

9603

Diag. Cht. Nos. 904-2 & 905

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT (HYDROGRAPHIC)

Type of Survey HYDROGRAPHIC
Field No. WH-10-3-76
Office No. H-9603

LOCALITY

State U.S. VIRGIN ISLANDS
General Locality ST. THOMAS
Locality NORTHWEST OF ST. THOMAS

1976

CHIEF OF PARTY
R.A. Trauschke

LIBRARY & ARCHIVES

DATE 5/24/77

☆ U.S. GOV. PRINTING OFFICE: 1975-688-353

9603

Area 3

Charts

*904
905
920*

*Nmck
4/80*

HYDROGRAPHIC TITLE SHEET

H-9603

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

FIELD NO.

WH-10-3-76

State U.S. Virgin Islands

General locality St. Thomas ~~Island~~

Locality ~~Area~~ Northwest of St. Thomas ~~Island~~

Scale 1:10,000 Date of survey March 3-24, 1976

Instructions dated October 16, 1975 Project No. OPR-423-WH-76

Vessel NOAA Ship Whiting

Chief of party Robert A. Trauschke, CDR, NOAA
LCDR. J.W. DeCoste, LT.D.W. Yeager, LT. P.R. Chelgren, ENS. J.G. Gofus

Surveyed by ENS. G.R. Barone, ENS. V.E. Newell, ENS. D.M. Goodrich

Soundings taken by echo sounder, ~~hand lead, etc.~~ Ross 5000

Graphic record scaled by Ships personnel

Graphic record checked by Ships personnel

Protracted by N/A Automated plot by Calcomp-618
Hydroplot System

Verification by R. Hill

Soundings in ~~fathoms~~ at MLW feet ~~xxxxxx~~ xxxxxx Soundings ~~not~~ reduced for tides

REMARKS: Time meridian for all work was 0°, (GMT)

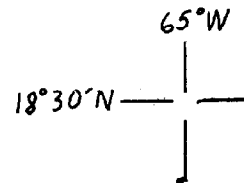
Project instructions supplemented by change # 1, dated 20 January

1976.

Applied to station 10-28-77
OH

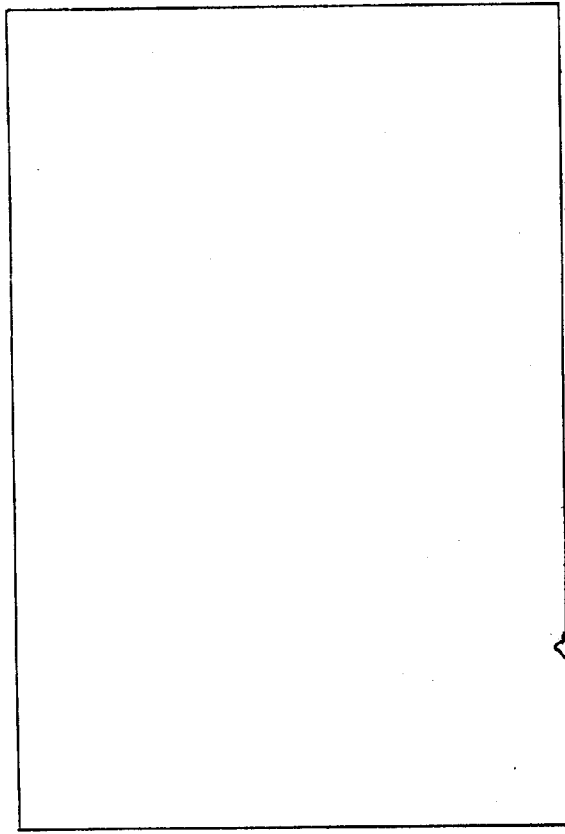
WH-10-3-76

SHEET LIMITS



Scale 1:10000

From Chart 25650



o Cricket Rks.
o Cockroach I.

o Dutchcap Cay

Salt Cay

West Cay

Kalkun Cay.

Savana I.

St. Thomas I.

