involved in many operations where it could have been used tactically. During shock trials, all four of the hydrophones were disabled due to improper installation. During PSA, they will be installed properly.

12. Recorders. THRESHER has three time bearing recorders installed on board.

a. Unit 15A4, AN/BQS-6 installed in the Sonar Control Room.

b. Unit 4A2, AN/BQR-7 installed in the Sonar Control Room.

c. RO-136/BQR-7 installed in the attack center.

The RO-136 installed in the attack center is outstanding. It displays target bearing information from either the conformal (BQR-7) or spherical (BQS-6) passive arrays depending on the position of the selector switch. It is of value to the conning officer by providing him with a complete picture of all contacts within the operating area. In many cases the recorder picks up and indicates the contact before the operator hears it. It has also been used to distinguish contacts from own ship's indicated noise. It is a visual aid in determining close-in contacts by rapid bearing rate when in the fast speed position. Bearing resolution is poor when using this RO-136 in the spherical position. Two or more short range targets at the same approximate bearing indicate on the recorder paper as a single target.

13. Sound Recorder-Reproducer Set (AN/UNQ-7). Operation of the UNQ-7 has been outstanding. During shock trials, the UNQ-7 continuously recorded without a failure. Despite its reliable performance, the UNQ-7 itself is obsolete on this class of submarine. The frequency of the recorder doesn't have a flat response and does not cover the frequency bands of the installed equipments.

14. General Layout of Sonar Equipment. The layout of the Sonar Control Room is excellent. It could be improved in follow boats of the class by interchanging the location of the Graphic Indicator (AN/BQA-3) with the BQS-6 Passive Console. Traffic into the room is blocked by the operator of the AN/BQS-6 Passive Console which is manned continuously while underway. Frequent interruptions markedly reduces this operator's efficiency. The present location of the DUUG-1B and the Rycom Receiver are inadequate for the proper operation and use of these two equipments. Both units are being relocated during PSA to enable the sonar operator to see the indicator scope and operate the Rycom Receiver simultaneously. The layout of sonar equipment in the sonar equipment space is satisfactory. Access for maintenance of all units is also satisfactory.

15. Maintenance. The AN/BQQ-2 Integrated Sonar System is a very complicated and intricate system. It requires that all maintenance personnel have a firm understanding of basic electronics and computer theory. The average sonarman does not have this basic knowledge, even to operate this system, let alone maintain it. It is therefore essential that sonarmen reporting to a ship with this sonar system be ordered to the schools available at the Fleet Sonar School in Key West, Florida, prior to reporting aboard the ship for duty. (b)(1) Sonarmen reporting aboard without the background of these schools are handicapped and cannot be expected to operate and maintain the BQQ-2 equipment. To date, THRESHER has had trained men to maintain the equipment; however, occasional engineering services are required.

A rigid training program is a must on all submarines with BQQ-2 Integrated Sonar Systems installed in order to ensure that all sonar operators can be depended upon to use the various modes of operation which are necessary to provide the correct reports and information to the conning officer.

Ship Handling

1. Alongside. THRESHER's arrangement of cleats has proven unsatisfactory. Her deep draft, single screw design dictates the use of tugs in nearly every mooring. To properly and safely position these tugs our portable cleats must be increased in size and another retractable cleat added. Both of these items are receiving design attention during PSA.

Personnel transfers at sea are rendered difficult by the rounded hull and the propensity of the ship to roll in nearly any seaway. A sail plane transfer rig was fabricated but proved difficult to rig and "deck to deck" transfers were used almost exclusively without incident.

While she answers very well to her rudder when going ahead, a disconcerting characteristic of the ship is her inability to change the direction of an astern turn once the swing has commenced. This is an added inducement to the use of tugs.

2. Surfaced. THRESHER was not conceived as a surface craft, and she proves her dislike of it by exhibiting an ungainly and uncomfortable roll in anything but a flat calm. Her extremely low sail is wet and dangerous in anything above a State 3 sea. It has, on occasion, been necessary to operate THRESHER surfaced but with the bridge rigged for dive and no personnel topside.

3. Submerged. THRESHER's difficult handling at periscope depth has been the subject of considerable previous correspondence, and is mentioned here only in passing. With that exception she handles beautifully submerged. There is no suggestion of the extreme roll experienced by the 585 Class in high speed turns--only a gentle banking, first away, then into the turn.

Acceleration is again excellent, but, with no external reference, it is difficult to appreciate. Once at speed she is loath to slow down. We have often coasted for over a half hour and still had some plane and rudder control.

While on the subject of controls, this commanding officer feels that the automatic depth control system is an unreliable, expensive, needless waste of money, space and maintenance manpower. We would be better off without it.

Hovering is easier to accomplish than on any ship any of the officers had previously sailed.

All in all, THRESHER is a pleasure to handle, and if her periscope depth problems are solved, little more could be asked for.

Armament

1. Torpedo Tubes. No difficulties have been encountered due to the angling of the torpedo tubes. However, the faired, rotating shutters have shown considerable tendency toward binding at deep depths. Causes for this are presently being evaluated by Portsmouth Naval Shipyard. Tube interlock equipment showed excessive failures during shock trials, putting various tubes out of commission on each shot.

2. Weapons Handling and Stowage. The loading system is satisfactory, but has a built-in hazard in the method of transfer of control from crane to ship. A strong request has been entered for the Mare Island type loading system. Stowage is satisfactory. However, a slight increase (about 12 inches) in room length would allow double loading of MK 37-1 torpedoes--an increase of 19 weapons. The room handling equipment is excellent in concept, but failed miserably during shock trials. Failures were of such a scope as to totally disable the weapons handling system. Extensive design changes are underway at Portsmouth Naval Shipyard, with a view toward shock hardening this equipment.

3. Fire Control System MK 113. The FCS MK 113 has shown a gratifyingly low failure rate, and Librascope has worked very hard at fixes for those failures which have occurred due to design deficiencies. However, several severe errors in hardware and programming were made in the original installation, which greatly limited the effectiveness of the system. All these deficiencies are under study by BUWEPS and Librascope, and it is hoped they will all be corrected prior to the forthcoming technical evaluation. Several minor failures combined to put the Fire Control System out of commission for varying time periods after each shot in shock tests. All failures are under investigation by BUWEPS and Librascope.

Operations Installation

1. Communications

a. General. THRESHER has been designed and built as a sonar platform and is ill at ease on or near the surface. Her communications installation represents a new design which, in operation, has proven marginal. The most significant deficiency is that the ship is limited to six knots at periscope depth due to the design of the antennas and an unfaired periscope.

b. Antennas. THRESHER had the following antennas installed:

(1) Helical "CHU" Antenna (AN/BRA-14)

(2) Snorkel Whip (AT-497/U)

(3) Emergency Whip (AT-774/UR)

(4) UHF (AS-468/B)

(5) Type 8B Periscope Stub

(6) VLF Loop (AT-317B/BRR)

(7) Floating Wire (AT-1075/B1 Clamp on)

Helical "CHU"— Initially, the telescoping whip antenna was installed as a MH/HF transmitting antenna; however, this proved to be very unreliable and was replaced by the untested, newly designed, Helical "CHU" antenna. This antenna has been a very satisfactory antenna for THRESHER class submarines.

Snorkel Whip — has performed satisfactorily. It is an excellent receiving antenna, but lack of a tuner limits its use as an efficient transmitting antenna.

Type 8B Periscope Stub Antenna is a very useful antenna. Excellent Loran signals have been consistently received on this antenna. After initial installation, this antenna frequently flooded out due to the seal of the stub wearing along the periscope housing. Encapsulating the antenna prevented this casualty from recurring.

The VLF Loop initially was very poor for VLF reception; the "black iron pipe" shielding had not been installed. High signal to noise ratio required that the ship go to about fifty feet in order to copy. A preamplifier was installed which amplified the signal as it

entered the hull. With this installation, THRESHER was able to copy consistently at sixty-seven feet.

c. Transmitters. The TBL-13 was very reliable as a secondary transmitter, but was damaged during shock tests. It is going to be replaced by a TCS during P.S.A.

The performance of the WRT-2 transmitter was outstanding. It is an excellent, compact, high-powered transmitter.

d. Receivers. All receivers in THRESHER performed satisfactorily.

The BRR-3 VLF receiver has proven to be very satisfactory.

e. Miscellaneous. Maintenance of all equipment in the radio room is satisfactory; however, whenever maintenance must be performed, the radio room is effectively out of commission.

2. Electronics

a. Radar (AN/BPS-9) has performed exceptionally well. Ranges of 40,000 yards on surface contacts have been achieved. ST ranges of 15,000 yards are normal.

b. Radar Repeater (AN/SPA-4B) performed satisfactorily, but full value of this equipment was not achieved due to the installation arrangement. In order to properly man the repeater, the operator must stand in front of the controls, thus causing interference with the Navigator who is normally performing his duties at the chart desk. During P.S.A., the repeater will be rotated 90 degrees with the controls to starboard (operator then faces port and does not interfere with the Navigator). THRESHER normally uses this repeater for both navigation and tracking contacts.

c. ECM Installation - THRESHER has the following equipments:

(1) AN/BLR-1

(2) AN/WLR-3

(3) Periscope Intercept Receiver

THRESHER has the following ECM Antennas:

(1) AS-944/BLR

(2) AT-693/BLR

(3) AS-371B/S

(4) Periscope Stub

The BLR and WLR-3 have performed satisfactorily during the first year's operations with the minimum amount of maintenance. This installation has been able to pick up radar signals at ranges of 50 miles. No significant difficulties have been experienced with any of the ECM antennas.

3. Navigation

a. The following navigational aids are installed:

(1) Periscope sextant MK 3

(2) Loran (UPN-12)

(3) Fathometer (UQN-1D)

(4) SINS MK II Mod I

(5) Topside fathometer (BQN-4)

b. Loran has served as the primary navigational aid. Other than a tendency toward overheating due to installation location, no problems have occurred with this equipment.

c. The Ship's Inertial Navigation System has not provided the precision which had been originally hoped for. This is due in part to the original design concept for this equipment which presupposed the availability of precise positional reference for purposes of reset. Without Loran-C or other SINS equipment available for this comparison and reset, accuracy is necessarily degraded.

With more experience in setting biases, and taking into account that the exact degree of precision originally conceived for this equipment is not as applicable to attack class submarines as it is to fleet ballistic missile types, the present SINS is considered an excellent backup means for navigational purposes.

Engineering

1. General. Consistent with the performance of other S5W submarines, the propulsion system has been excellent. Of important consideration to operating personnel on THRESHER are the many new engineering concepts which are enveloped within her hull. A partial listing of the important ones are:

a. Sound isolation of most major equipments.

b. A major emphasis on sound specifications for installed equipments.

c. Installation of a new pressure-demand hydraulic system.

d. A continuance of emphasis on remotely operated equipment.

e. A condenser de-aeration system.

f. A condenser "vacuum breaker" system.

g. Sound quieting "treatments" of certain known problem areas, specifically:

(1) b(1)

(2) Main shaft resonance changer.

