H10597

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC/ SIDE SCAN SONAR

Field No. WH-10-3-95

Registry No. H-10597

LOCALITY

State GEORGIA

General Locality NORTH ATLANTIC OCEAN

Sublocality 12 NM SE OF TYBEE ROADS

19 95

CHIEF OF PARTY

CDR J. D. WILDER, NOAA

LIBRARY & ARCHIVES

DATE JUN 1 1 1996

☆U.S. GOV. PRINTING OFFICE: 1987—756-980

DIAGRAM 1111-1

(1)
Bo 158528-29

Charts

CH
1513
11480 Appd 3/4/97 TLW
11009NC

NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTER NOS.

H-10597

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

WH-10-3-95

State: GEORGIA

General locality: NORTH ATLANTIC OCEAN

Locality: 12 NM SE OF TYBEE ROADS

Scale: 1:10,000 Date of Survey: APRIL 24-JUNE 28, 1995

Instructions dated: MARCH 14, 1995 Project No.: OPR-G398-WH

Vessel: 2930, 2931, 2932

Chief of Party: CDR John D. Wilder, NOAA

Surveyed by: J.D. Wilder, M.R. Kenny, W.G. Kitt, A.L. Beaver, C.E. Parrish, J.T. Michalski, K.M. Bowditch, J.D. Garte, M.M. Cisternelli, F.R. Cruz, J.C. Gaskin, B.C. Detrich

Soundings taken by echo sounder: DSF-6000N

Graphic record scaled by: WHITING SURVEY PERSONNEL

Graphic record checked by: WHITING SURVEY PERSONNEL

Protracted by: N/A Automated plot by: ENCAD NOVAJET plotter III (AHB) ZETA 936 PLOTTER (Field)

Verification by: ATLANTIC Hydrographic Branch Personnel

Soundings in MLLW: METERS

REMARKS: Time zone used: GMT (UTC), +0

200% Side Scan Sonar coverage performed on entire survey area

Notes in the Descriptive Report were made in Red During Office processing.

AWOIS and SURF ✓ RWD 6/96

JUN 11 1996

NOAA FORM 77-28 SUPERSEDES FORM C & GS-537

PROGRESS SKETCH

HYDROGRAPHIC SURVEY

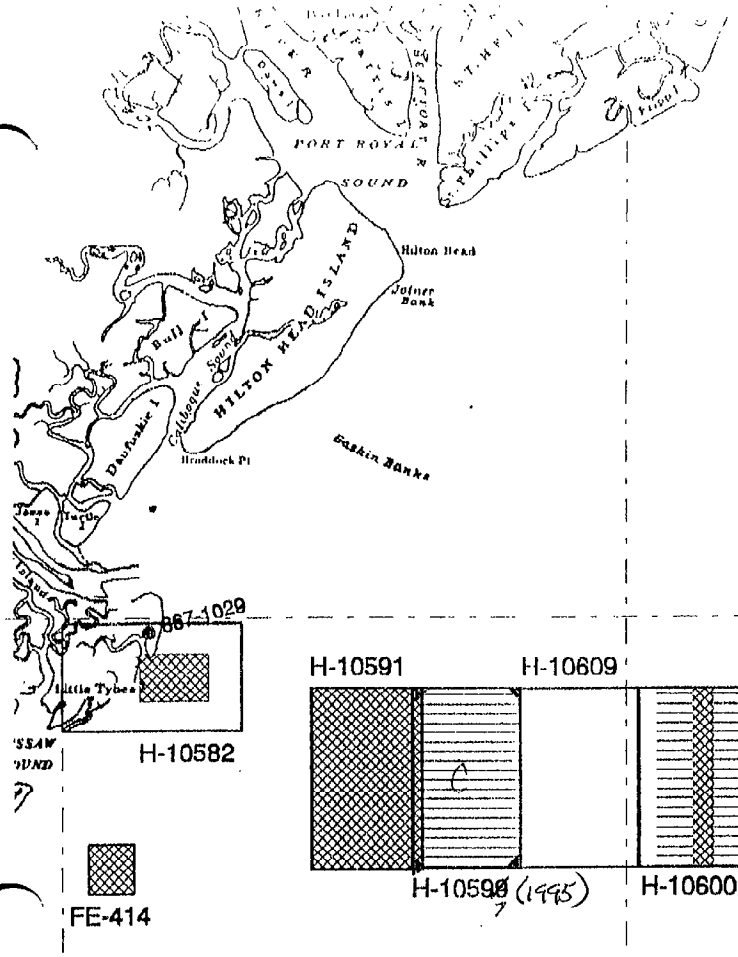
OPR-G115-WH

WASSAW SOUND and WILMINGTON RIVER

OPR-G398-WH

APPROACHES TO SAVANNAH RIVER

APRIL - NOVEMBER 1995



32-00-00

080-55-00

080-30-00

080-00-00

NOAA SHIP WHITING S329

CDR JOHN D. WILDER, COMMANDING

APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	
24								DAYS AT SEA
156								LNM SOUNDINGS (SHIP)
173								LNM SOUNDINGS (LAUNCHES)
904								LNM SIDE SCAN (SHIP)
7								LNM SIDE SCAN (LAUNCHES)
38								SQ NM SURVEYED
6								ITEMS INV/DIVES
7								VELOCITY CASTS
5								BOTTOM SAMPLES
20								WATER CLARITY OBS
								HYDROGRAPHY

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-G398-WH
H-10597

NOAA Ship WHITING
CDR John D. Wilder, NOAA
Commanding Officer

A. PROJECT

The purpose of project OPR-G398-WH is to provide contemporary hydrographic survey data for existing nautical charts. This project is in response to requests from the Georgia Ports Authority and the Savannah Pilots Association to determine the deepest and safest approach to the newly dredged Savannah River shipping channel, a 31-mile stretch of which was deepened from 38 to 42 feet in 1994.