18°20'N

65°W

DESCRIPTIVE REPORT
TO ACCOMPANY HYDROGRAPHIC SURVEY
H-9603 (Field No. WH-10-3-76)

A. PROJECT

This survey was conducted in accordance with Project Instructions OPR-423-WH-76, Virgin Islands, dated October 16, 1975, as supplemented by Change No. 1 dated January 20, 1976.

B. AREA SURVEYED

The area surveyed is approximately 5 miles Northwest of St. Thomas Island, with the following boundaries:

Latitude (North) $18^{\circ}22.1'$ - $18^{\circ}28.15'$

Longitude (West) $65^{\circ}04.5'$ - $65^{\circ}08.4'$

The nearest adjacent coastline is on Cockroach Island, Dutchcap Cay, Salt Cay, Kalkun Cay and Savana Island.

The survey was conducted from March 3, 1976 (Julian Day 063) to March 24, 1976 (Julian Day 085). Main scheme line spacing was 400 meters, except in areas less than 125 feet in which 200 meter spacing was used. Morphology of the bottom in the area covered by this survey was generally relatively flat except in the

southern portions of the area where the bottom was irregular, depth curves tend generally East-West in this area another irregular area was noted in the Northwest corner of the sheet, bottom samples in this area also show a change, this area is coral and probably a submerged coral reef.

C. SOUNDING VESSEL

The NOAA Ship WHITING, CSS-29, performed all survey operations on this sheet. The EDP number of the WHITING was 2930.

D. SOUNDING EQUIPMENT

The depth recorder used by the WHITING for this survey was a Ross Model 5000, Serial Number 1049; the digitizer a Ross Model 6000, Serial Number 1055; and the transmitter a Ross Model 4000, Serial Number 1055. This equipment performed satisfactorily during the course of the survey with no breakdowns, recording depths between 100 and 200 feet. Calibrations were done frequently during the operations; any initial error was taken into account during scanning of the fathograms. Squat and settlement corrections were obtained from October 1973 trials of the WHITING.

These corrections are listed in the Appendices under "Abstract of Corrections to Echo Soundings".

Two leadline comparisons with this fathometer were taken in shallow (70 ft.) water. After applying velocity corrections and correcting for transducer draft, differences between leadline casts and fathometer readings were negligible (less than 1 %).

Velocity corrections were based on three Nansen casts and TDC cast taken at the following dates and locations:

Nansen casts:	March 8, 1976	18°32.6' N
		65°16.8' W
	March 12, 1976	18°08.8' N
		65°10.1' W
	March 26, 1976	18°09.0' N
		65°11.0' W
TDC cast	March 4, 1976	18°19.9' N
		65°01.1' W

Corrections produced from these casts are essentially identical. Data from the casts was used to compute sound velocity at depth, by means of program RK 530 with curve fit option. Transducer draft was taken into account. This output information was then graphed,

and depth intervals for which particular corrections were to be applied were scaled ~~off~~ (ref. Provisional Hydrographic Manual). Intervals and their corrections were then made up into a velocity correction tape, which was used in final plots.

E. HYDROGRAPHIC SHEETS

The field sheets were prepared by WHITING personnel using a Houston Instrument Model DP-3-5 Plotter, serial number 4680-1. The survey area was divided into two plotter sheets at $65^{\circ}06'30''$. Velocity corrections and static draft corrections have been applied to the soundings; electronic position corrections have been applied during the plotting.

The smooth sheets will be sent to Atlantic Marine Center, Norfolk, Virginia for verification and plotting.

F. CONTROL STATIONS

The following were used as electronic control stations:

<u>Name</u>	<u>EDP Number</u>	<u>Locality</u>
EL VIGIA USE, 1966	148	Culebra I.
EAST END , 1900	158	Vieques I
T-95 CADASTRAL, 1946 (Fortuna Hill)	130	St. Thomas I.

All stations are monumented, recoverable, and conform to 3rd order standards. Puerto Rico datum is used throughout.

G. HYDROGRAPHIC POSITION CONTROL

Position control was accomplished using the Del Norte system, a range-range configuration stations were selected so that intersection of Del Norte ranges was at no time less than 30°.