(3) b(1)

h. Usage of new, previously untried, air reducers with integral reliefs.

i. Use of a Lithium Bromide absorption type air conditioning system.

(1) Sound isolation. As indicated by results of various BUSHIPS conducted sound tests, the THRESHER has been eminently successful in her sound isolation program. b(1)

A direct consequence in the engine room of this program has been to "open up" the space and provide excellent access to most equipments for maintenance. Better access allows more care of equipment. Sound characteristics, thus, also improve.

(2) Sound specifications. The adoption of higher Bureau sound standards on purchased equipment has had its corollary in that equipment has, in general, operated well. Most corrective maintenance has been performed by Naval Shipyards during THRESHER's first year of operations. However, when required, the newer, closer tolerance equipment has been worked on in place by ship's force. No unusual problems in maintenance have been observed. In general, all of ship's force corrective maintenance demands later Shipyard or tender balancing facilities. This double expense might be limited should techniques and facilities for on-board balancing be accomplished.

(3) The hydraulic system has, in general, performed well considering that it is the first of a kind. It would appear that a regrouping in hydraulics is necessary to provide a more simple, rugged system. Separate correspondence by the ship recommending a single-mode, constant pressure system had been initiated. The relatively low incidence of failures in this system during shock trials was very gratifying.

(4) Remotely operated equipment. The program to provide remotely operated equipment has been continued on THRESHER. It is felt that in many areas this might be curtailed in favor of simple reachrods or manifolds. In other cases, a grouping of presently provided remote operators is necessary to allow a logical operation of system components. A corollary problem of remote operators is that of remote indicators. Normal operations, as well as shock trials, reveal a woeful lack of dependable, sturdy indicators for fluid levels, pressures, valve positions, etcetera.

b(3) 10 USC 130

In fact, this system has been utilized very seldom b(1) because of its negligible effect on condensate oxygen levels (which are satisfactory without b(3) 10 USC 130 Since use of b(3) 10 USC 130 cannot be justified solely on the basis of lowering condensate depression, as plant efficiency will obviously decrease, b(3) 10 USC 130 has only seldom been utilized.

b(3) 10 USC 130

7. Various sound treatments

a. b(1)

This has apparently eliminated the problem.

b. Main shaft resonance changer. As a result of earlier tests on SSBN's, a need for a main shaft resonance changer was apparent. A very cumbersome and space consuming model was installed on THRESHER. Combined with a 7-bladed propeller, the resonance changer was considered to be an ultimate installation for eliminating sound emanations originating from the main shaft. In fact, the 7-bladed propeller alone appears to successfully reduce shaft produced noises and it has been recommended by the ship that the resonance changer installation be removed.

DCSL: Any decision should be based on more data of final test

b(1)

8. Air reducers. High pressure air reducers were an original source of recurrent trouble. By February, 1962, a satisfactory reducer was developed which performed well until shock trials in June. A poorly designed pressure poppet spring combined with an integral vent poppet seat combined to again place the reducers in the role of Nemesis. An improved spring should solve the observed shock deficiency and a removable poppet seal may be required.

9. Lithium Bromide. The large capacity, silently operating lithium bromide air-conditioning system has proven to be quite dependable. The metrix salt water mixing valve was unequal to its task, and caused several troublesome "freeze-ups" of the system. Replacement with a newly designed valve should eliminate most of the problems observed with this unit.

Enclosure (7)

SSN593/DLA:cmd
3000

MISCELLANEOUS COMMENTS

1. Personnel. Personnel allowance is similar to other attack nuclear submarines with 9 officers, 85 enlisted and a "training allowance" of 10 enlisted. The "training allowance" for all intents and purposes is part of the normal complement and 95 enlisted appears about right for operations. In actual practice, the normal complement during the first year's operations has been closer to 10 officers and 105 enlisted, making for cramped and overcrowded conditions.

2. Arrangement. Arrangements aft of frame 52 (Engineering Spaces) are excellent; however, it is considered that improvement is necessary forward of frame 52, particularly with respect to habitability. CNO's initial requirement in the design phase of THRESHER class submarines was for an allowance of 72 men. On this basis, berthing was provided for 76 men. It soon became apparent that this was woefully inadequate and through the joint efforts of Portsmouth Naval Shipyard and the pre-commissioning detail of THRESHER, the number of bunks available was raised to 101. Included in this total are 10 portable air-mattresses, and 9 semi-portable bunks, all located in the torpedo room. This berthing deficiency is accompanied by inadequate personal stowage facilities. Officers' country is also deficient in this regard.

With the exception of a poor arrangement of Fire Control facilities, the Control Room arrangement is excellent and affords the Conning Officer immediate visual access to all the key control room personnel and equipment.

The arrangement of the galley is excellent and well thought out but the crews' mess is barely satisfactory with respect to size and a traffic problem exists when meals are being served.

Another item worthy of note is the "Cocoon" installation in the forward compartment and part of the midships compartment. The installation has the inherent disadvantage of poor accessibility to various components and equipments. The remainder of the forward spaces are considered to be satisfactorily arranged.

As mentioned above, the arrangement of the engineering spaces is considered superior. There is easy access to almost every piece of equipment and in addition, the working and watch station spaces are roomy and conducive to alert watchstanding.

3. Supply and Commissary.

a. Stores. Locker and drawer stowage for repair parts is barely adequate. Stowage for consumable stores is also very tight, particularly since much of the GSK has had to be used for repair parts stowage. The problem of lack of working space for the Storekeeper is now being solved

by providing office space in the GSK.

b. Commissary. The galley installation has been quite satisfactory with the exception of some minor items now being corrected during PSA.

c. Commissary Stores. Food storage space is excellent. Frozen stores are adequate for 95 men for 161 days. The chill box is as expected, small but has proven quite adequate. Dry stowage space is sufficient for 88 days' supplies for 95 men. Additional capacity can be gained by stowing bulk items elsewhere in the ship.

(b) (6)

JOB ORDER

IND-PNS-1714 (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
(b) (6)	377C	(b) (6)	2BD	SS(N) 593	15-930-50612

DATE SCHEDULED	PHONE	DATE PREPARED	PHONE
7-27-62	1362	7-27-62	206

AUTHORITY: N-60

P & E SUPVR. (UNIT CODE DATE): 9C46 2B 7/27

TYPE DESK (UNIT CODE DATE): JMB 213 ~~7/27/62~~ 7-28-62

JOB TITLE: INSPECTION & TEST OF SEA WATER SYSTEMS

R

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR.	ESTIMATED MAN HOURS ALLOW	ESTIMATED MAN HOURS TYPE	SCHEDULE DATES START	SCHEDULE DATES COMPLETE	WORK DESCRIPTION	REF.
							(A) DIAGRAM - MAIN SEA WATER 1862579-J	
							(B) ASW SYS. (AFT) 1862582-G	
							(C) ASW SYS (FWD) 1862745-D	
3	24						(D) F.O. & COMP. WATER 1862803-H	
5	40						(E) DIESEL GEN. S.W. COOL. 1862588-F	
5	40						(F) TRIM & DRAIN SYS. 1862774-J	
2	16						(G) AIR COND. S.W. COOL. 1862711-J	
	120	M1					(H) 8000 G.P.D. 1862889-N	
	16						(J) PLUMBING SYS. 1862757-H	
	8						(K) L.O. FILL & TRANS. 1862626-J	
	8						(L) PRESSURE SCHEDULE 1862994-F	
	8							
	8							
	8							
1	76							
	8							
	4							
	0							

NOTE: THIS JOB WILL BE ISSUED IN THREE PARTS.

PART I - INITIAL TESTS OF SYSTEMS.

PART II - REPAIR AND/OR REPLACEMENT OF REJECTED JOINTS.

PART III - FINAL TESTS

GENERAL INSTRUCTIONS

PART I - HYDROSTATICALLY TEST SEA WATER SYSTEMS REF (A) TO (K) PER INSTRUCTIONS ON SH. 4 THRU SH 6 OF THIS J.O.

ALLOWABLE LEAKAGE RATE FOR FINAL TESTS WILL BE 15 LBS. PER HOUR MAX. DROP, WITH THE EXCEPTION OF MAIN SEA WATER, WHICH SHALL HAVE A VISUAL

40

DISTR.	PRODUCTION DEPT.			STRUCT.		OUTFG	ELEC.	MECHANICAL			SERVICE		NUCL. PWR.		PLANNING SUPPLY & COMPTROLLER DEP									
	303C	303D	340	11	17	38	51	06	31	37	64	71	2302	63	2344B	227	228	229	231	232	233	213	CA	
	340A	376	377	23	26	56	67	81	94		72	99	2306	66	245A	239	507	609	565	650		251		210

WORK COMPLETED	DATE	LABOR (DOLLARS)	OVERHEAD (DOLLARS)	MATERIAL (DOLLARS)	TOTAL (DOLLARS)
				150.	

Exhibit (112) -1

(b) (6)

N-GO

INSPECTION & TEST OF SEA WATER SYSTEMS

INSPECTION WHILE UNDER TEST PRESSURE.

SYSTEMS THAT MEET TEST REQUIREMENTS AND HAVE NO VISUALLY OR ULTRASONICALLY REJECTED JOINTS ON INITIAL TEST WILL BE CONSIDERED COMPLETE.

SHIPS FORCE WILL ASSIST X-SG IN LINING SYSTEMS UP FOR TESTS AND WILL SIGN OFF COMPLETED TESTS.

NOTIFY CODE 303-3 WHEN SYSTEMS ARE UNDER PRESSURE SO THAT THEY MAY COMPLETE THEIR PHASE OF THE JOB. ALSO DURING THE ACTUAL CONDUCT OF THESE TESTS, U.P. DIV. MUST BE KEPT INFORMED WHEN ANY SYS ARE PRESSURIZED THAT PASS THROUGH THE REACTOR COMPARTMENT.

02 569 60 A 7-23-62 8-2-62 REMOVE LAGGING FROM ALL SILVER BRAZED JOINTS BETWEEN AND INCLUDING HULL VALVE AND BACK UP VALVE OF THE SYS LISTED UNDER REF (A) TO PER (N) FOR CLARIFICATION AS TO LOCATION AND WHICH JOINTS WILL BE AFFECTED, PIPEFITTERS ARE TO ASSIST THE INSULATORS.