Survey Operations were conducted in compliance with Hydrographic Project Instructions OPR-G398-WH dated March 8, 1995. Changes to the original project instructions are as follows.

Change Number 1 May 17, 1995

Project OPR-G398-WH consists of twelve survey sheets. This survey was assigned sheet letter "C", field sheet number WH-10-3-95, and registry number H-10597.

B. AREA SURVEYED

Hydrographic survey H-10597 is located 12 nautical miles southeast of Tybee Roads , GA and is bounded by the following coordinates:

Position	Latitude	Longitude
1-SE Corner	31° 51' 30.269" N	080° 34' 27.320" W
2-SW Corner	31° 51' 30.914" N	080° 39' 35.444" W
3-NW Corner	31° 58' 30.509" N	080° 39' 34.429" W
4-NE Corner	31° 58' 29.861" N	080° 34' 25.916" W

Survey operations, including diving operations and bottom sampling, commenced on April 24, 1995 (DN 114) and concluded on June 28, 1995 (DN 179).

C. SURVEY VESSELS

NOAA Ship WHITING (VESNO 2930), launch 1014 (VESNO 2932) and launch 1015 (VESNO 2931) were used to conduct mainscheme echosounder/side scan sonar lines, developments, crosslines, diver investigations and bottom samples. No unusual problems or equipment configurations were encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

See also Evaluation Report

Survey data acquisition and processing were accomplished using the HDAPS system with the following software:

PROGRAM NAME	VERSION	DATE INSTALLED
BACKUP	2.00	February 27, 1995
BASELINE	1.14	February 27, 1995
BIGABST	2.07	February 27, 1995
BIGAUTOST	3.01	February 27, 1995
BLKEDIT	2.02	February 27, 1995
CARTO	2.17	February 27, 1995
CLASSIFY	2.12	April 17, 1995
CONTACT	2.48	April 17, 1995
CONVERT	3.65	February 27, 1995
DAS_SURV	6.80	April 17, 1995
DIAGNOSE	3.05	February 27, 1995
DISC_UTIL	1.00	February 27, 1995
DP	2.18	February 27, 1995
DPCONVERT	1.03	March 7, 1995
DSNEDITS	1.04	March 7, 1995
EXCESS	4.32	February 27, 1995
FILESYS	3.31	March 7, 1995
GRAFEDIT	1.06	February 27, 1995
HIPSTICK	1.01	February 27, 1995
HPRAZ	1.26	February 27, 1995
INVERSE	2.02	February 27, 1995
LISTDATA	1.02	February 27, 1995
LOADNEW	2.13	March 7, 1995
LSTAWOIS	3.07	March 7, 1995
MAINMENU	1.20	February 27, 1995
MAN_DATA	3.02	March 7, 1995
NEWPOST	6.13	February 27, 1995
PLOTALL	2.32	February 27, 1995

POINT	2.12	March 7, 1995
PREDICT	2.01	February 27, 1995
PRESURV	7.11	February 27, 1995
PRINTOUT	4.04	February 27, 1995
QUICK	2.07	February 27, 1995
RAMSAVER	1.02	February 27, 1995
REAPPLY	2.12	February 27, 1995
RECOMP	1.04	March 7, 1995
SCANNER	1.00	February 27, 1995
SELPRINT	2.05	February 27, 1995
SYMBOLS	2.00	February 27, 1995
VERSIONS	1.00	February 27, 1995
ZOOMEDIT	2.33	February 27, 1995

Sound velocity corrections were determined using *CAT* version 2.00 and *VELOCITY* version 2.11. The DGPS station was checked using *MONITOR* version 1.2.

There were no nonstandard automated acquisition or processing methods used.

E. SIDE SCAN SONAR EQUIPMENT

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected recorder and an EG&G 272-TH dual-channel, single frequency towfish. The towfish was operated on the 100 kHz frequency and configured with a 20° beam depression. The following SSS equipment was used throughout the survey:

VESNO	Type	S/N	DN
2930	Towfish	001494	114-116, 121, 125-129, 135-140,
	Recorder	016942	151-152
2931	Towfish	016835	137
	Recorder	016671	
2932	Towfish	0011902	129, 158
	Recorder	016673	

On WHITING, the SSS towfish was deployed using a Reuland winch (s/n 814861A-1) mounted on the stern of ship. On both launches, the SSS towfish was deployed using a Superwinch Model W115 in conjunction with an adjustable davit arm on the side of the launch. The launches SSS towfish was towed with vinyl-coated Kevlar cable and was connected to the recorder via a slip ring assembly.

The SSS towfish was operated on the 100 meter range scale with the height off the bottom maintained at 8 to 20 percent of the range scale (8-20 meters). SSS operations were limited to a speed-over-ground between 4 and 6 knots.

F. SOUNDING EQUIPMENT

Raytheon Digital Survey Fathometer (DSF 6000N) echo sounders were used to measure bottom depths during the survey. The DSF 6000N produced a graphic record of the high frequency (100 kHz) and low frequency (24 kHz) bottom depths below the keel. Digital depths from the high frequency and low frequency beams were recorded by the HDAPS acquisition system. High frequency soundings were selected as the primary depths and are displayed on all sounding plots. Echograms were carefully reviewed for significant features along the track line. Depths on the graphic record that were not selected as primary soundings were then manually inserted.