At times during the course of the survey erroneous readings were obtained; however, at no time

were these errors frequent enough to seriously degrade the accuracy of the survey. These errors were noted on line and later corrected on a time and course basis. Probable causes for these readings were system malfunction or foremast interference. The former would include DMU, Remote, or Master malfunction. Foremast interference refers to the fact that, on certain headings, the foremast passed between Remote and Master Units, causing occasional erroneous readings.

Calibration of the system in the field was accomplished using three point fixes on the signals listed in the appendix. Pattern correctors were computed from visual and electronic fix data using RK 561. Inverse distance between fixes and check fixes were compared and daily pattern correctors computed as follows:

Fixes with inverse distances of 20 meters were counted once; 10-15 meter inverses, twice; 5-10 meter inverses, 3 times; and inverses of less than 5 meters were counted 4 times in averaging.

In this manner the effects of bad visual fixes were minimized. In addition every two weeks, the system

was calibrated along a baseline of known length. In this configuration, each DMU and Master was calibrated against the complete set of Remote units in accordance with procedures described in the Del Norte manual.

The equipment used was as follows:

Distance Measuring Unit, serial number 180; Master Unit, S/N 185; Remote Unit "A" (El Vigia), S/N 251; Remote Unit "D" (I-95), S/N 245; and Remote Unit "D" (East End) S/N 222.

All field and baseline calibrations are included in the report "Field Records for Determination of Electronic Position Correctors".

For the most part, this electronic position control was stable and consistent during the course of this survey.

H. SHORELINE

There was no shoreline covered on this survey.

I. CROSSLINES

The percentage of crosslines run on this survey was 14.4 %. Agreement between main scheme and crosslines was excellent, generally 0-1 ft. In no case was any sounding in disagreement by more than three feet and these few occurred in areas of irregular relief.

J. JUNCTIONS

This survey junctions with five contemporary surveys, four of which were done during this project. Junctions with ^{H-9601 ESE} WH-10-1-76 and ^{H-9602 ENE} WH-10-2-76 are excellent, with differences of 1 foot or less. Although no actual junction was required (i.e. same vessel, same year) with ^{H-9617 S.} WH-10-5-76, the adjacent line on WH-10-5-76 shows continuity of depth curves and good area agreement.

Agreement of junction sounding on ^{H-9604 W to NNW} WH-20-1-76 is good, well within one fathom. Junctions with ~~survey~~ ^{H-9517 NNE} survey WH-20-2-75, done also by the WHITING in 1975 was excellent with agreement within 0-1 feet except where bottom was irregular and soundings did not fall exactly on top of each other, disagreement was less than three feet in these areas.

K. COMPARISON WITH PRIOR SURVEY

The last survey of this area was done in 1923-1926, Registry No. H4651a. The scale was 1:20,000 and the soundings were in ~~fathoms~~^{feet}. The survey only extends to 26° N. A random sampling of soundings throughout the survey showed good agreement (within 1 fathom) on all but two soundings:

H-4651a	H-9603		
<u>Depth</u>	<u>Depth</u>	<u>Latitude</u>	<u>Longitude</u>
176	168	18°23.6' N	65°07.7' W
188	179	18°24.4' N	65°06.0' W

The latter was the deepest found on H-4651a, while the deepest on H-9603 was 183 feet. This area shows evidence of irregular bottom with small peaks, it is felt that the shoaler soundings from this survey should be charted as these depths were probably missed during the course of the prior survey.

L. COMPARISON WITH THE CHART

The survey was compared with Chart 25650 (904), Virgin Passage and Sonda de Vieques, dated August 9, 1975. Agreement was good overall within .50 fathom on all soundings but those mentioned below. Disagreement

may be due in part to errors in transferring soundings from the 1:100,000 chart to the 1:10,000 sheet. An additional source of error is in the comparison of soundings in fathoms to soundings in feet. However, several of the disagreements clearly cannot be accounted for by these effects.

