

9935

Diagram No. 905-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey .... Hydrographic.....  
Field No. .... MI-10-1-81.....  
Office No..... H-9935.....

LOCALITY

State ..... U.S. Virgin Islands.....  
General Locality .. Approaches to Christiansted ..  
Locality ..... Harbor.....

1982

CHIEF OF PARTY

CAPT R.A. Trauschke & CAPT J.A. Yeager.....

LIBRARY & ARCHIVES

DATE ..... August 8, 1986.....

9935

25634  
25636  
25645  
25671

Dr. Guy H. St...  
11/2/86

**HYDROGRAPHIC TITLE SHEET**

H-9935

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.

MI-10-1-81

State U.S. Virgin Islands

General locality St. Croix

Locality ~~White Horse Point to Pull Point~~ Approaches to Christiansted Harbor  
March 10 to March 28

Scale 1:10,000 Date of survey 43 February 1981

Instructions dated 13 November 1980 Project No. OPR-1149-MI-81, PE-81

Vessel NOAA Ship Mt. Mitchell launch (VESNO 2225)

Chief of party Captain Robert A. Trauschke, NOAA

Surveyed by Ship's officers (See Remarks)

Soundings taken by echo sounder, hand lead, pole Ross Model 5000 Fathme  
Echo sounder

Graphic record scaled by GC, BG, EM, FS, RW

Graphic record checked by GC, BG, EM, FS, RW

Protracted by \_\_\_\_\_ Automated plot by Synetics 1201 Plotter (A)

53 Verification by E.L. Saunders ~~to verification check by R.P. Hill~~

Soundings in fathoms and tenths ~~feet~~ at MLW MLLW ~~Fathoms at MLW (Gulf Coast Datum)~~

REMARKS: LTJG Jim Long

ENS. Daryl Henegar, OIC

Notes in red ink in the Descriptive Report  
were made during office processing.

STANDARDS CK'D 8-12-86

C. Loy

AWOIS/SURF SM&M 9/18/86

A. PROJECT

This survey was performed in accordance with Project Instructions OPR-I149-MI-81, PE-81, St. Croix, U.S. Virgin Islands, dated 13 November 1980, and amendments covered under change number 1 dated 24 November 1980.

B. AREA OF SURVEY

The general locality of this survey was from ~~White Horse Point~~ <sup>Whitehorse Rock</sup> to Pull Point from 10 March 1981, JD 067, to 28 March 1981, JD 087. The total area of coverage involved 28 square nautical miles. The survey limits of this area can be delineated by the following enclosing Latitudes and Longitudes:

17°45'18"N	064°45' <sup>2</sup> 39"W
17°48'00 N	064°3' <sup>1</sup> 48"W

This area is characterized by irregular shoreline with rocky points, sandy beaches, and numerous coral reefs. The bottom is usually sand and coral. White Horse Point as a rule is buffeted by sizeable swells. Because of concurrent overlapping surveys MI-5-1-81 and MI-5-2-81, the actual area surveyed extended from White Horse Point to Pelican's Cove within the following limits:

17°45' <sup>2</sup> 38"N	064°45' <sup>2</sup> 33"W
17°48'30"N	064°43'32"W

and from Green Cay to Pull Point within the following boundaries:

17°45'38"N	064°39'40"W
17°48'30"N	064°38'54"W

C. SOUNDING VESSEL

The NOAA Ship MT. MITCHELL automated launch number 2225 (Jensen 1002) was used in conducting this survey. All equipment used in this launch is discussed in later sections.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

All echo soundings were recorded in fathoms using a hull-mounted transducer with an antenna distance of 0.0 and the following equipment:

Ross Model 5000 Finesline Depth Recorder	S/N-3780
Ross Model 4000 Finesline Tranceiver	S/N-1053
Ross Digitizer	S/N-1039
Ross Inverter	S/N-1050