The following fathometers were used during this survey:

Vessel	S/N	Dates Used (DN)
2930	A109N	114-116, 121, 125-129, 135-140, 151-152
2931	B050N	137, 179
2932	A105N	129, 152, 158-159, 171

G. CORRECTIONS TO SOUNDINGS

Sound-velocity profiles of the water column were determined using a Seacat Conductivity, Temperature, and Depth (CTD) profiler (model SBE 19, s/n 286). The profiler was calibrated on February 15, 1995, during WHITING's winter inport period. A copy of the calibration report is included in Separate IV. DATA filed with Field Records.

After the CTD cast, programs *CAT 2.00* and *VELOCITY 2.11* were used to process the data, select significant data points, and create a corrector table. The velocity correctors were manually entered into an HDAPS velocity table where the correctors were applied to both high and low frequency beams during data acquisition. Velocity profile data are in the Separates submitted with this survey.

Data Quality Assurance (DQA) for the Seacat CTD profiler was performed by using a hydrometer and a thermometer to measure the density and temperature of a surface water sample taken during the CTD cast. The program *CAT* compared these values to the CTD surface values and confirmed that the velocity probe was working properly.

The velocity casts were performed as described below for mainscheme data acquisition (first table number is the ships velocity table, the second is the launches velocity table):

DN(1995)	Vel.Table#	Latitude	Longitude	Depth
114	8, 9	31° 56' 00" N	80° 37' 00" W	14.8 m
127	15, 16	31° 55' 08" N	80° 34' 56" W	14.8 m
138	18, 19	31° 55' 12" N	80° 35' 12" W	16.1 m
151	26, 27	31° 51' 51" N	80° 36' 29" W	16.8 m

Velocity casts were also performed during diving operations for calibration of the MOD3 diver least depth gauge, but are not listed above. There were no variations in instrument initials.

Bar checks were performed on launches 1014 and 1015 on February 23, 1995 to detect the need for corrections to digitized readings from the DSF-6000N and throughout this project to verify the accuracy of the echosounder. No corrections were needed.

The correction for the static draft of 0.55 meters for launches 1014 and 1015 was measured on July 28, 1993. The correction for the static draft of 3.2 meters for WHITING was checked by divers on May 11, 1995 with the MOD3 Diver Least Depth Gauge. The measured draft of the transducer was determined to be 3.16 meters.

Settlement and squat measurements for launches 1014 and 1015 were determined on March 29, 1995 and entered in Offset Tables 2 and 1, respectively. Settlement and squat measurements for WHITING were determined on November 10, 1993 and entered in Offset Table 9. The settlement and squat correctors were applied during data acquisition on each survey platform.

For data collected on WHITING, heave correctors were applied during data collection using a Heave, Roll and Pitch Sensor (s/n 19109-C). Heave correctors for launches 1014 and 1015 were applied during post processing by manually scanning the echograms and making the appropriate corrections.

New leadlines were made and calibrated on February 23, 1995. Calibration confirmed the leadline error was negligible. A leadline comparison was conducted on May 11, 1995 in the Wilmington River. Due to current and uneven bottom characteristics, the accuracy of this leadline comparison is questionable with readings falling within 0.3 meters of the high frequency depth. Another leadline comparison was performed on August 3, 1995 which indicated a difference of 0.08 meters between the high frequency depth and the leadline depth.

The tidal datum for this project was Mean Lower Low Water. The operating tide station at Fort Pulaski, Georgia (867-0870) served as the reference station for predicted tides. No tidal zoning was done for this survey. Time and height correctors used for this survey are as follows:

Time Correction	Height Ratio
+ 0 hr 0 min	x0.94

The tidal time correction was changed to -0hr 10min with the first change to the project instructions but was not applied due to the near completion of the sheet and the relatively small change involved.

Tidal data used during data acquisition were taken from Table 2 of the East Coast of North and South America Tide Tables and were applied on-line to the digital data using HDAPS software. The tidal data, in digital form, were received on floppy disk from N/CG241, Hydrographic Surveys Branch.

On March 29, 1995, WHITING installed a tide station at Tybee Marina (867-1029) for datum control of H-10597. Opening levels were run on March 30, 1995. A request for smooth tides was submitted to Product and Services Branch, Datum Section, N/OES231 on July 24, 1995. Approved Tides were Applied During Office processing.

H. CONTROL STATIONS See also Evaluation Report.

The horizontal datum for this project is the North American Datum of 1983 (NAD-83). The source of differential correctors in 1995 was a High Frequency Differential GPS receiver/ transmitter station set on a tower over a control mark on Skidaway Island, GA. Additionally, WHITING used the forward range marker on Jones Island Range for performance checks. The adjusted NAD-83 positions for SKID (2nd Order Class I) and Jones Island Forward Range (4th Order) were provided by the Field Photogrammetry Section. The positions are as follows:

Station	Latitude	Longitude
SKID	31° 59' 19.22599" N	081° 01' 12.26294" W
Jones Island Range, Front	32° 02' 31.71243" N	080° 51' 10.09256" W

WHITING used *MONITOR 1.2* to verify the station position and to check for multipath in the area. The *OUTLIER.SUM* files and associated scatterplots are in Separate III. DATA Filed with field Records.