Exhibit (112) -2

JOB ORDER CONT
IND-PNS- 1714A (REV. 4-62)

CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
	(b) (6)	2BD	SS(N) 593	15-930-50612
	DATE PREPARED: 7-27-62	PHONE: 206		

N-60

P & E SURVR (UNIT) CODE DATE | TYPE DESK (UNIT) CODE DATE

INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION			SCHEDULE DATES			REF
			START	COMPLETE		
03 3200	320	A	7-30-62	8-31-62	DURING INITIAL HYDROSTATIC TESTS OF SEA WATER SYS REF. (A) TO (K) VISUALLY INSPECT ALL SILVER BRAZED JOINTS BETWEEN AND INCLUDING HULL VALVE AND BACK UP VALVE AND ALL OTHERS IN THE SYS. THAT ARE NOT LAGGED AND ARE ACCESSIBLE WITHOUT THE REMOVAL OF ANY INTERFERENCES IN ACCORDANCE WITH NAVSHIPS 250-648-8, SECTION 36. HAVE ANY JOINTS THAT FAIL ON VISUAL INSPECTION ULTRASONICALLY INSPECTED BY SHOP 54. REPORT ANY JOINTS THAT FAIL BOTH INSPECTIONS TO P&E CODE 232BD AND SHIPS FORCE VIA CONDITION REPORT.	
5400	120	A	—	—	PROVIDE SERVICES OF ULTRASONIC INSPECTION TEAM AS REQUESTED BY CODE 303-B	

NOTE: ADDITIONAL INSTRUCTIONS FOR TESTING ASW-SYS (ACT), TRIM & DRAIN SYS, FD & COMB. WATER AND SANITARY TK. PIPING WILL BE ISSUED AS SOON AS POSSIBLE

Exhibit (112) -3
SHEET 3 OF 6

JOB ORDER

(b) (6) | 2BD | SS(N) 593 | 15-930-50612

7-27-62 20 G

N-60

INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION | SCHEDULE DATE | COMPLETE

04 56C7 160 A 7-30-62 8-6-62 MAIN SEA WATER SYSTEM

REFERENCES:
1. BUSHIPS DWG. SS(N) 593-209-1862579-J MAIN S.W. SYS. DIAGRAM
2. BUSHIPS DWG. SS(N) 593-845-1862944-F PRESSURE SCHEDULE

PREPARATION:
1. b(3) 10 USC 130

VISUAL ONLY WELDED JOINTS

2. HYDROSTATICALLY TEST TO ITEM 1 ON REF. 2. HOLD PRESSURE LONG ENOUGH TO VISUALLY INSPECT ENTIRE SYSTEM. IF PRESSURE CANNOT BE MAINTAINED b(3) 10 USC 130

05 56C7 32 A 7-30-62 8-1-62 L.O. FILLING, PURIF. & TRANS. SYS.

REFERENCES:
1. BUSHIPS DWG. SS(N) 593-211-1862626-J L.O. FILLING, PURIF & TRANS SYS DIAGRAM
2. BUSHIPS DWG. SS(N) 593-845-1862944-F PRESSURE SCHEDULE

PREPARATION:
1. SHUT: LO-1 AND LO-2
2. PRESSURIZE THRU LO-3 TO ITEM 4 ON REF. 2

VISUAL ONLY HULL VALVE REMOVED

JOB ORDER CONT

IND-PNS- 1714A (REV. 4-62)

CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
	(b) (6)	2BD	SS(N) 593	15-930-50612
	DATE PREPARED: 7-27-62 PHONE: 2066			
N-60		P & E SUPVR. (UNIT CODE DATE)		TYPE DESK (UNIT CODE DATE)

INSPECTION & TEST OF SEA WATER SYSTEMS

WORK DESCRIPTION	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE	REF
06 5607	144	A	7-30-62	8-3-62	

A.S.W. SYSTEM - FORWARD

REFERENCES:

1. BUSHIPS DWG. SS(N)593-527-1862745-D
   ASW SYS. PIPING DIAGRAM - FWD.
2. BUSHIPS DWG. SS(N)593-845-1862944-F
   PRESSURE SCHEDULE.

PREPARATION:

1 b(3) 10 USC 130

2

3. TEST TO ITEM 1 OF REF. 2
4. PRESSURIZE THRU b(3) 10 USC 130

30 ? to 60 LBS

07 5607	120	A	7-30-62	8-3-62	

DIESEL GEN. S.W. COOLING

REFERENCES:

1. BUSHIPS DWG. SS(N)593-209-1862588-F
   DIESEL GEN. S.W. COOLING-DIAGRAM
2. BUSHIPS DWG. SS(N)593-845-1862944-F
   PRESSURE SCHEDULE

PREPARATION:

1. b(3) SHUT: DSW-1, 5, 27, 26, 12, 13, 17, 20, 21, 22, 23, 24, 25, 28, 29 AND F.O.-15
2. PRESSURIZE THRU DSW-19 TO ITEM 4 ON REF. 2

VISUAL INSPECTION ONLY PARTIAL DISASSEMBLY NOT required

INACCESSIBLE FOR INSP. AT TIME OF AUTHORITY INSPECTION

Exhibit (112) -5

(b) (6)	CODE 280	SHIP ACTIVITY SS(N) 593	15-930-50612
7-27-62	206		

N-60

INSPECTION & TEST OF SEA WATER SYSTEMS

08 5607 48 A 7-30-62 8-2-62 H.P. BRINE (OVERBHD. DISCHG.)

REFERENCES:

1. BUSHIPS DWG. SS(N) 593-517-1862889-N 800 G.P.D. DISTILLING SYS. - DIAGRAM
2. BUSHIPS DWG. SS(N) 593-845-1862944-F PRESSURE SCHEDULE

303 COVER TO VISUAL & ULTRASONICALLY

PREPARATION:

1. SHUT: SD-85, 44, 139, 81 AND DISCONNECT PUMP DISCHARGE. (b)(1)
2. INSTALL BLANK WITH PIPE TAP AT PUMP DISCHARGE AND PRESSURIZE TO ITEM 4 ON REF. 2

09 5607 160 A 7-30-62 8-7-62 AIR CONDITIONING SYS. - S.W.

REFERENCES:

1. BUSHIPS DWG. SS(N) 593-502-1862711-J AIR COND. SYS - SEA WATER COOLING
2. BUSHIPS DWG. SS(N) 593-845-1862944-F PRESSURE SCHEDULE
3. BUSHIPS DWG. SS(N) 593-204-1862582-G AUX S.W. SYS - AFT - DIAGRAM

LAGGING NOT REMOVED

PREPARATION:

1. b(3) 10 USC 130
2.
3.
4. HYDROSTATICALLY TEST TO ITEM 1 OF REF 2

JOB ORDER CONT

JOB ORDER

IND-PNS-1714 (REV. 4-62)

SCHEDULER	CODE	PLANNER	CODE	SHIP ACTIVITY	JOB ORDER NUMBER
(b) (6)	3770	(b) (6)	28D	SS(N) 593	15-930-90393
SHIP SCHEDULED / PHONE		DATE PREPARED / PHONE			
9-25-62	1363	9-21-62	206		MIP
AUTHORITY		P & E SUPVR (UNIT CODE DATE)		TYPE DESK (UNIT CODE DATE)	
W/L ITEM N-116		C/A 2B 9-21		2B3 9-24-62	9-25-62

JOB TITLE

VISUAL & ULTRASONIC INSPECTION OF SEA WATER SYS.

KEY OP	KEY SHOP WORK CTR.	ASST SHOP WORK CTR	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE	WORK DESCRIPTION	REF.
							(A) MAIN SEA WATER - 1862579-J	
							(B) ASW SYS. (AFT) - 1862582-G	
							(C) ASW SYS. (FWD) - 862745-D	
							(D) F.O.S. COMP. WATER - 1862803-H	
							(E) DIESEL GEN. S.W. COOL - 1862588-F	
							(F) TRIM & DRAIN SYS. - 1862774-J	
							(G) A.C. SYS COOL - 1862711-J	
							(H) 8000 G.P.D. - S.W. - 1862889-N	
							(J) PLUMBING SYS. - 1862757-H	
							(K) F.O. FILL & TRANS. - 1862626-J	
							(L) PRESSURE SCHEDULE - 1862944-F	
							(M) NAVSHIPS 250-648-8	
01	3200	4280	A	10-1-62	11-1-62		VISUALLY INSPECT, PER SECTION 3b OF REF (M), AND ULTRASONICALLY INSPECT ALL SILVER BRAZED JOINTS TWO INCHES AND ABOVE ON ALL PIPING SYS. REF (A) TO (K) THAT ARE SUBJECTED TO SEA PRESSURE. A MAN WILL BE ASSIGNED TO THE INSPECTION CREW TO SERIALIZE JOINTS FOR IDENTIFICATION AND RECORDING PURPOSES. CHECK FIRST THOSE JOINTS IN THE SYS THAT ARE NOT LAGGED. IF, AT A LATER DATE, TIME ALLOWS,	

PRODUCTION DEPT.			STRUCT.		OUTFG	ELEC.	MECHANICAL			SERVICE		NUCL. PWR.		PLANNING SUPPLY & CONTROLLER DEP							
303C	303D	340	11	17	38	51	08	31	37	64	71	2302	63	2344	227	228	229	231	232	233	240
340A	376	377	23	26	56	67	81	94		72	99	2306	66	2454	239	507	609	565	680		243

WORK COMPLETED	DATE	LABOR (DOLLARS)	OVERHEAD (DOLLARS)	MATERIAL (DOLLARS)	TOTAL (DOLLARS)
				100.	

Exhibit (113) - 1

SHEET 1 OF 2

JOB ORDER

JOB ORDER CONT

(IND-PAC-1744 (REV. 4-62))

SCHEDULED TO	SHOP	PLANNER	CODE	SHIP	ACTIVITY	JOB ORDER NUMBER
		(b) (6)	660	SS(N) 593		13-930-9039
DATE SCHEDULED	PHASE	DATE PREPARED	PHASE			
		9-21-62	206			

AUTHORITY	PREVIOUS (UNIT CODE DATE)	THIS ORDER (UNIT CODE DATE)
3 M's W/L ITEM N-116		

JOB TITLE

VISUAL & ULTRASONIC INSPECTION OF SEA WATER SYS

WORK DESCRIPTION

NEXT OP	REF SHOP WORK STN	ASST SHOP WORK STR	ESTIMATED MAN HOURS ALLOW	TYPE	SCHEDULE DATES START	COMPLETE	REF
						THAN LAGGING WILL BE	
						REMOVED. KEEP PE AND	
						DESIGN INFORMED ON THE	
						RESULTS OF THIS INSPECTION	
						PERIODICALLY, ESPECIALLY	
						REJECTED JOINTS, SO THAT	
						REPLACEMENT ACTION MAY	
						BE TAKEN.	
		566640	A			SERVICES OF MAN	
						TO SERIALIZE PIPING JOINTS	
117						ON PIPING ARRGT PLANS TO	
114						BE USED FOR RECORDING	
30						PURPOSES BY INSPECTORS	
						FOR THE ACCOMPLISHMENT	
						OF INSPECTION OUTLINED	
						ABOVE.	