D. (continued)

Soundings shallower than 50 fathoms were collected using a manual sensitivity on the fathometer of 5 and below. Deeper soundings were obtained starting from shallow waters, 30 to 50 fathoms, and running seaward at idle speed (800 rpm). Manual sensitivity was increased gradually, just enough to maintain a light trace. Automatic gain control was not used because it appeared to cause errors. Frequent phase calibrations were performed to ensure accurate soundings of the depths involved. Because of the rapid dropoff of the bottom, at times 50 fathoms in 50 meters, the trace was often undiscernible and had to be rejected. As can be noted in Section "I", crosslines beyond 50 fathoms were often 30 to 50 fathoms deeper than the main scheme. This can be attributed to the steep gradient of the bottom and the angle at which it was approached. The crosslines were run along the contours, often in the trough of the swells. The rolling motion of the launch can be the reason for such errors, since the area directly beneath the launch may not be the area for which the depth was obtained. These crosslines were smooth plotted but further recommendations for handling them are given in Section "I". All fathometer printouts were scanned by trained survey technicians and officers to determine differences in the analog and digital depths. Often beyond 50 fathoms no digitized depths were available, so the analog trace when accurately discernible was entered along with the corrected digitized depths on an electronic corrector tape. Peaks and deeps were also noted on the fathograms and inserted on corrector tapes. Each corrector tape also contained a TRA of  $0.3$  fathoms (1.1 feet). Fathogram scale changes were correlated with the sounding volumes, and depth corrections were rechecked with the on-line printout, fathogram, and electronic corrector tape. These were verified by the sheet manager (OIC).

Two Nansen casts were performed on the following dates and locations:

<u>Vertical Cast #</u>	<u>Location</u>	<u>Date</u>
1	17°48'04"N 064°40'00"W	2/19/81
2	17°49'12"N 064°41'35"W	3/19/81

The speed of sound at various depths and the necessary velocity corrections were calculated using program RK530. Graphs and tables of the velocity corrections were also generated (see Appendix "D"). A plot of the 22 bar checks, which were usually performed twice daily (see supporting data file) to a depth of 30 feet, compared moderately well with the velocity correction graphs. The velocity corrections derived from the vertical casts, both of which compared excellently, were assumed to be more accurate, and those from the first cast were used in smooth plotting. Two velocity tables were used, one for range/range and the other for range/azimuth hydrography. Table number 2 was a duplicate of number 1, only with fewer records due to a 31-record limit for the range/azimuth plot. An extrapolated velocity tape for deeper depths than the Nansen casts was produced after smooth plotting was completed. A graph of the extrapolated velocity corrections (depth versus correction) is included with all other graphs and tape listings in Appendix "D".

D. (continued)-

Off-line predicted tide correctors were applied while smooth plotting using the reference station at Galveston, Texas (3277) and daily predictions from Charlotte Amalie, St. Thomas, U.S. Virgin Islands (974-1639) for Julian Days 069 through 087. Smooth tides have been requested from the Chief of Tides and Water Levels Branch (C331) for the period of hydrography. Settlement and squat corrections obtained on 10 February 1981 in Fredericksted Harbor, St. Croix were calculated but were not used in smooth plotting since the corrections were insignificant. They are listed in Appendix "D" along with a TC/TI tape listing. *(transferred to Sdg Records)*

E. HYDROGRAPHIC SHEETS

Hydrographic sheets were plotted on the MT. MITCHELL HYDROPLOT System. These consisted of two mylar sheets plotted with a Modified Transverse Mercator grid at a skew of 0,21,54. Corrections for velocity, draft, predicted tides, digitized depths and DEL NORTE were applied in an off-line smooth plot on these sheets. All the main scheme and shorelines were plotted on sheet number 1. Presurvey Review Items were also placed on this sheet. All crosslines, developments, splits, and bottom samples were placed on sheet number 2. A final smooth plot will be done at the Atlantic Marine Center, Norfolk, Virginia using smooth tides and any other necessary corrections. All field records and the following tapes have been forwarded to AMC:

- Master Range/Range Data Tapes
- Master Range/Azimuth Data Tapes
- Electronic Corrector Tapes
- Velocity Corrections Tapes (Tables 1-3)
- Predicted Tide Tapes (JD 068-083)
- Parameter/Signal Tape
- TC/TI Tape

F. CONTROL STATIONS

The six horizontal control stations (electronic and azimuth) for this survey consisted of the following:

<u>Number</u>	<u>Signal Name</u>		<u>Location</u>
130	Skow	17°45'42".302N	064°36'57".225W } <i>off sheet</i>
200	Buck Island Light	17°47'19".987N	064°37'10".175W
300	Green, 1919	<sup>1980</sup> 17°46'12".254N	064°39'55".348W
400	Christiansted Front Range Light	17°45'25".424N	064°41'41".593W
*535	Cement, <del>ST 1982</del>	17°45'11".759N	064°42'52".613W-
600	Salt 2, <del>AB2</del>	17°47'02".614N	064°44'55".987W

\* Located within HULL on H-9929

F. (control stations continued)

All stations were located or verified by personnel from the Operations Division at AMC and the NOAA Ship MT. MITCHELL. In addition, two stations were used as calibration and initialization stations. They were Buck Island Pier-East and Christiansted Harbor Daymarker #7. Buck Island Pier was located by scaling its position from manuscript TP-00004. Their positions are as follows:

<u>Signal Number and Name</u>		<u>Position</u>
Buck Island Pier - East	17°47'13".927N	064°37'29".684W - <i>off sheet</i>
410; Christiansted Harbor Daymarker #7	17°45'32".991N	064°41'41".607W

G. HYDROGRAPHIC POSITION CONTROL

Positional control was provided using DEL NORTE equipment for range/range hydrography and a Wild T-2 Theodolite in conjunction with the DEL NORTE on Julian Day 078 for range/azimuth hydrography. The following is a list of all equipment used:

<u>Equipment</u>	<u>Serial Number</u>	<u>Comments</u>
DMU/Master	173/187	
Remote (74) Unit	1134	Recorded form 76
Remote (74) Unit	1317	R/A <del>JD</del> 078 - Damaged <del>JD</del> 086
Remote (76) Unit	1059	<i>Day Day</i>
Wild T-2 Theodolite	16017	

Calibration checks of the DEL NORTE were done twice daily, once at the start and once at the end of each work day. They were accomplished by maneuvering the launch's DEL NORTE antenna beside either Buck Island Pier - East or Christiansted Harbor Daymarker #7 and recording 5 consecutive readings into a sounding volume. The average of these readings was compared with the inverse distance(s) (see supporting data file) between the control station(s) and the calibration station. The morning corrector was applied to on-line data because, in some cases, it was excessive (see Appendix "E"). However, morning and afternoon correctors were similar in all cases and were consistent from day to day except when either the remotes or their positions were changed (see supporting data file). The final smooth plot used the daily average which was placed on each corrector tape. Over-water baseline calibrations of the DEL NORTE were performed on the following dates and locations:

<u>Date</u>	<u>DMU/Master Pair Baseline</u>	<u>Baseline Distance</u>
3/06/81	173/187 Cement <del>87</del> <sup>2</sup> - CHV 1-3	2132.49M
3/20/81	173/187 Calib. 3 - Calib. 4	1625.04M
4/03/81	173/187 Pier #1 - Southpoint 1	3952.00M
4/06/81	173/187 Cement <del>87</del> <sup>2</sup> - Buck Island Light	10830.30M

The distance between calibration points 3 and 4 was determined using a Ranger III EDM.

## H. SHORELINE

Shoreline was drawn on the smooth sheet in blue from the manuscript since it was not verified, although from visual inspection no significant differences were evident. Photobathymetric support was available to 3 fathoms in most of the area surveyed. As a check, sounding lines were run to give a representative coverage of the photobathymetry available. Comparisons were performed with the following photo manuscripts:

<u>Manuscript</u>	<u>Date</u>	<u>of Photography</u>
TP-00002	<del>December 1980</del>	Nov-Dec 1977
TP-00003	<del>December 1980</del>	Nov-Dec 1977
TP-00004	<del>December 1980</del>	Nov-Dec 1977

TP-00002 agreed with this survey within -0.3 fathoms for 93% and within -0.6 fathoms for 100% of the compared soundings. TP-00003 was within  $\pm 0.5$  fathoms for 75% and within  $\pm 3$  fathoms for 100% of the soundings compared with this survey. TP-00004 agreed with 88% of the soundings  $\pm 0.5$  fathoms, 98% within  $\pm 2$  fathoms, and 2% from  $\pm 2$  to  $\pm 6$  fathoms.