I. HYDROGRAPHIC POSITION CONTROL

A Differential Global Positioning System (DGPS) was used as the navigation system for this survey. Both launches and the ship used an Ashtech Sensor GPS receiver with a LRD-1 HF receiver supplying correctors for DGPS navigation. Ashtech receivers were initialized by HDAPS and LRD-1 receivers were set to the appropriate frequency.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. Horizontal Dilution of Precision (HDOP) limits were computed as required in section 3.4.2 of the FPM. The HDOP limit for a 1:10,000 scale survey using the Skidaway Island station is 3.75. No position flyers were encountered. All suspect positions (high HDOP, DR'ed positions, high EPE) were examined for reliability. Questionable positions were either smoothed or rejected.

The control station on Skidaway Island consisted of a Ashtech Mk12 receiver, LRD-3 modulator, and Ray 152 high frequency transceiver.

The serial numbers of the Ashtech Sensor and LRD-1 receivers used on the data acquisition platforms are as follows:

VESNO #	Device	Serial Number
2930	Ashtech Sensor	700417B1203
	LRD-1	248
2931	Ashtech Sensor	700417B1191
	LRD-1	233
2932	Ashtech Sensor	700417B1194
	LRD-1	206

DGPS performance checks were done in two stages. The first stage was to send a launch to the Jones Island Forward Range marker. The launch would take ten detached positions, apply range and bearing corrections, and compare the positions to the known position. Stage two was conducted with each launch securely housed in WHITING's davits. Simultaneous HDAPS positions were printed and compared between WHITING and each launch utilizing the shipboard performance check software. Offset in distance and azimuth was then applied between the ship and each launch system. All DGPS performance checks confirmed that the DGPS beacon was operating properly.

DGPS antenna offsets and laybacks were measured on July 28, 1993, for launches 1014 and 1015 and on March 19, 1993 for the WHITING. Offsets and laybacks were measured using the 100 kHz (high frequency) echosounder transducer as the reference. Antenna heights were also measured on the same respective dates shown above, using the water line as the reference. The offset and layback for the both launch SSS towfish davits was measured on March 29, 1995. The offsets, laybacks and heights were applied by HDAPS on-line by way of the vessels individual offset tables. All offset data are on file at N/CS33. DATA Filed with Field Records.

A minimum of four satellites were used during survey H-10597 (1:10,000), providing altitude unconstrained positioning.

J. SHORELINE

There was no shoreline on this sheet.

K. CROSSLINES

A total of 79.61 nautical miles of crosslines were run on H-10597, or 9.3% of the total linear nautical miles of main-scheme lines run. Crossline and main-scheme agreement, with predicted tides applied, was adequate. Most soundings agreed to within 0.5 meters with no errors greater than 0.8 meters.

L. JUNCTIONS See Also Evaluation Report.

Comparisons were made with sheet WH-10-1-95 (H-10591, OPR-G398-WH-95) and sheet WH-10-7-95 (H-10609, OPR-G398-WH-95). In general, agreement with both sheets is adequate. Most soundings agree to within 0.5 meter with the largest discrepancy of 1.5 meter occurring with WH-10-5-95. Depth contours agreed very well between the three sheets.

M. COMPARISONS WITH PRIOR SURVEYS See Also Evaluation Report.

Comparisons with prior survey H-9144 indicated very good agreement between the two surveys. Due to the small scale of the prior survey, a plot at 1:40,000 had to be generated for an accurate comparison. The large amount of data gathered for this survey made comparison to the prior survey difficult, mostly due to the small size of the plotted soundings. Only the eastern edge of survey H-9144 overlapped this survey area. Most soundings agreed with the prior survey by one to two feet, with the largest discrepancy being 3 feet. Shoals and deeps found in H-10597 matched extremely well with the prior survey.

N. ITEM INVESTIGATIONS

This sheet had AWOIS item investigations. Seven dives were performed to resolve possible navigational hazards with four of the dives resulting in the location of significant bottom obstructions and one dive on a common contact with H-10591.

The following features were found during hydrographic survey operations on this sheet:

		Contact	Latitude/Longitude
N1.	Metal Box	7166.33P	31° 52' 49.721" N 080° 38' 52.863" W

Divers discovered a steel container measuring approximately 1 meter by 2 meters by 2 meters embedded in the sand and shell bottom. Least depth measured by divers was 15.5 meters in 16.2 meters of water. Since the contact only rises 0.7 meters from the surrounding bottom, WHITING recommends the item be considered insignificant and not be charted. CONCUR

N2.	Metal Box	6542.59P	31° 52' 17.456" N 080° 39' 27.057" W

Divers discovered a steel container similar to the one described above. Least depth measured by divers was 14.7 meters in 15.6 meters of water. Since the contact only rises 0.8 meters from the surrounding bottom, WHITING recommends the item be considered insignificant and not be charted. CONCUR

N3.	Metal Boxes	6556.10P	Previously Located

Divers discovered the same contacts discovered during survey operations on H-10591, WH-10-1-95, Sheet "A", contact 6094.13S. See the descriptive report and data for H-10591 for a description, position and least depth for this contact. DO NOT CONCUR, IT is Recommended THAT AN OBSTRUCTION WITH A KNOWN DEPTH OF 13.3 m, (43 FT.) be CHARTED IN LAT. 31°52'17.964"N LON. 80°39'25.694"W (CHART 43 OBSTN) See Also section N. of the Evaluation Report.

N4.	Coral Head	9356.34P	31° 51' 43.491" N 080° 36' 31.425" W

Divers discovered a live coral head. Least depth measured by divers was 15.9 meters in 16.9 meters of water. Since the contact only rises 1.0 meters from the surrounding bottom, WHITING recommends the item be considered insignificant and not be charted.