The following soundings were in substantial disagreement:

<u>Charted Sounding</u> (feet)	<u>Nearest Sheet</u> <u>Sounding (feet)</u>	<u>Latitude</u>	<u>Longitude</u>
1. 168	179-183	18°27. ⁹⁵ 1' N	65°05.3' W ⁷⁴
2. 174	180	18°27. ⁹ 2' N	65°06.0' W
3. 198	174-175	18°27.3' N	65°0 ⁵ 6.8' W
4. 168	177	18°27.5' N	65°06.6' W
5. 138	176 130	18°2 ² 7.8' N	65°07.5' W
6. 102 (Source unknown) <i>See verifier's report.</i>	178-179	18°24.0' N	65°07.5' W

Sounding numbers 2, 4, and 5 fell directly on a sheet sounding, while nos. 1, 3, and 6 fell between lines (sheet depth given is the local range of depths). Sounding 6, the shoalest depth in this area of the chart, was not found nor was there any indication of shoaling in the immediate vicinity. It is believed that the survey is of greater accuracy than the chart and that ^{present} survey depths should be used.

M. ADEQUACY OF SURVEY

This survey is complete and adequate, and should supercede all prior surveys.

N. AIDS TO NAVIGATION

There no aids to navigation in the survey area.

O. STATISTICS

Total Miles	139.9
Total Square Miles (Inner Margins)	20.4
Percentage of Crosslines	14.4
Number of Positions:	
STD Stations	3
Tide Stations	5

P. MISCELLANEOUS

The central meridians listed in the Projection Parameters form are the central meridian of the smooth sheet and not of the project (i.e. not same as on parameter tape).

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

Data was plotted on-line using RK 111, Range-Range Real-Time Hydroplot, version 1/30/76. Off-line plots were formulated with RK 211, Range-Range Sounding Plot, version 1/15/76. Visual calibrations of Del Norte units were obtained through RK 561, Hyperbolic and Range-Range Geodetic calibrations, version 2/19/75. Plotting sheets were constructed using AM 201, Grid and H/R Lattice Plot, version 4/18/75. All types were edited using AM 602, Extended Line-Oriented Editor (ELINORE), version 3/10/72.

S. REFERENCES TO REPORTS

The reports "Field Records for Determination of Electronic Position Correctors" and "Field Records for Determination of Corrections to Echo Soundings" will be forwarded to Atlantic Marine Center, Norfolk, Virginia shortly after this report.

Approval Sheet

David M. Goodrich

Submitted by

David M. Goodrich
Ensign, NOAA

Supervision of field and office work on this hydrographic survey was continuous on a day to day basis to ensure completeness of the survey and that all work was done in accordance with the instructions.

Approved/Forwarded

Robert A. Trauschke
Robert A. Trauschke

Cdr., NOAA
Commanding Officer, NOAA Ship Whiting

VELOCITY TAPE LISTING

WH-10-3-76, H-9603

page 1 of 2

000140 0 0025 0002 000 293000 009603

000235 0 0010

000325 0 0015

000420 0 0020

000510 0 0025

000605 0 0030

000700 0 0035

000790 0 0040

000885 0 0045

000975 0 0050

001070 0 0055

001160 0 0060

001255 0 0065

001350 0 0070

001440 0 0075

001535 0 0080

001625 0 0085

001720 0 0090

001815 0 0095

001910 0 0100

002000 0 0105

002100 0 0110

002300 0 0120

002470 0 0130

002670 0 0140

002850 0 0150

003050 0 0160

003250 0 0170

003420 0 0180

Velocity tape listing, continued
page 2 of 2

003620 0 0190
003300 0 0200
004000 0 0210
004180 0 0220
004370 0 0230
004550 0 0240
004750 0 0250
004950 0 0260
005150 0 0270
005360 0 0280
005630 0 0290
005800 0 0300
006000 0 0310
006200 0 0320
006450 0 0330
006650 0 0340
006850 0 0350
007100 0 0360
007300 0 0370
007550 0 0380
007750 0 0390
008000 0 0400
008200 0 0410
008450 0 0420
008700 0 0430
008950 0 0440
009200 0 0450
009400 0 0460
999999 0 0460

9/2/76

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center:

Hourly heights are approved for Form 362

Tide Station Used (NOAA Form 77-12): Botany Bay

Period: March 3 - 25, 1976

HYDROGRAPHIC SHEET: H-9603

OPR: 423

Locality: Off the northwest coast of St. Thomas, V.I.

Plane of reference (mean ~~lower~~ low water): 2.2 ft.

Height of Mean High Water above Plane of Reference is
0.9 ft.