## I. CROSSLINES *see Eval Rept.*

Crosslines were run at a  $45^\circ$  to  $90^\circ$  angle to the main scheme. They constituted 23% of the total sounding line mileage. In the eastern section of the survey near Pull Point, depths agreed with the main scheme within  $\pm 0.2$  fathoms out to 20 fathoms, within  $\pm 0.3$  fathoms from 20 to 50 fathoms, and from  $\pm 3$  to  $\pm 40$  fathoms beyond 50 fathoms. There were five occurrences of the last comparison. They are as follows:

<u>Main Scheme (fathoms)</u>	<u>Crosslines (fathoms)</u>	<u>Position</u>	
100	61	17°47'04.5"N	064°39'37.5"W
57	48	17°47'05.5"N	064°39'37.5"W
90	58	17°47'06"N	064°39'31"W
100	74	17°47'08"N	064°39'28"W
98	69	17°47'19"N	064°39'07"W

Due to the general trend of the contours and surrounding soundings, it is recommended that the main scheme soundings listed above be held in suspect of errors. *Concur*

Crosslines in the western section of the survey near White Horse Point <sup>*Rock*</sup> agreed with the main scheme out to 7 fathoms within  $\pm 0.5$  fathoms, from 8 to 50 fathoms within  $\pm 3$  fathoms and beyond 50 fathoms from  $\pm 20$  to  $\pm 50$  fathoms. As explained in Section D, it is recommended that crosslines indicating excessive error be examined closely. Comparisons of the main scheme with prior surveys, charts, and adjoining surveys seem to indicate that the crosslines should be rejected. *They are smooth plotted for their verification by personnel at AMC. Concur*

J. JUNCTIONS *See Eval Rept.*

This survey junctions with the following surveys:

<u>Area of Junction</u>	<u>Field #</u>	<u>Registry #</u>	<u>Scale</u>	<u>Date</u>	<u>Ship</u>
Eastern Edge Western Section	MI-5-1-81	H-9929	1:5,000	1981	MT. MITCHELL
Western Edge Eastern Section	MI-5-2-81	H-9930	1:5,000	1981	MT. MITCHELL
Eastern Edge Eastern Section	MI-10-2-81	H-9936	1:10,000	1981	MT. MITCHELL

Comparison of two overlapping sounding lines was available for each survey. MI-5-1-81 was shoaler than this survey but by no more than 0.5 fathoms. MI-5-2-81 compared to within  $\pm 0.25$  fathoms. MI-10-2-81 agreed to  $\pm 0.3$  fathoms out to 8 fathoms,  $\pm 1$  fathom from 9 to 20 fathoms, and  $\pm 5$  fathoms beyond 20 fathoms. This agreement is excellent considering the steepness of the slope at this junction.

K. COMPARISON WITH PRIOR SURVEYS *See Eval Rept.*

Prior surveys available for comparison were as follows:

<u>Survey</u>	<u>Scale</u>	<u>Date</u>
H-4629 <del>ka</del>	1:10,000	April 1924 - February 1926 ( <del>wire drag</del> )
H-4652 <del>ka</del>	1:20,000	April 1924 - February 1926
H-4653 <del>ka</del>	1:20,000	1924 - 1925

The ~~wire drag~~, H-4629~~ka~~, was shoaler than this survey for those soundings which were compared. For 91% of the compared soundings for this survey, H-4652~~ka~~ agreed within  $\pm 1$  fathom. The other 9% agreed from -1 to -5 fathoms. Of the depths from H-4653~~ka~~ compared with this survey most agreed within  $\pm 0.5$  fathoms. A few of the ~~clearances~~ <sup>soundings</sup> appeared to be as much as 20 fathoms deeper than nearby soundings from this survey. Again, this can probably be attributed to the steepness of the slope and the irregularity of the bottom which was very noticeable around the 10 fathom curve.