N5.	Wreckage	1233.09S	31° 52' 10.485" N 080° 38' 45.624" W

Divers discovered the remains of an uncharted wreck. Portions of the hull, a bollard, anchor chain, and a large metal container were some of the items discovered in the wreckage. Least depth measured by divers was ~~15.1~~ 14.5 meters in 16.2 meters of water. Since the contact only rises 1.1 meters from the surrounding bottom, WHITING recommends the item be considered insignificant and not be charted. DO NOT CONCUR IT is Recommended THAT A DANGEROUS SUNKEN WRECK WITH A KNOWN DEPTH OF 14.5 m, (47 FT.) be CHARTED IN LAT. 31°52'10.485"N, LON. 80°38'45.624"W (CHART 47 WK)

All least depths were determined by diver held MOD3 least depth gauge (SN 68332) which was compared to the WHITING's barometer on a daily basis to ensure correct operation of the unit. CTD casts were performed during diving operations and applied to all least depth measurements for MOD3 calibration purposes.

O. COMPARISON WITH THE CHART See also Evaluation Report.

Soundings from chart 11513 (21st ed., 4 June 94, 1:80,000) were compared to H-10597 soundings. Comparisons showed agreement within 0.5 meters with all but three of the charted soundings with the largest discrepancy observed as 1.2 meters. Two soundings were equivalent to the charted depths with the remaining charted depths being shoaler than corrected soundings.

Chart comparisons with chart 11480 (32nd ed., 14 May 94, 1:449,659) showed the same trend as comparisons with chart 11513. Only five charted soundings not covered by chart 11513 fell within the borders of survey H-10597. Charted soundings were shoaler by 0.9 to 2.6 meters.

P. ADEQUACY OF SURVEY See also Evaluation Report.

All items found during this survey have been resolved. This survey is complete and adequate to supersede all prior surveys of the area.

Q. AIDS TO NAVIGATION

No aids to navigation exist within the survey area.

R. STATISTICS

Number of Positions	5464
Main-scheme Sounding Lines (Nautical Miles)	777.3
Crosslines (Nautical Miles)	79.6
Square Nautical Miles Surveyed	31.5
Days of Production	21
Detached Positions	7
Bottom Samples	15
Tide Stations Installed	None
Current Stations	None
Number of CTD Casts	4
Magnetic Stations	None

S. MISCELLANEOUS See also Evaluation Report.

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area. No unusual submarine features were discovered. Bottom samples were submitted to the Smithsonian Institution.

T. RECOMMENDATIONS See also Section P. of the Evaluation Report.

H-10597 is complete and without inadequacies. No additional fieldwork is required. There are no current plans for construction or dredging in the survey area.

U. REFERRAL TO OTHER REPORTS

There are no other relevant reports submitted as a part of OPR-G398-WH.

Submitted by:

Andrew L. Beaver LT/NOAA

Lieutenant Andrew L. Beaver, NOAA
Operations Officer, NOAA Ship WHITING

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-B616-WH

SURVEY H-10597 FIELD SHEET WH-10-3-95 (c)
ITEM NUMBER SSS Contact 7166.33P
CHART NO. (largest scale) 11480

DESCRIPTION OR CROSS REFERENCE(S): Hard Hit

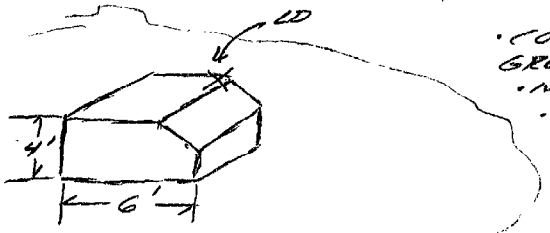
AWOIS POS: L ° ' " N
(NAD 83) λ ° ' " W

SSS POS: L ° ' " N
λ ° ' " W
E 42268
N 23730

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced 1926 Completed 1948
Current (Slack) 0.5 kts 1 kt 1.5+ kts Bottom Type (S) (Sh) M P
Visibility 0 1 2 3 4 (5) 6 7 8 9 ≥10m

INVESTIGATION NOTES:



- COVERED WITH GROWTH
- NO VISIBLE DOORS
- HOLLOW

POSITION: Date/DN 9 MAY 95 / 129 Time (UTC) 19:41:07 Fix # 3010
Easting 42264.1 Northing 23731.7
Latitude 31 ° 52 ' 48.721 " N Longitude 080 ° 38 ' 52.863 " W
LORAN C: W 14 X 25 Y ~~13~~ 45530.5 Z ~~60~~ 61244.4
(LORAN for AWOIS only. GRI = ~~9960~~ 7980 ~~N.E.~~ S.E. United States.)