Remarks: Zone direct.



Chief, Tides Branch

GEOGRAPHIC NAMES

H-9603

Name on Survey	A ON CHART NO.		B ON PREVIOUS SURVEY NO.		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	
ST. THOMAS (TITLE)																		1
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																		3
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APPROVED

Chas. E. Harrington

STAFF GEOGRAPHER - C51x2

27 JUNE 1977

APPROVAL SHEET
FOR
SURVEY H- 9603

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~has not~~ been made. A new final sounding printout has/~~has not~~ been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Provisional Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date: 26 April 1977

Signed:

William L. Jones

Title: Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-9603

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET with smooth PNO & excess overlay	1	BOAT SHEETS (2 parts, mylar)	1
DESCRIPTIVE REPORT	1	OVERLAYS (preliminary)	2

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
Accordition ENVELOPES	7		smooth 1			misc. data
CAHIERS	1-with printouts					
VOLUMES	1					
BOXES			1			

T-SHEET PRINTS (List) NONE

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				1900
POSITIONS CHECKED		80	10	
POSITIONS REVISED		10	--	
DEPTH SOUNDINGS REVISED		30	5	
DEPTH SOUNDINGS ERRONEOUSLY SPACED		--	--	
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		--	--	
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS		--	--	
JUNCTIONS		12	2	
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		15	6	
SPECIAL ADJUSTMENTS		--	--	
ALL OTHER WORK		56	12	
TOTALS		83	20	
PRE-VERIFICATION BY D. V. Mason, M. W. Johnson	BEGINNING DATE 05/21/76	ENDING DATE 12/04/76		
VERIFICATION BY R. R. Hill	BEGINNING DATE 04/01/77	ENDING DATE 04/21/77		
REVIEW BY R. R. Hill	BEGINNING DATE 04/22/77	ENDING DATE 04/29/77		

QC. Insp. R.W. Derkarian 8 hrs. 6/22/77
DR Eisle 4 hrs 30/1/77

Cartage: 6 hrs 10-17-77

Reg. No. 9603

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

pos 38
1777

Reg. No. _____

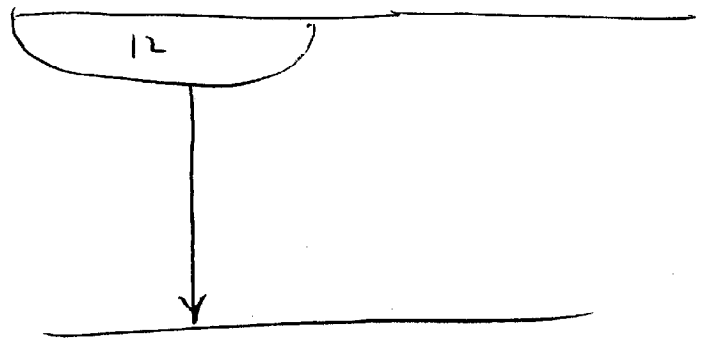
The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE 10-13-82 TIME REQ'D. _____ INITIALS JAC

REMARKS:



H-9603

Information for Future Presurvey Reviews

The bottom has basically remained unchanged although several isolated areas reveal differences of 20 feet which is attributed to different survey methods.

<u>Position Index</u>		<u>Bottom Change</u>	<u>Use</u>	<u>Resurvey</u>
<u>Lat.</u>	<u>Long.</u>	<u>Index</u>	<u>Index</u>	<u>Cycle</u>
182	651	2	1	50 years

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9603

FIELD NO. WH-10-3-76

U.S. Virgin Islands, Northwest of St. Thomas

SURVEYED: March 3 through March 24, 1976

SCALE: 1:10,000

PROJECT NO.: OPR-423

SOUNDINGS: Ross Model 5,000 #1049

CONTROL: Del-Norte

Chief of Party	CDR R. A. Trauschke
Surveyed by	LCDR J. W. DeCoste
.....	LT D. W. Yeager
.....	LT P. R. Chelgren
.....	ENS J. G. Gofus
.....	ENS G. R. Barone
.....	ENS V. E. Newell
.....	ENS D. M. Goodrich
Automated Plot by	Calcomp Plotter #618 (JMC)
Verified and Inked by	R. R. Hill <i>RR Hill</i>

1. Introduction

Standard verification procedures were used in completing the verification of this survey and no unusual problems were encountered during this process.