L. COMPARISON WITH CHART *See Eval Rpt.*

Comparisons with this survey and the following charts were performed:

<u>Chart #</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
25641	17th	8 September 79	1:100,000
25645	9th	26 April 80	1:10,000

Chart 25641 compared well with this survey as far as depths are concerned. A wreck located on the east side of White Horse Point at approximate position  $17^{\circ}47'.22N$ ,  $064^{\circ}44'.85W$  has been moved by sea action. This stranded wreck, the M/V Cumulus, is addressed as Presurvey Review Item #1. It is located in 2 to 3 feet of water in an area often buffeted by a heavy surge. No salvage operations are in progress or are considered



L. (comparison with chart continued)

feasible from sea. The Cumulus is <sup>charted</sup> located at 17°47'13"N, 64°44'50"W and is not to be considered a danger to navigation. Both the wreck and a large rock are visible on photos 9829 and 9830. The rock's position was ascertained from photogrametric sheet TP-00003 to be 17°47'20".3N, 064°44'57".2W. *See Eval Rept for pres. position*  
*This rock shown as bare islet on pres survey from TP-00002 is named Whitehorse Rock.*

This survey agreed with 24% of the depths on chart 25645 within ±0.5 fathoms, 63% within ±2 fathoms, 83% within ±5 fathoms, 95% within ±10 fathoms, and 5% from +50 to +70 fathoms. The last comparisons occurred at depths beyond 150 fathoms at the point where the slope is extreme. As well, the comparison area of 25645 is on the far eastern part of White Horse Point near Pelican Cove. The drop-off here is the sharpest of the whole survey, as much as 50 fathoms in 50 meters.

M. ADEQUACY OF SURVEY

This survey is complete and adequate to supersede all prior surveys.

N. AIDS TO NAVIGATION

No aids to navigation were present within the limits of the <sup>field</sup> boat sheet. Those within the survey limits are covered by survey MI-5-1-81 (H-9929).

O. STATISTICS

		% Hydrography	% Total
Main Scheme Linear Nautical Miles	46.8	63.8	16.8
Crossline Linear Nautical Miles	16.9	23.0	6.1
Shoreline Linear Nautical Miles	6.9	9.4	2.5
Development Linear Nautical Miles	2.8	3.8	0.4
Total Hydrographic Nautical Miles	73.4	----	26.4
Total Miscellaneous Nautical Miles	74.0	----	26.6
Total To and From Nautical Miles	131.0	----	47.0
Total Nautical Miles	287.4	----	----
Total Bottom Samples	20		
Total Nansen Casts	2		
Total Number of Positions	723		
Total Data Days (JD 069-087)	12		

P. MISCELLANEOUS

Due to equipment problems hydrography was not run on ~~Julian~~ Days 074, 075, and 084. Only partial days were possible on ~~Julian~~ Days 083, 085, and 086 for the same reasons.

Q. RECOMMENDATIONS

It is recommended that updated electronic and computer equipment be installed, and that new procedures for maintaining this hardware and software to avoid future inadequacy (obsolete by 10 to 15 years) be instituted as it directly affects efficiency in the mass of documentation that follows and consequently the cost per achieved amount of hydrography on each project. Reference to electronic instrumentation and computer report to be submitted at a later date is advised.

R. AUTOMATED DATA PROCESSING

All data was acquired and processed using the NOAA Ship MT. MITCHELL and launch 2225 automated HYDROPLOT/HYDROLOG Computer Systems. The software used in conjunction with this survey was as listed below:

<u>Program</u>	<u>Description</u>	<u>Version</u>
RK 111	R/R Real Time Plot	1/30/76
FA 181	R/A Real Time Data Acquisition	2/23/78
RK 201	Grid, Signal and Lattice Plot	4/18/75
RK 211	R/R Non-Real Time Plot	1/15/76
RK 212	Visual Station Table Load and Plot	4/01/74
RK 216	R/A Plot	2/05/76
RK 300	Utility Computations	10/21/80
RK 330	Data Reformat and Check	5/04/75
RK 360	Electronic Corrector Tape Abstract	2/02/76
RK 407	Geodetic Inverse Direct Computation	9/25/78
AM 500	Predicted Tides	11/10/72
RK 530	Velocity Corrections Computations	5/10/76
RK 602	Extended Line Oriented Editor	5/21/78
RK 612	High Speed Print Out	3/23/78

Several problems were encountered in using programs RK 112 and RK 211, R/R Real Time Plot Version 1/21/81, and R/R Off-line Plot Version 7/25/80. Memos were sent to RADM R. A. HOULDER on 26 February 1981 and 31 March 1981 concerning the problems and as of change number 30, dated 19 March 1981, appeared to be corrected. Copies of memos are included in the supporting data file. A problem with program FA 181, R/A Real Time Data Acquisition Version 2/23/78 was also encountered. It generates punch and printout errors, such as repetition of a line of data over itself, and random characters. A large amount of time was expended correcting these errors. An examination of the problem is suggested.