LEAST DEPTH: Date/DN 9 MAY 95 / 129 Time (UTC) 1935
Method TRACK 3 68232
S/N

Measured Depth: 1. 39.93 2. — 3. — Avg. 17.45 (m) ft

Uncorrected Depth:	17.45	meters
Tide Corrector:	-1.9 2.1	meters
Draft Corrector:	—	meters
Velocity Corrector:	-4	meters
CORRECTED LEAST DEPTH:	15.55 (50FT)	meters

Recorder [illegible] Checked by _____

SEE SECTION N.1., PAGE 8, OF DESCRIPTIVE REPORT FOR CHARTING RECOMMENDATION

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-G398-WH

SURVEY H-10597 FIELD SHEET WH-10-3-95
ITEM NUMBER 6542.59P
CHART NO. (largest scale) 11480

DESCRIPTION OR CROSS REFERENCE(S): 6556.06P - Hard Hit

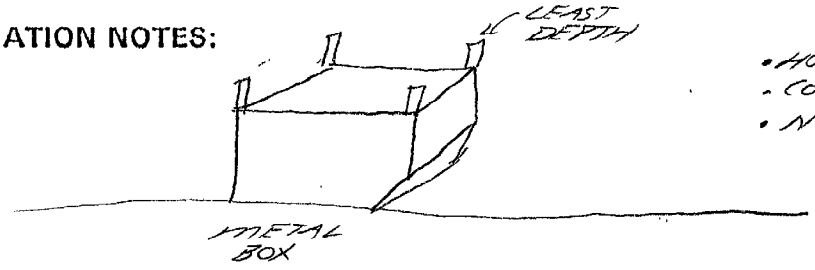
AWOIS POS: (NAD 83) L ° ' " N λ ° ' " W

SSS POS: L ° ' " N λ ° ' " W
E 41363.3
N 22735.9

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack (0.5 kts) 1 kt 1.5+ kts Bottom Type (S) (Sh) M P
Visibility 0 1 2 3 4 5 6 7 8 9 (10)

INVESTIGATION NOTES:



- HOLLOW
- COVERED W/ GROWTH
- NO VISIBLE DOORS

POSITION: Date/DN 6/7/95 158 Time (UTC) 1610 Fix # 3050
Easting 41367.5 Northing 22736.0
Latitude ° ' " N Longitude ° ' " W
LORAN C: W 14 X 31 Y 45531.1 Z 61250.5
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN 6/7/95 158 Time (UTC) 1635
Method MOD 3
S/N 68337

Measured Depth: 1. 36.90 2. _____ 3. _____ Avg. 15.33 (m) ft

Uncorrected Depth:	15.33	meters
Tide Corrector:	-0.912	meters
Draft Corrector:	—	meters
Velocity Corrector:	—	meters
CORRECTED LEAST DEPTH:	14.41 (46 FT)	meters

Recorder [illegible] Checked by _____

SEE SECTION N.2, PAGE 9, OF DESCRIPTIVE REPORT FOR CHARTING RECOMMENDATION

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-~~G398~~-WH

SURVEY H-10597 FIELD SHEET WH-10-3-95
ITEM NUMBER 6556.10P
CHART NO. (largest scale) 11480

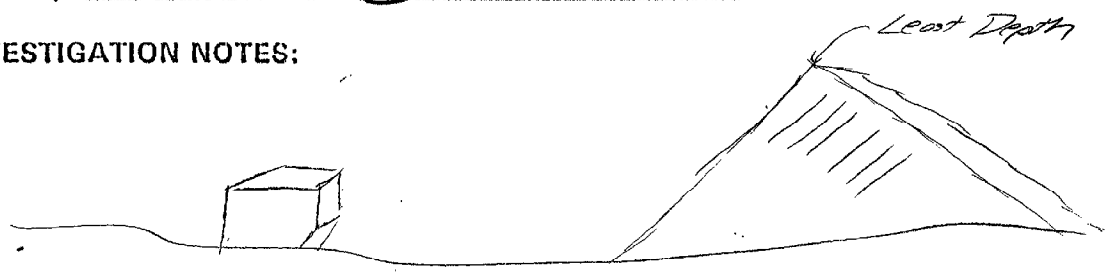
DESCRIPTION OR CROSS REFERENCE(S): 6542.57P - Hard Hit

AWOIS POS: (NAD 83) L ° ' " N λ ° ' " W
SSS POS: L ° ' " N λ ° ' " W
E 41396.1
N 22755.6

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack (0.5) kts 1 kt 1.5+ kts Bottom Type (S) (Sh) M P
Visibility 0 1 2 3 4 (5) 6 7 8 9 >10 m

INVESTIGATION NOTES:



POSITION: Date/DN 20 JUN 95 / 171 Time (UTC) 154240 Fix # 3057
Easting 41403.3 Northing 22751.7
Latitude 31 ° 52 ' 17.964 " N Longitude 80 ° 39 ' 25.694 " W
LORAN C: W 14 X 31 Y 45531.0 Z 61252.3
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN 20 JUN 95 / 171 Time (UTC) 1600
Method HYDRA 14.69 in
S/N 6833

Measured Depth: 1. 37.15 2. 35.85 3. _____ Avg. _____ m ft

Uncorrected Depth:	~~15.46~~ / ~~14.57~~ 14.6	meters
Tide Corrector:	-0.8 / 1.3	meters
Draft Corrector:	_____	meters
Velocity Corrector:	_____	meters
CORRECTED LEAST DEPTH:	13.8 3 (43 FT)	meters

Recorder [illegible] Checked by _____

SEE SECTION N.3, PAGE 9, OF DESCRIPTIVE REPORT FOR CHARTING RECOMMENDATION

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-~~G398~~-WH

SURVEY H-10597 FIELD SHEET WH-10-3-95
ITEM NUMBER 1233.095
CHART NO. (largest scale) 11480

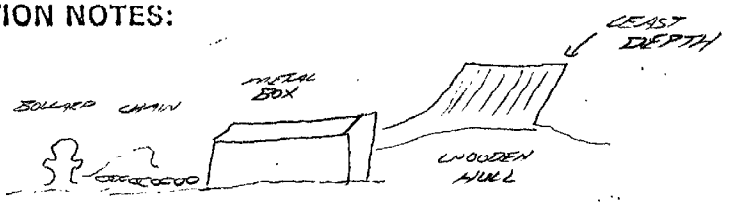
DESCRIPTION OR CROSS REFERENCE(S): 4 Hard Lits together