Illegible copy provided

BJG

213
SS(N)593/9020
(C-7672)
Ser 0226-62

OCT 25 1962

From: Commander, Portsmouth Naval Shipyard
To: Chief, Bureau of Ships

Subj: USS THRESHER (SS(N)593) Silbraze joint ultrasonic inspection during PSA

Ref: (a) BUSHIPS conf ltr C-SS(N)593C1/9020 Ser 525-0232 of 28 Aug 1962
(b) NAVSHIPS 329-0029

1. Reference (a) directed this Shipyard to employ at least one ultrasonic test team throughout the entire assigned PSA of USS THRESHER (SS(N)593), to examine the maximum number of silbrazed joints, following a prescribed order of priority. Due to a limited number of qualified inspection personnel and equipments, only one such team can be employed at this time.

2. As directed by reference (a), first priority of this inspection shall be given to sea water systems between hull valve and backup valve. It may not be possible, however, to inspect those systems given second and third priorities, namely high pressure hydraulic piping and compressed gas systems, for the following reasons:

a. There are no fittings in these systems of 2 inch diameter and larger which are silbrazed, and

b. This Shipyard does not have presently a technique for inspection of silbraze joints below 2 inch diameter.

The Shipyard received on 19 September 1962 a Sonoray, Model 50, [redacted] made by Branson Instruments, Inc., which has somewhat greater resolution than the Model 5 currently in use, and is superior for the inspection of thin-walled fittings, as described in reference (b). It is hoped that by retraining our qualified inspectors with this new equipment, the Shipyard can develop the capability of U/T inspection down to 1-1/2 inch diameter within the next few weeks.

BJG

213
SS(N)593/9020
(C-7672)
Ser 0226-62

3. Based on the foregoing, the Shipyard will proceed with the inspections of fourth priority, salt water systems inboard of back-up valves, immediately upon completion of those joints of first priority until such time as the capability of U/T inspection below 2 inch may be developed. At that time inspection of high pressure hydraulic piping and compressed gas systems to the limit of capability will commence.

b(6)
W.D. ROSEBOROUGH, JR.
By direction

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DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO

C-SS(N)593C1/9020
Ser 525-0232
28 August 1962

From: Chief, Bureau of Ships
To: Commander, Portsmouth Naval Shipyard

Subj: USS THRESHER Silver-Brazed piping (U)

Ref: (a) NAVSHIPYD PTSMH conf ltr ser 0114-62 of 9 May 62
(b) BUSHIPS ltr ser 648X-160 of 13 Feb 62
(c) BUSHIPS ltr ser 525-1325 of 29 May 62
(d) DATMOBAS Report C-1399 of March 62 (SKIPJACK)
(e) DATMOBAS Report C-1445 of July 62 (THRESHER)

Encl: (1) U/T results THRESHER Hydraulic Piping (pre-chock test aval)

1. Reference (a) suggests that measures taken in THRESHER (SS(N)593 to insure the integrity of sil-brazed piping are adequate and that no additional measures should be required. In particular the suggestion is that the intent of reference (b) has been met and that no more testing should be required during THRESHER's PSA. Reference (c) was written prior to THRESHER's shock tests and requires the shipyard to visually inspect salt water piping for visible defects and to certify materials within the salt water piping system in accordance with NAVSHIPS 250-648-8.

2. It is significant that failures in sil-braze joints occurred during previous shock test series of other submarines and, that as the shock loading was increased, the number of sil-braze piping failures increased. These failures were for the most part due to substandard bond, insufficient pipe support, or use of threaded fittings. To illustrate this point the following data has been extracted from references (d) and (e):

SHOCK FACTOR	SHIP	NO of PIPE FAILURES
b(1) 0.20	b(1) SKIPJACK	7
0.28	SKIPJACK	11
0.20	THRESHER	6
0.28	THRESHER	8
0.33	THRESHER	14

Exhibit (115) -1

3. In the documented sil-braze failures in THRESHER, the majority occurred in pipe joints less than 1" i.p.s. which were of the insert type but no solder insert ring had been used. The result was no bond achieved in the joint but very slight bond appeared in the vicinity of the face fed fillet.

4. Another factor (briefly alluded to in paragraph 2 above) which has contributed to sil-braze joint failures is inadequate support of piping and valves. Long unsupported runs of piping place undue stress upon the pipe and the piping joints when subjected to shock. An example is the failure of the drain line to #2 Puffs hydrophone well in which a 3/4" i.p.s. sil-braze joint supported the valves and piping associated with a vertical run of pipe about 10 feet long.

5. In an effort to demonstrate the validity of ultrasonic testing of sil-brazed joints the Electric Boat Division was directed to conduct an inspection of certain joints in THRESHER prior to the shock test series. The results of this inspection are contained in enclosure (1). Preliminary review by the Bureau of the joints which failed during shock test indicates that none of the failures occurred in joints which had been certified as satisfactory in the pre-test ultrasonic inspection. It is requested that Portsmouth Naval Shipyard make a detailed review of enclosure (1) for the purpose of verification. If the detailed review confirms this finding the Bureau considers that the ultrasonic techniques employed by Electric Boat Division provide a mechanism for quality control during fabrication of sil-brazed joints in new construction work and for purging operational ships of defective joints.

6. The significance of gross failures of sil-brazed joints in vital submarine systems is such that the Bureau considers it a matter of urgency that an inspection program be developed for these systems that will ultimately permit the certification of all piping joints in submarines as meeting minimum Bureau acceptance standards for the type of joint involved. It is recognized that the number of joints involved is large; that, in completed ships, many are inaccessible; and that any program developed to certify all joints could be unacceptably costly both in dollars and time required. The importance of this matter to the submarine forces is such, however, that we must commence at the earliest possible date to attack the problem in a planned, step-by-step approach which will ultimately lead to the certification of all vital piping system joints. To this end Portsmouth Naval Shipyard is directed to initiate the following actions during THRESHER's PSA.

a. Employ a minimum of at least one ultrasonic test team throughout the entire assigned PSA to examine, insofar as possible, the maximum number of sil-braze joints.

b. The inspection team(s) should examine accessible sil-brazed joints in the following order of priority:

Ref CSL ltr Ser DEP402/N 6544 of 9/7/62

(1) Sea water systems (non-nuclear) between hull valve and back-up valve (visually examine to ascertain all "short bosses" and threaded fittings have been eliminated). See casualty 6-29 reference (e).

(2) Hydraulic high pressure piping:
(a) Vital hydraulic system.
(b) Main hydraulic system.
(c) External hydraulic system.

2" TS s&p socket weld

(3) Compressed gas systems (if installed in accordance with Mil. Std. 438B. If not the fittings shall be removed and replaced with authorized fittings.)

(4) Salt water systems inboard of back-up valves.

c. A complete check off record shall be maintained of each joint inspected. This record shall be retained by the shipyard for future planning action and a copy of the record of inspection shall be furnished to THRESHER for retention as a part of the ship's Machinery History.

d. All joints which do not indicate by U/T an average of 40% bond with a minimum of 25% bond on either land shall be considered defective. Defective joints shall be repaired or replaced on a "not-to-delay" ship basis. Defective joints which cannot be corrected within the assigned availability shall be delineated as part of the inspection record in order that replacement may be made during THRESHER's next availability. Joints in vital systems exhibiting gross defects which cannot be repaired without extending THRESHER's PSA completion date shall be referred to the Bureau for a decision as to whether or not the repair will be deferred.

e. The inspection team shall visually inspect each joint prior to ultrasonically testing it to establish acceptability in accordance with the visual criteria contained in NAVSHIPS 250-648-8.

f. All applicable piping shall be inspected to insure that adequate support is provided and that the type of joints used are proper for the service and size of the piping (see Mil. Std. 438B). All discrepancies shall be rectified or duly noted on the inspection report if insufficient time prohibits action during this availability.

g. The joints previously U/T inspected by the Electric Boat Division during the pre-shock test availability shall not be reinspected.

7. The intent of the Bureau is that the inspection directed by this letter shall serve as a pilot test of sil-brazed piping inspections in operating ships which were constructed without benefit of present day quality controls. A similar pilot test is contemplated for sil-brazed piping which will be conducted by another shipbuilding activity. The results of these trial in-

spections will serve as the basis for a Bureau instruction which will have as its purpose a "step-by-step" program of certifying vital submarine piping systems as meeting minimum Bureau acceptance standards in ships constructed prior to the current quality control program. To this end Portsmouth Naval Shipyard is requested to forward comments, suggestions, and recommendations based upon their experience as a result of this pilot test.

8. Charges for the actions required by this letter shall be lodged against Project Order 20995 741 SCN SH 2457 Cost Cat. 2A.

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NAVREPFAC SDIEGO
NAVSTA KWEST

(b) (6)

R. L. Moore, Jr.
Deputy Chief of Bureau

MJG

3038-2
SS(N)593/9480
29 Nov 1962

MEMORANDUM

From: 3038-2
To: 213X

Subj: USS THRESHER (SS(N)593); Sea Water Silver Braze Joints, inspection of

Ref: (a) J. O. 15-930-90393
(b) NAVSHIPS ltr SS(N)593 C1/9320 Ser 525-0232 of 28 Aug 1962

1. A visual and ultrasonic inspection has been conducted on the various Salt Water systems, 2" and over as per references (a) and (b).

2. As a result of this inspection, 166 unlagged joints were visually and ultrasonically inspected. Of these 166 joints, 20 were rejected by ultrasonic examination for failing to meet the minimum bond requirements of 40%.

The list below is a complete summary by Plan of the Unlagged and accessible joints inspected visually and ultrasonically:

Plan	System	Satisfactory	Rejected
1862606	A.S.W. Fwd	12 joints	1 joint
1862775	T & D	14 "	3 joints
1862776	T & D	17 "	4 "
1862780	T & D	21 "	2 "
1862782	T & D	39 "	4 "
1862892	8000 G.P.D.	43 "	6 "
	Total - -	146 Joints	20 Joints

3. 8 unlagged silver-brazed joints on Plan 1862606 (A.S.W. Sys. Fwd) and 25 unlagged silver-brazed joints on Plan 1862892, (8000 G.P.D. Sys), were visually inspected and found satisfactory according to NAVSHIPS 250-648-8. An attempt to ultrasonically inspect these joints was unsuccessful due to inaccessibility of joints.

4. Code 3038-2 has a record of these joints and the Joint Certification Cards (1HB-PMS-2036) have been filed. These joints are also serialized on the System Piping Plans. Design Division, Code 2328 has a copy of all sil-brazed joints listed on the Feeder forms which were used on this survey.