2. Control and Shoreline

- a. The control for this survey is adequately described in Sections F and G of the Descriptive Report.
- b. There is no shoreline within the limits of this survey.

3. Hydrography

- a. Depths at crossings are in good agreement.
- b. The standard depth curves adequately represented the bottom. Several brown curves have been added to emphasize other bottom features.
- c. The development of the bottom configuration is adequate.

4. Condition of the Survey

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate to conform to the requirements of the Provisional Hydrographic Manual.

5. Junctions

An adequate junction has been effected with the following surveys:

H-9604 (1976) to the north and west
H-9517 (1975) to the north
H-9602 (1976) to the east
H-9617 (1976) to the south
H-9601 (1976) to the southeast

6. Comparison with Prior Surveys

a. H-4651a (1923-26) 1:20,000

This prior survey covers only the southern two-thirds of the present survey. There are no prior surveys covering the remaining northern portion. A comparison of the areas in common reveals only minor differences, which are attributed to the less detailed and less accurate methods employed on the prior survey.

The present survey is adequate to supersede the prior survey within the common areas.

b. H-4651b WD (1924-27) 1:20,000

This wire drag survey covers the southern two-thirds of the present survey. There are no conflicts between present survey depths and effective drag depths on this wire drag survey.

7. Comparison with Chart 25650, 20th Edition, August 9, 1975

a. Hydrography

The charted hydrography north of latitude 18° 26' apparently originates with British Admiralty charts. A comparison between the present survey and the charted hydrography reveals only minor differences, and these are considered insignificant.

The charted hydrography below latitude 18° 26' originates with the previously discussed prior survey and requires no further consideration. Only minor differences were noted between charted depths and present survey depths, with the following exception: ✓

A 17 fathom (102 feet)^{source unknown} charted sounding at latitude 18° 24.1'N, longitude 65° 07.56'W was not found on the present survey. The authenticity of this sounding is questionable and it is recommended not to be retained for charting. ✓

Except as noted, the present survey is adequate to supersede the charted hydrography within the common area. ✓

b. Aids to Navigation

There are no aids to navigation located within the limits of hydrography on this survey. ✓

8. Compliance with Instructions


This survey adequately complies with the Project Instructions. ✓

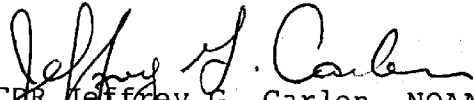
9. Additional Field Work

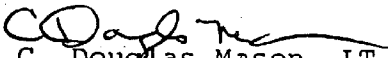
This is a very good basic survey and no additional field work is recommended. ✓


Approval Sheet for H-9603

Examined and Approved:
Hydrographic Inspection Team
Date:


CDR Robert A. Trauschke, NOAA
Chief, Processing Division

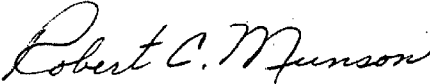

CDR Jeffrey G. Carlen, NOAA
Chief, Coastal Mapping Division


C. Douglas Mason, LT, NOAA
Chief, EDP Branch


William L. Jones
Chief, Verification Branch


Dorothy C. Calland
Verification Branch

Approved/Forwarded



Robert C. Munson
RADM, NOAA
Director, Atlantic Marine Center



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C352

June 22, 1977

A. J. Patrick
TO: A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: R. W. DerKazarian *RW DerKazarian*
Quality Evaluator