AWOIS POS: (NAD 83) L ° ' " N λ ° ' " W
SSS POS: L ° ' " N λ ° ' " W
E 42765.4
N 22520.9

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack (0.5) kts 1 kt 1.5+ kts Bottom Type (S) (Sh) M P
Visibility 0 1 2 3 4 5 6 7 8 9 (>10) m

INVESTIGATION NOTES:



POSITION: Date/DN 20 JUN 95 171 Time (UTC) 163725 Fix # 3059
Easting 42457.0 Northing 22523.6
Latitude 31° 52 ' 10.485 " N Longitude 80° 38 ' 45.624 " W
LORAN C: W 14 X 31 Y 45526.7 Z 61247.1
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN 20 JUN 95 171 Time (UTC) 1700
Method MOD3 14.66 ft
S/N 68332

Measured Depth: 1. 38.28 2. _____ 3. _____ Avg. 16.26 (m) ft

Uncorrected Depth:	16.26	meters
Tide Corrector:	-1.27	meters
Draft Corrector:	—	meters
Velocity Corrector:	—	meters
CORRECTED LEAST DEPTH:	15.114.5 (47FT)	meters

Recorder _____ Checked by _____

SEE SECTION N.S., PAGE 9, OF DESCRIPTIVE REPORT FOR CHARTING RECOMMENDATION

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-~~G398~~-WH

SURVEY H-10597 FIELD SHEET WH-10-3-95
ITEM NUMBER 9356.34 P
CHART NO. (largest scale) 11480

DESCRIPTION OR CROSS REFERENCE(S): 9361.52P - Hard Hit

AWOIS POS: L ° ' " N SSS POS: L ° ' " N
(NAD 83) λ ° ' " W λ ° ' " W
E 45965.6
N 21693.3

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack (0.5) kts 1 kt 1.5+ kts Bottom Type (S) (Sh) M P
Visibility 0 1 2 3 4 (5) 6 7 8 9 >10 m

INVESTIGATION NOTES: Coral Head

POSITION: Date/DN 20 JUN 95 171 Time (UTC) 195218 Fix # 3065
Easting 45986.5 Northing 21700.5
Latitude 31° 51' 43.491" N Longitude 80° 36' 31.425" W
LORAN C: W 14 X 31 Y 45511.7 Z 61279.5
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN 20 JUN 95 171 Time (UTC) 1538
Method MOD 3 14.81 m
S/N 6833

Measured Depth: 1. 40.85 2. _____ 3. _____ Avg. 17.93 (m) ft

Uncorrected Depth:	17.93	meters
Tide Corrector:	-2.01	meters
Draft Corrector:	—	meters
Velocity Corrector:	—	meters
CORRECTED LEAST DEPTH:	~~15.9~~ 16.8 (55 FT)	meters

Recorder [signature] Checked by _____

SEE SECTION N.4, PAGE 9, OF DESCRIPTIVE REPORT FOR CHARTING RECOMMENDATION

HORIZONTAL CONTROL STATIONS

WHITING personnel erected a HF Differential GPS receiver/transmitter on the grounds of Skidaway Institute of Oceanography (station SKID). The position of the Skidaway mark was faxed from Field Photogrammetry Section to the WHITING on March 6, 1995. WHITING launches conducted DGPS performance checks using the Jones Island Range, Front Light as a known position. The positions are as follows:

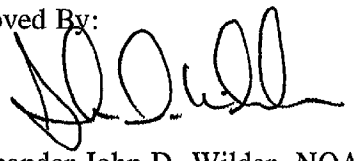
Station:	**SKID**
Latitude:	31° 59' 19.22599" N
Longitude:	081° 01' 12.26294" W
Ellipsoid Ht:	-29.858 meters

Station:	**Jones Island Range, Front Light**
Latitude:	32° 02' 31.71243" N
Longitude	080° 51' 10.09256" W

APPROVAL SHEET
HYDROGRAPHIC SURVEY
OPR-G398-WH
1995
WH-10-3-95
H-10597

The data for this survey were acquired and checked under my daily supervision. Position and sounding accuracy meet the requirements specified in the Field Project Instructions, Hydrographic Manual, Hydrographic Survey Guidelines and the Field Procedures Manual for Hydrographic Surveying. This survey is complete and adequate for the intended purpose of delineating bottom topography, determining depths and identifying all potential dangers to navigation. No final field sheets were prepared for this survey. The survey data and accompanying records are complete for the preparation of the smooth sheet.

Approved By:



Commander John D. Wilder, NOAA
Commanding Officer, NOAA Ship WHITING

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 25, 1995

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-G398-WH

HYDROGRAPHIC SHEET: H-10597

LOCALITY: East of Tybee Island, Georgia and the Savannah River Entrance

TIME PERIOD: April 24 - June 28, 1995

TIDE STATION USED: 867-1029 Tybee Marina, Ga.
Lat. 31° 59.8′N Lon. 80° 51.3′W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): -0.05 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 6.8 ft.

REMARKS: RECOMMENDED ZONING

Apply a -10 minute correction to times and a x0.97 range ratio to heights using Tybee Marina, Ga. (867-1029).

Notes: 1. Times are tabulated in Greenwich Mean Time.
2. Data for Tybee Marina, Ga. (867-1029) are temporarily stored on file #667-1029.