5. Code 3038-2 would like a decision at this time in regard to the lagged portions of these systems as per reference (a).

R. L. FITZ
By direction

Copy to:

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Exhibit (116)-2

ER

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, N. H.

IN REPLY REFER TO
213X
SS(N)593/9480
4 Dec 1962

MEMORANDUM

From: 213X
To: 303b-2

Subj: USS THRESHER (SS(N)593), Sea water silver braze joints; inspection of

Ref: (a) Code 303b-2 Memo SS(N)593/9480 of 29 Nov 1962
(b) J.O. 15-930-90393

1. In reply to reference (a), the current status of shipboard tests will not permit inspection of the lagged portion of the subject systems as indicated in reference (b). (b) (6)

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Exhibit (117)

PORTSMOUTH NAVAL SHIPYARD
MEB PORTSMOUTH, NEW HAMPSHIRE 303B-2
SS(N)593/9480
17 Apr 1963

MEMORANDUM

From: 303B-2
To: 303

Subj: USS THRESHER (SS(N)593); Sea Water Systems Sil-Brazed Joints, Inspection of

Ref: (a) J. O. 15-930-90393
(b) BUSHIPS Ltr SS(N)593 C1/593 Ser 525-0232 of 28 Aug 1962
(c) COMSUBLANT Ltr 9480/SS(N)593 Ser; Dep 402/N6544 of 7 Sep 1962
(d) Code 303B-2 Memo 303B-2-SS(N)593/9480 of 29 Nov 1962
(e) Code 213X/SS(N)593/9480 of 4 Dec 1962

1. A visual and ultrasonic inspection was accomplished on the subject systems in accordance with reference (a), (b) and (c). The results of this survey were submitted to Code 213 on 29 November 1962, reference (d).

2. Code 213X answer to reference (d), reference (e), stated no further inspection was to be accomplished.

3. A detailed summary of the inspection accomplished shown in table below.

Plan	System	Joints Accepted U.T. Insp	** Visual Insp	Joints Rejected By U.T.	New Joints Installed
1862606	ASW Fwd	12	8	1	22
1862775	T & D	14	0	3	*6
1862776	T & D	17	0	4	11
1862780	T & D	21	0	2	5
1862782	T & D	28	11	4	10
1862892	8000 GPD Still	33	26	6	13
	Totals	125	45	20	67

* Five (5) of these replaced joints were changed to electric welded joints.

** Joints listed as visually inspected were found satisfactory according to NAVSHIPS 250-648-8. An attempt to ultrasonically inspect these joints was unsuccessful due to inaccessibility of the joints.

4. Plan 1862776 shows one sil-braze flange, FL-2 on tank side of hull valve TD.21, and five sil-braze fittings between hull valve TD 21 and Back-up valves TD 19 and TD 20.

5. Plan 1862782 shows welded fittings in drain pump suction line, P-54. A visual inspection of P-54 from strainer, FTD-1 to the suction side of drain pump revealed these fittings to be sil-brazed.

6. An air sealing test on MBT 3A, prior to undocking revealed 4 sil-brazed joints in fuel filling line P-39, Plan 1862805 and 2 sil-brazed joints on L.O. filling line P-1, Plan 1862638, were leaking. These six joints were replaced, then ultrasonically tested and hydrostatically tested.

(b) (6)

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CONDITION REPORT (SPECS.) F No.
~~IND-PNS-1018~~ *(New 2-56)*

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2635T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593)	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/3/62
CHECKED BY QTMN. (b) (6)	DATE 10/3/62	APPROVED BY	DATE

REFERENCES

(a) 1862776 #3 (b) BUSHIPS ltr C-SS(N)593C1/9020 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the Sil-Brz joints for the Trim and Drain piping, to Nos. 1 and 2 auxiliary tanks, in accordance with reference (b).

(1) Four inch elbow (F-7-2) on line P36-1 on reference (a) did not meet the minimum bond requirements according to reference (b).

(2) Three inch elbow (F-9-2) on line P33-2 reference (a) did not meet the minimum bond requirements, according to reference (b)

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Exhibit (127) - 1

Ex 127

COPIES TO:
[X] ~~CODE 280 (3)~~ [X] ~~CODE 330~~ [X] C.O. VESSEL [X] SHOP PLUS

Navy-DPPO IND, Portsmouth, N.H.

Exhibits jump from 118 to 127. Exhibits 119-126 are blueprints.

CONDITION REPORT (SPECS.) F' .
IND-PNS-1018 *(New 2-56)*

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2638T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593)	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/8/62
CHECKED BY QTMN. (b) (6)	DATE 10/8/62	APPROVED BY (b) (6)	DATE

REFERENCES

(a) 1862776 #3 (b) BUSHIPS ltr C-SS(N)593 C1/9320 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the Sil Brz joints for the trim and drain piping, to Nos. 1 and 2 auxiliary tanks, in accordance with reference (b).

(1) Three inch tee (F-19-1) on Line P33-1 on reference (a) at Fr. 47 Port did not meet the minimum bond requirements, according to reference (b).

(2) Three inch elbow (F-9-1) on Line P38-1 on reference (a) at Fr. 47 Port did not meet the minimum bond requirements, according to reference (b).

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Exhibit (127) - 2

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Navy-DPPO IND, Portsmouth, N.H.

CONDITION REPORT (SPECS.) F
IND-PNS-1018 (New 2-56)

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2640T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593)	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM (See References)	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/12/62
CHECKED BY QTMN. (b) (6)	DATE 10/12/62	APPROVED BY (b) (6)	DATE

REFERENCES

(a) 1862780 (b) BUSHIPS ltr C-SS(N)593C1/9320 Ser 525-0232 of 28 Aug 62

An ultrasonic examination was conducted on the sil-brz joints for the trim pump discharge in accordance with reference (b)

1. Three inch flange (FL2-7) on Line P8-2 on reference (a) at Fr 68 Stbd, did not meet the minimum bond requirements according to reference (b).

2. Three inch coupling (F-4-1) on Line P1-3 on reference (a) at Fr 71 Port, did not meet the minimum bond requirements according to reference (b).

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Exhibit (127) - 3

COPIES TO:
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CONDITION REPORT (SPECS.) F
IND-PNS-1018 (New 2-56)

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2641T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593)	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM (See References)	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/16/62
CHECKED BY QTMN. (b) (6)	DATE 10/16/62	APPROVED BY (b) (6)	DATE

REFERENCES

(a) 1862782 (b) BUSHIPS ltr C-SS(N)593 CL/9320 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the Sil-Brz joints for drain pump discharge in accordance with reference (b).

Three inch coupling (F1-1) on Line P50-3 reference (a) at Fr 77 Port Engine Room Lower Level did not meet the minimum bond requirements according to reference (b).

The list below is a summary of 71 lagged sil-brz joints inspected visually and ultrasonicly to present.

T & D System

Satisfactory			Rejected
14	Pl.	1862775	3
17		1862776 #3	4
21		1862780	2
9		1862782	1
Total 61			10

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Exhibit (127) - 4

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CONDITION REPORT (SPECS.) F
IND-PNS-1018 *(New 2-56)*

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2643T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593)	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/19/62
CHECKED BY QTMN. (b) (6)	DATE 10/19/62	APPROVED BY (b) (6)	DATE

REFERENCES

(a) 1862782 (b) BUSHIPS ltr C-SS(N)593 CL/9320 Ser 525-0232 of 28 Aug 62

An ultrasonic examination was conducted on the Sil-Brz joints for the drain pump suction in accordance with reference (b).

1. Four inch elbow (F4-9) on line P54-9 reference (a) at Fr 77 port engine room lower level did not meet the minimum bond requirements according to reference (b).

2. Four inch added coupling (F-101-1) not shown on reference (a) on line P54-7 at Fr 78-1/2 engine room lower level failed on visual inspection according to NAVSHIPS 250-648-8.

Ultrasonic examination was conducted according to reference (b) with several no bond readings.

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Exhibit (127) - 5

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Navy-DPPO IND, Portsmouth, N.H.

CONDITION REPORT (SPECS.) NO. REPORT PNS-4850-28
IND-PNS-1018 *(New 2-56)*

SERIAL NO. 303B-2/SS(N)593/2644T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/22/62
CHECKED BY QTMN. (b) (6)	DATE	APPROVED BY (b) (6)	DATE

REFERENCES

Ref (a) 1862782 (b) BUSHIPS ltr C SS(N)593 CL/9320 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on Sil-Brz joints for the drain line, discharge, to the waste oil tank, in accordance with reference (b).

Three inch coupling (F1-3 on Line P191-3 at Frame 80 Port, on reference (a). Fitting did not meet the minimum bond requirements according to reference (b).

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Exhibit (127) - 6

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CONDITION REPORT (SPECS.) FI'
IND-PNS-1018 *(New 2-56)*

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2648T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593)	15-930-90393	S W Sil Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/24/62
CHECKED BY QTMN. (b) (6)	DATE 10/25/62	APPROVED BY (b) (6)	DATE

REFERENCES
(a) 1862892 (b) BUSHIPS ltr C SS(N)593 C1/9320 Ser 525-0232 of 28 Aug 1962 (c) PRODEPT INST 4855.2 (303A)

An ultrasonic examination was conducted on the Sea water Sil-Brz joints for the 8000 GPD system in accordance with reference (b).

2-1/2 Inch strainer (F6-1) in line P1-6, reference (a), at Fr 78 Port Engine Room lower level, fitting has several consecutive no bond readings in the socket area, which according to reference (c) is cause for rejection.

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Exhibit (127) - 7

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Navy-DPPO IND, Portsmouth, N.H.

CONDITION REPORT (SPECS.) [illegible] No.
IND-PNS-1018 *(New 2-56)*

REPORT PNS-4850-28

SERIAL NO. 303B-2/SS(N)593/2651T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593	15-930-90393	S W Sil-Brz Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LDGM.	DATE	PREPARED BY (b) (6)	DATE 10/25/62
CHECKED BY QTMN. (b) (6)	DATE 10/25/62	APPROVED BY (b) (6)	DATE 10/25/62

REFERENCES

(a) 1862892 #1 (b) BUSHIPS ltr C ss(N)593 C1/9320 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the (Sea Water) Sil-Brz joints regarding the 8000 GPD system in accordance with reference (b).

2-1/2 Inch strainer (F6-2) on line P1-12 reference (a) at Frame 78 Port engine room lower level, fitting did not meet the minimum bond requirements according to reference (b).

The list below is a summary of 107 unlagged sil-brz joints inspected visually and ultrasonically to present.