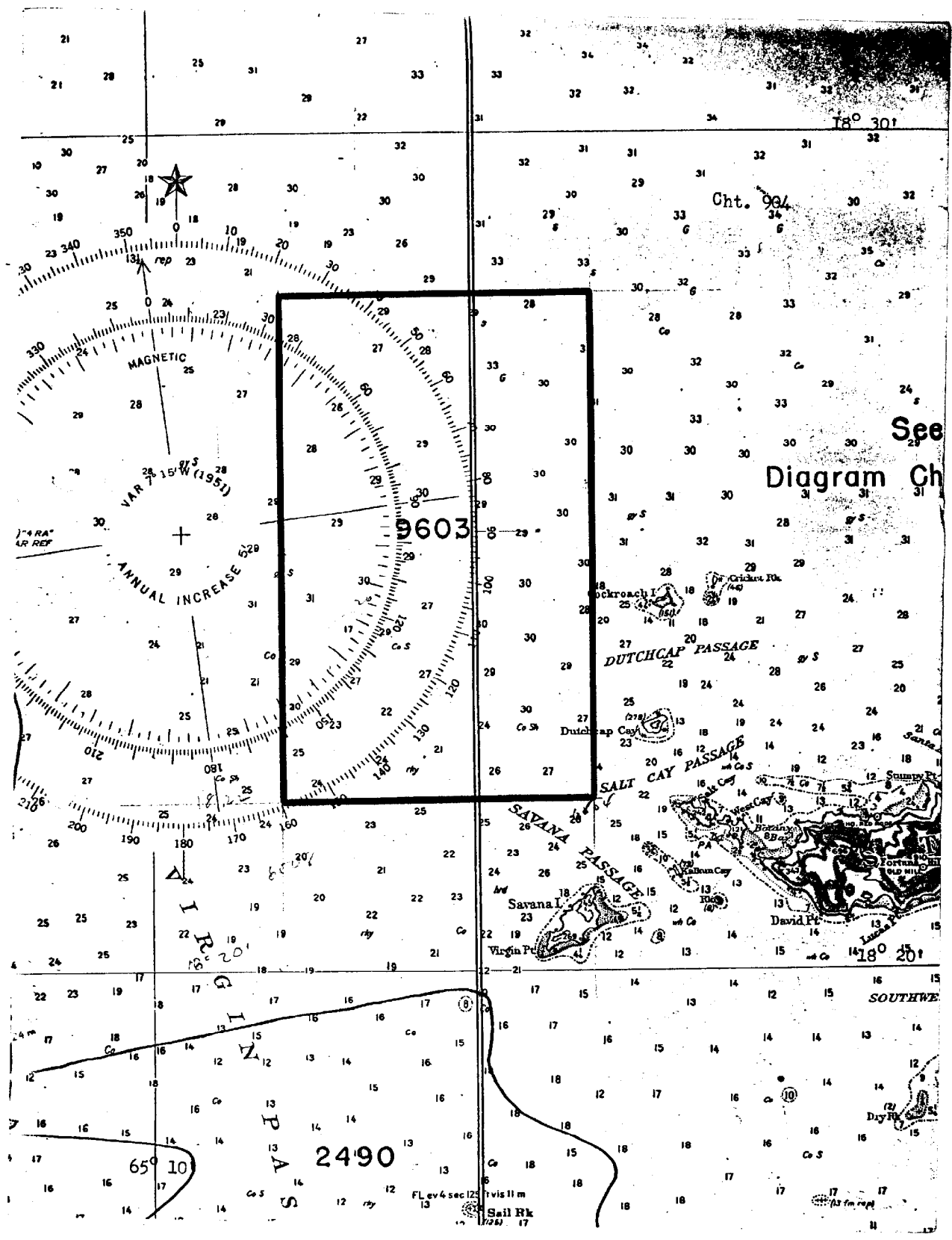
SUBJECT: Quality Control Report for H-9603 (1976), Northwest of
St. Thomas, St. Thomas, Virgin Islands

Survey H-9603 was inspected to evaluate the accuracy and adequacy of the survey with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements.

1. The junction adequacy of survey H-9601 and H-9617 of 1976 will be considered at the time of their quality control evaluation. These surveys have not been received at Headquarters as of the date of this report. An adequate junction was effected with H-9517 (1975) and H-9604 (1976) at the time of the quality control evaluation.

2. The HIT Team did not enter its time on the "Hydrographic Survey Statistics" sheet.

cc:
C351



See
Diagram Ch

9603

DUTCH CAP PASSAGE

SALT CAY PASSAGE

SAVANA PASSAGE

2490

FL ev 4 sec 123
Sail Rk

65° 10'

SOUTHWEST