Caution: Tybee Marina, Ga. (867-1029) data are considered preliminary until vertical stability is verified with closing levels by the NOAA ship Whiting.

William M. Stone

CHIEF, DATUMS SECTION

TIDE STATION NOTE

TYBEE MARINA #867-1029

The tide station at Tybee Marina was set up on March 29, 1995 and continues to be operational. Five bench marks were tied and leveled forward and backward. Opening levels were run on March 30, 1995. A confidence check tying three bench marks was run on June 6, 1995, and confirmed that the staff was not disturbed.

The station referenced with the tide station at Fort Pulaski will serve as control for datum determination for hydrography in Sheet C (H-10597). The station is located at 31° 59.8' N, 080° 51.3' W.

The tide station was installed at the western end of the deck at Tybee Marina. The station consists of: 1) a Fisher & Porter ADR set on top of a 6" PVC floatwell clamped to the southwestern most pile, 2) a tide staff of vitrified metal strips graduated in feet secured to a 2"x4"x12' backing board installed on a pile supporting the floating pier (Note: the staff was mounted in such a way that the motion of the floating pier should not effect the staff.), and 3) a Next Generation Sutron 8200 tide gauge. This gauge consists of a water level sensor on top of a 20' long 4" PVC protective well and connected to the 8200 DCP. The 8200 is mounted inside the protective cabinet located at the southwest end of the Tybee Marina pier. A GOES antenna and solar panel are mounted to a 4' steel mast and connected to the 8200 DCP using standard connections and cables.

An opening tide station package was submitted for this station on May 1, 1995.

NOAA FORM 76-155
(11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10597

Name on Survey	A ON CHART NO. 11480	B ON PREVIOUS SURVEY NO. 11513	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
GEORGIA (title)	X		X							1
NORTH ATLANTIC OCEAN	X		X							2
TYBEE ROADS (inlet)	X		X							3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
				Approved:						18
										19
				Chief Geographer						20
				OCT 11 1995						21
										22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

06/03/96

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10597

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	5464
NUMBER OF SOUNDINGS	31198

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	40	10/05/95
VERIFICATION OF FIELD DATA	31	01/26/96
QUALITY CONTROL CHECKS	0	
EVALUATION AND ANALYSIS	20	
FINAL INSPECTION	9.50	03/08/96
COMPILATION	33	05/17/96
TOTAL TIME	134	

ATLANTIC HYDROGRAPHIC BRANCH APPROVAL 03/18/96

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10597 (1995)

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

Hydrographic Processing System
NADCON, version 2.10
AUTOCAD, Release 12
QUICKSURF, version 5.1
MicroStation, version 5.0
I/RAS B, version 5.01

The smooth sheet was plotted using an ENCAD NovaJet III plotter.

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values. The smooth sheet has been annotated with ticks showing the computed mean shift between the NAD 83 and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27, move the projection lines 0.780 seconds (24.032 meters or 2.40 mm at the scale of the survey) north in latitude, and 0.623 seconds (16.374 meters or 1.64 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H-10591 (1995) to the west
H-10609 (1994) to the east
H-10624 (1995) to the north
H-10631 (1995) to the north
H-10642 (1995) to the south

Standard junctions were effected between the present survey and surveys H-10591 (1995), H-10609 (1995), H-10624 (1995), H-10631 (1995), and H-10642 (1995).

A standard junction could not be effected with survey H-10631 (1995). The survey has not reached the sounding stage of office processing.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4. of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995.

N. ITEM INVESTIGATIONS

Two uncharted obstructions were noted in the vicinity of Latitude 31°52'18"N, Longitude 80°39'25"W during side scan operations conducted during survey H-10591 (1995). One of the two obstructions was investigated using divers during H-10591 (1995) operations and is discussed in the Descriptive Report for that survey. The obstruction shown on H-10591 (1995) has been brought forward from the prior survey to supplement the present survey. The second obstruction was investigated during present survey operations. A steel container, in Latitude 31°52'17.96"N, Longitude 80°39'25.69"W, with a least depth of 43 feet (13^3 m) was located. It is recommended that these obstructions be charted as obstructions with a least depth of 43 feet (13^3 m)and a danger curve in the location shown on the present survey.

O. COMPARISON WITH CHARTS 11513 (21st Edition, June 4/94) 11480 (32nd Edition, May 14/94)

Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in sections N. and O. of the Descriptive Report.

The present survey is adequate to supersede the charted hydrography within the common area.

P. ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar survey. No additional work is recommended.

S. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

WHITING Processing Team

Robert Snow
Robert Snow
Cartographic Technician

Norris A. Wike
Cartographer

APPROVAL SHEET
H-10597

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Date: 18 MAR 96

Norris A. Wike
Cartographer
Atlantic Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Date: 18 March 1996

Nicholas E. Perugini
Commander, NOAA
Chief, Atlantic Hydrographic Branch

****

Final Approval:

Approved: Date: July 7, 1996

Andrew A. Armstrong, III
Captain, NOAA
Chief, Hydrographic Surveys Division

NOAA FORM 75-96
(10-83)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H10597

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
11513	5/17/96		Full ~~Part Before~~ After Marine Center Approval Signed Via FULL APPLICATION
			Drawing No. OF SOUNDINGS FROM SMOOTH SHEET
11480	5/17/96		
			Full ~~Part Before~~ After Marine Center Approval Signed Via FULL APPLICATION
			Drawing No. OF SOUNDINGS THRU 11513
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.