	Satisfactory	Plan	Rejected
	14	1862775	3
	17	1862776 #3	4
	21	1862780	2
	28	1862782	4
	12	1862892 #1	2
Total	92		15

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CONDITION REPORT (SPECS.) F No. REPORT PNS-4850-28
IND-PNS-1018 (New 2-56)

SERIAL NO. SS(N)593/2660T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
USS THRESHER (SS(N)593	15-930-90393	S.W. Sil-Braze Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM (See References)	
CHECKED BY LDGM. (b) (6)	DATE 11-1-62	PREPARED BY (b) (6)	DATE 11-1-62
CHECKED BY QTMN.	DATE	APPROVED BY (b) (6)	DATE 11-1-62

REFERENCES

(a) 1862892 #3 (b) BUSHIPS Ltr C SS(N)593 C1/9320 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the (sea water) Sil-Braze joints in the 8000 GPD system in accordance with reference (b) with the following results:

2½" Elbow (F5-4) on line P1-14 reference (a) at Fr. 78 Port eng. room lower level.

2½" Flange (FL2-3) in line P1-26 reference (a) at Fr. 78 Port eng. room lower level.

2½" Strainer (F6-2) on line P1-13 reference (a) at Fr. 78 Port eng. room lower level.

Above fittings do not meet the minimum bond requirements according to reference (b).

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232B
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313
CO SS(N)593
X56
303B-2

Exhibit (127) - 9

COPIES TO:
☐ CODE 230 (3) ☐ CODE 330 ☐ C.O. VESSEL ☐ SHOP FILE

Navy-DPPO IND, Portsmouth, N.H.

CONDITION REPORT (SPECS.) No.
IND-PNS-1018 (New 2-56)

REPORT PNS-4850-28

SERIAL NO. SS(N)593/2661T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
SS(N)593 THRESHER	15-930-90393	S.W. &il-Braze Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM (See References)	
CHECKED BY Qtrmn (b) (6)	DATE 11-6-62	PREPARED BY (b) (6)	DATE 11-6-62
CHECKED BY OTMN.	DATE	APPROVED BY (b) (6)	DATE 11-6-62

REFERENCES

(a) 1862892 #1 (b) BUSHIPS ltr C SS(N)593 C1/9320 Ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the Sea Water Silver Brazed Joints for the 8000 GPD system in accordance with reference (b).

2½" Strainer (F6-1) on line P1-7 at Fr 78 Eng. Room LL, Port, on reference (a) fitting did not meet the minimum bond requirements according to reference (b).

The list below is a summary of 130 unlagged sil-braze joints inspected visually and ultrasonically to present:

Satisfactory	Plan	Rejected
14	1862775	3
17	1862776 #3	4
21	1862780	2
39	1862782	4
20	1862892	6
Total --- 111		19

Copy to:
232B
227
313
CO SS(N)593
X56
303B-2

Exhibit (127) - 10

COPIES TO:
☐ CODE 230 (3) ☐ CODE 330 ☐ C.O. VESSEL ☐ SHOP FILE

CONDITION REPORT (SPECS.) F 'o.
IND-PNS-1018 *(New 2-56)*

REPORT PNS-4850-2ℓ

SERIAL NO. SS(N)593/2663T SHEET NO. 1 OF 1

SHIP	JOB ORDER	EQUIPMENT	
SS(N)593 THRESHER	15-930-90393	S.W. Sil-Braze Integrity Inspection	
CLASS OF SHIP			
OPENING DATE	CLOSING DATE	SERIAL	UNIT NO.
WITNESSED BY		CLASSIFICATION	
MECHANIC	ANALYST	DATA FROM *(See References)*	
CHECKED BY LOGM.	DATE	PREPARED BY (b) (6)	DATE 11-8-52
CHECKED BY QTMN. (b) (6)	DATE 11-8-62	APPROVED BY (b) (6)	DATE 11-8-62

REFERENCES

(a) 1862606 (b) BUSHIPS ltr C SS(N)593 C1/9320 ser 525-0232 of 28 Aug 1962

An ultrasonic examination was conducted on the silver brazed joints for the fwd ASW system, in accordance with reference (b):

b(3) Tee (F27-1) on Line P6-1 at Fr 50 stbd side Air Regen. room, on reference (a), fitting did not meet the minimum bond requirements according to reference (b).

Copy to:
232B
227
313
CO SS(N)593
X56
303B-2

Exhibit (127) - 11

COPIES TO:
☐ CODE 230 (3) ☐ CODE 330 ☐ C.O. VESSEL ☐ SHOP FILE

MJC

303B-2
SS(N)593/9480
11 Jan 1963

MEMORANDUM

From: 303B
To: Commanding Officer, (SS(N)593) USS THRESHER

Subj: Sea Water System New Joints, repair of

Ref: (a) PROBEPT INST 4410.4, Enclosure 4 of 30 Mar 1962
(b) PROBEPT INST 4855.2

Encl: (1) List of subject joints

1. As required by reference (a), enclosure (1) is submitted for ships records.

2. All subject joints have 100% fillet added in accordance with reference (b).

3. All subject joints as listed in enclosure (1) have been ultrasonic tested and found to equal or exceed the maximum bond requirements.

MINIMUM

(b) (6)

Copy to:
303
303B
303B-2(3)
303E

This list is in accordance with the instruction which requires listing all welds that were "UT Repair".

See encl. 4

Exhibit (128) - 1

(SS(N)593 USS THRESHER

U. T. REPAIR

SYSTEM	PLAN	PC.NO.	FITT.TYPE	SIZE	LOCATION	MATERIAL FITTING	MATERIAL PIPE	BRAZED
		P-1-8						
8000 GPD	1862892	2-NF-5-2	Elbo	2½"	78-P	Brns	CuNi	#159
"	"	P-1-7 2-NF-5-2	"	"	"	"	"	"
"	"	P-1-7 1-NF-6-1	Strainer	"	"	"	"	"
		P-191-3						
T & D	1862782	3-NF-1-3	Coup.	3"	81-P	"	"	#36
		P-38-1						
"	1862776	2-NF-9-1	Elbo	"	48-P	"	"	#136
		P-33-1						
"	"	2-NF-19-1	Tee	"	47-S	"	"	#136
		P-6-1						
A S W	1862606	2-NF-27-1	Tee	b(3) 10	50-S	"	"	#138
		P-7-2						
"	"	1-NF-23-2	Fl.Ell		50-S	"	"	#74
		P-10-2						
"	"	2-ANF-92-1	Coup		51-S	"	"	#20
		P-8-2						
T & D	1862780#1	1-NFL-2-7	Flng	3"	67-S	"	"	#146

ENCLOSURE (1)

PEB

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

303B-2
SS(N)593/9480
22 Jan 1963

MEMORANDUM

From: 303B
To: Commanding Officer, USS THRESHER (SS(N)593)
Via: 303

Subj: Sea Water System New Joints, repair of

Ref: (a) 303B Memo 303B-2 SS(N)593/9480 of 11 Jan 1963

1. The following joints, located in MBT 3A, should be added to enclosure (1) of reference (a):

System	Plan	Fc. No.	Fitt.Type	Size	Location	Material	Brazed
DLO Fill.	1862638	P-1-4 NF-38(A)	Elbow 90°	2 "	Fr. 265	Brnz-cu ni	#136
DLO Fill.	1862638	P-1-4 NF-38(B)	Elbow 90°	2 "	Fr. 265	Brnz-cu ni	#136
F O Fill.	1862805	P-39 NF-6(A)	Coupling	2 "	Fr. 265	Brnz-cu ni	#136
F O Fill.	1862805	P-39 NF-6(A)	Coupling	2 "	Fr. 265	Brnz-cu ni	#136
F O Fill.	1862805	P-39 ANF-6(A)	Coupling	2 "	Fr. 265	Brnz-cu ni	#136

(b) (6)

Copy to:
303
303B
303B-2 (3)
303S

INSPECTION REQUEST

NAVSHIPS-771 (Rev. 11-61)

FILE NO. | JOB ORDER | ITEM

TEST NO.

To: INSPECTION BRANCH, Code 3038, Bldg. 174

From: SHIP

USS

1. The [illegible] system on above Ship is ready for:

☐ INSPECTION ☑ TEST ☐ COMPLETE ☐ PARTIAL ☐ REPEAT DATE

SIGNATURE
KEY SHOP (b) (6)

OTHER SHOP

OTHER SHOP

OTHER SHOP

SHOP COMMENTS

b(3) 10 USC 130

INSPECTION COMMENTS

b(3) 10 USC 130

(b) (6)

EXH 132

VISUAL INSPECTION	OPERATION	INSPECTED/TESTED BY
REJECTED	REJECTED	
FINAL ACCEPTANCE	FINAL ACCEPTANCE	DATE

Exhibits jump from 128 to 132. Exhibit 129 is sample UT forms; 130 is a blueprint; and 131 is a chart.

NPS-PHS-540 (Rev. 8-58)

To: TEST NO. 7

Date 2-14-63

Submarine Wahoo Hull No. SS-565

Item T22-A2 USS 4266

P-1 Req'n 2774

Frames 52 to 0

Nature of Test b(1) Hydrostatic

Remarks

(b) (6)

Ship Inspector's Name and Rating

Inspected by (b) (6)

To be forwarded every day

EXH 133-1

INSPECTION REQUEST

NPG-PHS-711 (Rev. 11-61)

593-333-60 15-930 50612 NAVSHIPS-12

TEST NO.

To: INSPECTION BRANCH Code 2033, Bldg. 174

From: SHIP

USS Wahoo SS 565

1. The 3mm Flat Inc. 6 gauge Lagging on above Ship is ready for:

☑ INSPECTION ☑ TEST ☐ COMPLETE ☐ PARTIAL ☐ REPEAT DATE

SIGNATURE KEY SHOP (b) (6) 2/15/63

OTHER SHOP PL. 1562 776

OTHER SHOP

OTHER SHOP

Blank at FL 3 to Flange Aft see Dwg. P-143-9 - F-10 (3) add'l coupling Fig. 1

INSPECTION COMMENTS

Dock at.

Safety mooring Lines

VISUAL INSPECTION OPERATION INSPECTED/TESTED BY

REJECTED REJECTED (b) (6)

FINAL ACCEPTANCE FINAL ACCEPTANCE DATE 2/15/63

EXH 133-2

INSPECTION REQUEST
IND-PNS-771 (Rev. 11-71)

FILE NO. 593-03763 JOB ORDER 15-930-50612 ITEM
TEST NO.

To: INSPECTION BR[illegible] Code 3038, Bldg. 174
From: (b) (6)

Ship
USS Thresher SS 593

1. The Trim Discharge system on above Ship is ready for:

☐ INSPECTION ☑ TEST ☐ COMPLETE ☐ PARTIAL ☐ REPEAT DATE

(b) (6)

SHIPYARD KEY SHOP

OTHER SHOP

OTHER SHOP PL 1862 774

DESIGN SHOP

Hydro b(1) 1 Item 1

INSPECTION COMMENTS

Air Reg Rm. P 33- 2 3" tee 1 3" ell. 1 3" Flg
Torp Rm. STBD. P 143 1 coupling P 147 1 1" ell., AMS. 1" 3 coupling 1 flowmeter 2- 3" flanges.

VISUAL INSPECTION

FOR TE

FINAL ACCEPTANCE

OPERATIONS

FOR TE

FINAL ACCEPTANCE

INSPECTED/TESTED BY
(b) (6)

DATE 2-16-63

EXH 133-3

TEST NO. 9

Date 2-15-63

Submarine THRESHER Hull No. SSN 593

Test Main Drain Line & Suction

Pressure 52 - 60 Time 1862 - 1914

Nature of Test b(1) Hydrostatic

Remarks

Pressure held Satisfactory

Inspector's Name and Rating

Witnessed by (b) (6) 3205

To be forwarded every day

EXH 134-1

INSPECTION REQUEST SHI

From: INSPECTION DRAWING Code 2038, Bldg. 17

To: X 54

1. The Main drain line & pump system on above ship is ready for:

☐ INSPECTION ☒ TEST ☐ COMPLETE ☐ PAINTING ☐ REPEAT

DESIGNATED REP. SUPV. (b) (6) DATE 2/15/63

OTHER REP.

OTHER SUPV. P2-156274

OTHER SUPV.

She main drain line & drain pump from test pressure. Fwd to Compartment, P-3 Through TD-94, P-55 TD-86 TD-176 TD-44 - TD-181 TD-105 TD-247 P-272 - TD-34 P-60 TD-270 P-306 TD-134 TD-92 P-61 - TD-159 TD-159 P-63 TD-34 TD-181 - TD 155 P-201 TD-31 P-16 - AFT. TD-50 - TD-177 - P-25 - TD-123 P-166 P-205 - TD-52 - TD-300 - TD-63 - TD-64 TD-66 - TD-74 TD-275 - P-316 - TD-152 - P-46 P-55 - TD-28 thru P-54 Thru - FTD-2 P-165 P-166 - P164 - TD-120 Thru FTD1, drain pump TD-30 - P-50 & TD 28 To TD223 & TD222

New Work. (b) (6) END (SS) 2/15/63

VISUAL INSPECTION

REJECTED ☐ ACCEPTANCE ☑

RADIATION

REJECTED ☐ FINAL ACCEPTANCE ☑

INSPECTED/TESTED BY (b) (6)

DATE 2-16-63

EXH 134-2

INSPECTION REQUEST
IND-PNS-771 (Rev. 11-61) Sh II

FILE NO. 22-211-63 | JOB ORDER 15-930-SD612 | ITEM 50-12
TEST NO.

To: INSPECTION BRANCH Code 3038, Bldg. 174
From: X56

Ship
USS Thresher SS 593

1. The Main drain line [redacted] system on above Ship is ready for:

☐ INSPECTION ☑ TEST ☐ COMPLETE ☐ PARTIAL ☐ REPEAT | DATE 2/15/63

SIGNATURE
KEY SHOP
OTHER SHOP
OTHER SHOP P4 862 774
OTHER SHOP

9

INSPECTION COMMENTS

thru P273 TD 70 TD 72 thru P107
TD 76-TD-82 Thru P239 TD 217 P236
TD 84

NEW WORK

(b) (6)

END (SS)
2/15/63

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY (b) (6)
REJECTED		REJECTED		
FINAL ACCEPTANCE	✓	FINAL ACCEPTANCE		DATE 2/16/63

EXH 134-3

INSPECTION REQUEST

INR 778-1 (Rev. 11-6[illegible])

FILE NO. | JOB ORDER 5[illegible]12 | ITEM

TEST NO.

To: INSPECTION BRANCH, Code 3038, Bldg. 174

From: Drain System

Ship USS THRESHER SS 593

1. The _____ system on above Ship is ready for:

☒ INSPECTION	☒ TEST 900#	☐ COMPLETE	☐ PARTIAL	☐ REPEAT	DATE
SIGNATURE KEY SHOP (b) (6)					2/19/63
OTHER SHOP					
OTHER SHOP					
OTHER SHOP					

SPECIAL COMMENTS

From BALL VALVES TO CHECKS

INSPECTION COMMENTS

T.D 33 ✓	T.D. 45 ✓	T.D. 71 ✓
" 185	" 47	" 73 ✓
" 186	" 48	" 83 ✓
" 43 ✓	" 51 ✓	" 77 ✓
" 184 ✓	" 53 ✓	" 253 ✓
" 35	" 65 ✓	Satisfactory with
" 183 ✓	" 67 ✓	the exception of
" 182 ✓	" 75 ✓	TD-51 - (Check Leaks)

(b) (6)

VISUAL INSPECTION		OPERATION		
REJECTED		REJECTED		
FINAL ACCEPTANCE		FINAL ACCEPTANCE	DATE	2/19/63

EXH 134-4

1862944

INSPECTION REQUEST
IND-PR3-771 (Rev. 1 *)

FILE NO. | JOB ORDER 13 V-20329 | ITEM
TEST NO.

To: INSPECTION BRANCH, Code 3038, Bldg. 174

From: X56

Ship USS Thresher SS 593

1. The ~~Shaft~~ Stern Tube & Bushing system on above Ship is ready for:

☐ INSPECTION ☒ TEST ☐ COMPLETE ☐ PARTIAL ☐ REPEAT | DATE

SIGNATURE KEY SHOP (b) (6) | 3/3/63

OTHER SHOP

OTHER SHOP Hydro. Stem 1 = 1862944

OTHER SHOP

b(3) 10 USC 130

No Visible Leaks

(b) (6)

11111(55)

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY (b) (6)
REJECTED		REJECTED		
FINAL ACCEPTANCE		FINAL ACCEPTANCE	✓	DATE 3-4-63

EXH. 135

INSPECTION REQUEST
IND-PNS-771 (Rev. 11-61)

FILE NO. 593-21663 | JOB ORDER NS930-50612 | ITEM

TEST NO.

To: INSPECTION BR 4, Code 3038, Bldg. 174

F (b) (6)

Ship USS Thresher SS 593

1. The _____ system on above Ship is ready for:

☐ INSPECTION	☒ TEST	☐ COMPLETE	☐ PARTIAL	☐ REPEAT	DATE

(b) (6)

SIGNATURE KEY SHOP

OTHER SHOP piping A S W System

OTHER SHOP

OTHER SHOP Plan 1862586

SHIP COMMENTS

Flush and Test Hydro to Item #1

Line P-6 From F-122 To F-42 To FL-14. To ASW-7

Flushed hot water thr. Satisfactory 203 4HB

Hydro: Sat. 2-17-63 (b) (6)

(b) (6) TM1

2-19-63 Satisfactory

INSPECTION COMMENTS

VISUAL INSPECTION		Test ~~OPERATION~~ Flush		INSPECTED/TESTED BY (b) (6)
REJECTED		REJECTED		
FINAL ACCEPTANCE		FINAL ACCEPTANCE	✓	DATE 2-17-63

EXH 136

INSPECTION REQUEST
NAVSHIPS-771 (Rev. 11-6)

FILE NO. 593-166-63 | JOB ORDER 5[illegible]12 | ITEM

TEST NO.

To: INSPECTION BRANCH, Code 3038, Bldg. 174

From:

Ship USS Thresher SS 593

1. The ASW b(3) 10 USC 130 Note 1 system on above Ship is ready for:

☐ INSPECTION ☑ TEST ☐ COMPLETE ☐ PARTIAL ☐ REPEAT (b) (6)

	DATE
SIGNATURE KEY SHOP	2/5/63
OTHER SHOP	
OTHER SHOP	
OTHER SHOP	

SHOP COMMENTS

b(3) 10 U b(1) ASW system to 8000 stills - Converter, EPM coolers - check up to hull valves on Conv. Heats Running Test

INSPECTION COMMENTS

Vent Valve on EPM leaks —

(b) (6)

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY
REJECTED		REJECTED		
FINAL ACCEPTANCE		FINAL ACCEPTANCE		DATE

EXH 137

INSPECTION REQUEST
IRD-PNS-771 (Rev. 11-61)

FILE NO. 593-69-62 | JOB ORDER 15-930-5044 | ITEM | TEST NO.

To: INSPECTION BRAN Code 3038, Bldg. 174

From: (b) (6)

Ship USS Thresher SS 593

1. The "A" & "X" SEA WATER system on above Ship is ready for:

☐ INSPECTION	☒ TEST	☐ COMPLETE	☐ PARTIAL	☐ REPEAT	DATE
SIGNATURE KEY SHOP	(b) (6)	X56			12/4/62
OTHER SHOP	0				
OTHER SHOP	HYDRO	1 hr.			
OTHER SHOP	ITEM 1 OF 1862944				

b(3) 10 USC 130

(b) (6)

VISUAL INSPECTION		OPERATION NY070		INSPECTED/TESTED BY
REJECTED		REJECTED		(b) (6)
FINAL ACCEPTANCE		FINAL ACCEPTANCE	✓	DATE 12/4/62

EXH 138

INSPECTION REQUEST
IND-PNS-771 (Rev. 11-61)

FILE NO. 593-66-62 | JOB ORDER 45900-50819 | ITEM

TEST NO.

To: INSPECTION BRANCH Code 3038, Bldg. 174

(b) (6)

Ship

USS _____ SS _____

1. The GSW Overboard Discharge system on above Ship is ready for:

☐ INSPECTION	☑ TEST	☐ COMPLETE	☐ PARTIAL	☐ REPEAT	DATE
SIGNATURE KEY SHOP	X56				
OTHER SHOP					
OTHER SHOP					
OTHER SHOP					

b(3) 10 USC 130

Hydro Test. Item #1 and 100 lbs No Drop outboard in

INSPECTION COMMENTS

Plan 1862586

(b) (6)

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY
REJECTED		REJECTED		(b) (6)
FINAL ACCEPTANCE	✓	FINAL ACCEPTANCE	✓	DATE 12-6-62

EXH 139

copied from ORIGINAL RP 32256

INSPECTION REQUEST

TEST NO.

To: INSPECTION BRANCH Bldg. 174

From: Ship

1. The AIR COND SYS. — S. W. system on above Ship is ready for:

	INSPECTION	TEST	COMPLETE	PARTIAL	REPEAT	DATE
SIGNATURE KEY SHOP	(b) (6)					6/14
OTHER SHOP						
OTHER SHOP						
OTHER SHOP						

SHOP COMMENTS

R. 1862582-G. HYDRO TEST ITEM 1 ON R1862MM LITHIUM BROMIDE PLANT

INSPECTION COMMENTS

S. W. Suction & Disch. for Air Cond. Sys. - BRT Hull & Backup Values are flanged together - No Sil-Brz'd Joints.

Press. Drop in 15 Min. 220 P.S.I. from ITEM 2 above.

No Visible Leakage Through Lagging.

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY
REJECTED		REJECTED		
FINAL ACCEPTANCE		FINAL ACCEPTANCE		DATE EXH 140

(b) (6)

303 B2 OVER

LAGGING NOT REMOVED EXCEPT FOR
HULL ULVS

PIPES DROP AS NOTED

EXH 140-2

INSPECTION REQUEST
NAVSHIPS-771 (Rev. 11-61)

FILE NO. 593-2.62 | JOB ORDER | ITEM
TEST NO.

To: INSPECTION BRAN Code 3036, Bldg. 174

From: SHOP 56

Ship USS 593 SS

1. The AIR COND SYS - S.W. COOLING STBD system on above Ship is ready for:

	INSPECTION	TEST	COMPLETE	PARTIAL	REPEAT	DATE
SIGNATURE KEY SHOP	(b) (6)		56-08238			8-2-62
OTHER SHOP						
OTHER SHOP						
OTHER SHOP						

SHOP COMMENTS

TEST ITEM I ON PL 186.2944 SYS. PL 186.2711 b(3) 10 USC 130

b(3) 10 USC 130

b(3) 10 USC 130

ALL piping included is lagged, visual inspection impossible.

Test on No 1 + No. 2 Freon Condensers + piping

40 PSI. drop / 1 hour

(b) (6)

VISUAL INSPECTION		OPERATION		INSPECTED/TESTED BY
REJECTED		REJECTED		
FINAL ACCEPTANCE		FINAL ACCEPTANCE		DATE

EXH 140-3

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

MEMORANDUM FOR RECORD

From: 303B-2

Subj: USS THRESHER (SS(N)593); Sil-Braze Joints 2 in. and over, Sea Water Integrity Inspection of

1. During Integrity Test silver brazed joints in Sea Water Systems were rejected by Ultrasonic evaluation in accordance with the Shipyard requirements specifying acceptance and/or rejection standards for Ultrasonic testing as stated in PRODEPT INSTR 4855.2, as follows:

Plan	Sys.	Fitting & No.	Pipe No.	Pipe Size	% of Bond Outward Land	% of Bond Inward Land	% of Average Bond	Reason for Rejection
1862606	ASW Aft	Tee F-27-1	P6-1	b(3)	68	20	44	+ ✓
1862775	T&D	E11 F-2	P-13	4"	58	35	46.5	# ✓
1862775	T&D	E11 F-2	P-13	4"	61	5	33	* ✓
1862775	T&D	Tee F-1	P-13	4	65	0	32.5	* ✓
1862776	T&D	E11 F-9-1	P-38-1	3	65	11	38	* ✓
1862776	T&D	Tee F-19-1	P-33-1	3	39	25	32	* ✓
1862776	T&D	E11 F-9-2	P-38-2	3	72	8	40	+ ✓
1862776	T&D	E11 F-7-2	P-36-1	4	45	8	26	* ✓
1862780	T&D	Flange FL-2-7	P8-2	3	56	16	36	* ✓
1862780	T&D	Coup. F-4-1	P1-3	3	52	2	27	* ✓
1862782	T&D	Coup. F1-3	P191-3	3	77	20	48	+ ✓
1862782	T&D	Added Coup. AF101-1	P54-7	4	56	33	45	# ✓
1862782	T&D	E11 F-4-9	P54-9	4	70	24	47	# ✓
1862782	T&D	Coup F1-1	P-50-3	3	70	6	38	+ ✓
1862892	8000 GPD	Strainer F6-2	P1-12	2-1/2	64	6	35	* ✓
1862892	8000 GPD	Striner F6-1	P1-7	2-1/2	58	1	29	* ✓
1862892	8000 GPD	Strainer F6-2	P1-13	2-1/2	58	0	29	* ✓

EXHIBIT (141)
1

Plan	Sys	Fitting & No.	Pipe No.	Pipe Size	% of Bond Outward Land	% of Bond Inward Land	% of Average Bond	Reason for Rejection
1862892	8000 GPD	Strainer F6-2	P1-6	2-1/2	84	32	58	#
1862892	8000 GPD	Flange FL-2-3	P1-26	2-1/2	85	5	45	+
1862892	8000 GPD	E11 F5-4	P1-14	2-1/2	68	16	42	+

Symbols used for ~~xxx~~ reasons for rejections are as follows:

* Rejected due to low average bond percentage

\+ Rejected due to not meeting 25% minimum on one land.

\# Rejected due to requirement of consecutive no bond segments.

(b) (6)

EXHIBIT (141)
2

Copy-IF

HBC

PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NEW HAMPSHIRE

PRODEPT
INST 4855.2(303A)

PRODEPT INSTRUCTION 4855.2

3 Oct 1962

From: Production Officer
To: Distribution List

Subj: Ultrasonic Test of Sil-brazed Joints (Non-nuclear); acceptance standards for

Ref: (a) NAVSHIPS Manual 329-0029
(b) PRODEPT INST 4410.4
(c) PROCESS INST 1003.9

1. Purpose. To establish the areas of ultrasonic inspection and define the acceptance standards for sil-brazed joints in the non-nuclear piping systems.

2. Information. In ultrasonic inspection of brazed joints, high frequency waves are sent from a small search unit into the joint to determine the amount of bonding present beneath or next to the search unit. This inspection is being used to determine the structural strength of the joint being inspected. Brazed joints may be inspected by one of two methods: The angle beam or the straight beam method. The straight beam method, as defined in reference (a), is to be used unless otherwise directed.

3. Procedure. Ultrasonic testing, except as limited by established standards noted below, is to be used to evaluate brazing quality in the following areas:

"a. All sea water systems, sil-brazed joints that are *over 2" i.p.s.* and are brazed aboard ship, require ultrasonic test for per cent bond."

b. All joints termed inaccessible will be treated per paragraph 2.b., enclosure (1), of reference (b) (case 2.).

c. Any joint found suspect by visual inspection will be ultrasonically tested.

d. All joints that have been reheated to brazing temperature will be examined by ultrasonic test.

e. All fittings that have been reworked or reflowed will be subjected to ultrasonic test after the joint has been brazed.

EXHIBIT (142)
1

f. Random sampling of shop-made joints (any size and any hazardous system). Code 303B will co-ordinate with Code 303E and check a minimum of 6 joints a month at each area where shop joints are being made.

g. Random sampling of ship-made joints for hazardous systems other than sea water. Code 303B will designate number of joints to be tested.

NOTE: At the present time ultrasonic standards have been developed for fittings having a minimum wall thickness of .250" and for pipe with a minimum wall thickness of .100". Anything less than the above cannot be evaluated by ultrasonic test at this time.

4. Acceptance Standards. Brazed joints will be rejected if the ultrasonic inspection indicates the following:

a. There is less than 25% average bond on one land regardless of what is found on the other.

b. There is less than 50% total average bond for deep submergence ships (593 Class) or less than 40% total average bond for shallow submerged ships (585 Class). The same per cent bond will be maintained for ships under repair or overhaul at this Shipyard, when brazing is in accordance with reference (c).

c. The number of consecutive "no bond" segments exceeds Table I values for either land.

TABLE I

~~Inside Pipe Diameter~~ IPS	No. of Consecutive 1-inch Segments
1 - 1-1/2	2
2 - 2-1/2	3
3 - 3-1/2	4
4 - 5	5

NOTE: If there is an indeterminate segment between segments of no bond, this segment will also be considered unbonded. Exclude the indeterminate or inaccessible segments in a land when computing its average bond.

d. Joints with an acceptable over-all level of bond, but with a possible flow path for leakage (areas of 20% or less bond on each land) will be marked Rejected - Recommend Ultrasonic Test Repair. Refer to case 1 of enclosure (1), reference (b).

e. If more than half the segments in both lands are indeterminate or inaccessible, the joint will be referred to Code 303B for evaluation.

f. Questionable joints not covered by the above criteria will be referred to Code 303B for resolution with assistance from Code 374 when requested.

5. Responsibility

a. Code 303E will assure that all ultrasonic test operators are qualified and familiar with references (a), (b), and the acceptance standards stated herein. Personnel will be responsible for recording all data on Form 1ND-PNS-1773 (New 6/62) and reporting status to Shop 56. If the joint(s) are questionable, the data will be submitted to Code 303B for evaluation. Original copies of all forms will be filed by system and ship number and maintained by Code 303B until such time as the ship has satisfactorily completed all sea trials.

b. Code 303B will be responsible for resolving questionable joints and maintain records as noted above. Personnel will be assigned to assist Code 303E for random sampling of joints.

c. Code 303A will audit on a 3-month basis and take necessary steps to correct any areas of nonconformance with this Instruction.

(b) (6)

DISTRIBUTION:
A (Ship Supts)
C, D, G-1, G-2, (300 only)
H, I (926 & 956)
J
140
865

EXHIBIT (142)
3

VALVE #	SIZE	MARK	O RINGS	TEST ORDER TEFLON	BALL SENT TO TEFLON	TEFLON BALL TEST	SHIPPED OR REMARKS
b(3) 10 USC 130							
				OK	OK	OK	10-10-62
TD 132	3"			OK	OK	OK	10-10-62
b(3) 10 USC 130				OK	OK	OK	10-10-62
				OK	OK	OK	10-10-62
TD 14	4"			OK	OK	OK	10-10-62
TD 11	4"			OK	OK	OK	10-10-62
TD 255	3"			OK	OK	OK	10-12-62
TD 124	3"			OK	OK	OK	10-12-62
b(3) 10 USC 130				OK	OK	OK	10-30-62
DSW-1 } SHIPPED BOLTED TOGETHER				OK	OK	OK	10-19-62
DSW-2 }				OK	OK	OK	10-19-62
b(3) 10 USC 130			DUTCHMAN	OK ULV TO GO	OK	OK	11-6-62 12-7-62 BALL NO GOOD
		(ASSM. WITH	ASW 2 BALL)	DUTCHMAN TO GO WITH IT			11-23-62 BALL NO GOOD
							12-6-62 BALL NO GOOD
							12-3-62 BALL NO GOOD
		NEW BALL & SEATS		USED	DUTCHMAN TO GO WITH IT		11-20-62 BALL NO GOOD
TD 15	4			OK	OK	OK	10-31-62
TD 163	ROCKWOOD	NEW BALL & SEATS USED BALL WAS OK.		DUTCHMAN OK	TO GO WITH	IT (OK)	11-6-62
b(3) 10 USC 130				OK	OK		
				OK	OK	OK	10-31-62
		PUPPET VALVE TO GO WITH IT	DUTCHMAN TO GO WITH IT	OK	OK	OK	10-31-62
TD 13	3½			OK	OK	OK	11-6-62
b(1)							11-8-62
							11-8-62
							11-9-62

EXHIBIT (X43)-1