S. REFERENCES TO REPORTS

Electronic Instrumentation and Computer Report

Respectfully submitted,

*Robert D. Henegar*

Robert D. Henegar  
Ensign, NOAA

LIST OF STATIONS - VESNO 2225 - MI-10-1-81 - OPR-I149-MI-81,PE-81

100 EAST POINT  
 110 LAMB, 1919  
 120 COTTON GARDEN  
 130 SKOW  


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 200 BUCK ISLAND LIGHT  
 210 BIRD, 1919  
 220 COTTON VALLEY MILL  
 230 SOLITUDE MILL  
 240 SOL, 1919  
 245 COAKLEY BAY MILL  
 250 SCHOOLHOUSE  
 260 GREEN KAY ESTATE MILL  
 300 GREEN, 1919  


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 310 SHOYS MILL  
 400 CHRISTIANSTED RANGE LIGHT  


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 405 US ARMY CORP OF ENG DISK "CHV1-3 1962"  
 410 CHRISTIANSTED CHANNEL MARKER "7"  


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 420 RADIO TOWER (WSTX)  
 430 MT. WELCOME MILL  
 435 PORT 81  
 440 CHRISTIANSTED DAYMARK "16"  
 500 CHRISTIANSTED MAGNETIC STATION (BM)  
 510 CLOCK STEEPLE  
 520 LUTHERN CHURCH SPIRE  
 530 EPISCOPAL CHURCH SPIRE  
 535 CEMENT ~~812~~  


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 540 LITTLE PRINCESS CHIMNEY  
 550 PRINCESS SCHOOLHOUSE  
 560 ST. JOHN CHIMNEY  
 570 JUDITH FANCY CHIMNEY  
 600 SALT 2  


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APPENDIX "F"

*stations*

\GEOGRAPHIC POSITIONS LISTING\VESNO 2225\MI-10-1-81\OPR-1149-MI-81\

130	4	17	45	42302	064	36	57225	250	0034	000000
200	4	17	47	19987	064	37	10175	250	0110	000000
300	4	17	46	12254	064	39	55348	250	0016	000000
400	4	17	45	25424	064	41	41593	250	0014	000000
410	4	17	45	32991 <sup>2</sup>	064	41	41607 <sup>1</sup>	139	0005	000000 → 17 4
535	4	17	45	11759	064	42	52613	250	0001	000000
600	4	17	47	02614	064	44	55987	250	0027	000000

APPENDIX "F"

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT  
(Field Party, Ship or Office)

STATE  
St. Croix,  
U.S.V.I.

LOCALITY  
*Whitehorse Rock*  
White Horse Point to Pull  
Point

DATE  
2/26/81

The following objects HAVE  BEEN INSPECTED FROM SEAWARD TO DETERMINE THEIR VALUE AS LANDMARKS.

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	DATUM		POSITION		METHOD AND DATE OF LOCATION (See instructions on reverse side)		CHART AFFECT
		JOB NUMBER	SURVEY NUMBER	LATITUDE	LONGITUDE	OFFICE	FIELD	
I149-MI-81, PE-81	CM-7718	H-9935	MI-10-1-81					
Mill	To be charted (St. John's Mill 1919)	17 45	56.560	064 44	46.500		2/26/81 F-5-Vis	25641
Chimney	To be charted (St. John's Mill Chimney)	17 45	55.12	064 44	46.32	P-L	F-5-Vis 2/26/81	25641
Chimney	(St. John's Mill South Chimney)	17 45	54.100	064 44	48.100		F-5-Vis 2/26/81	25641
Mill	To be charted (Judith Fancy Chimney)	17 46	37.64666	064 44	41.11588		F-5-Vis 2/26/81	25641
Chimney	(Sion Hill Chimney 1919)	17 44	35.13620	064 44	50.97303		F-5-Vis 2/26/81	25641
Mill Tower	(Boutzberg Mill 1919)	17 44	55.32567	064 40	40.63417		F-5-Vis 2/26/81	25645
Mill	Charted as HO., should be mill (Shoy's Mill 1919)	17 45	25.08140	064 40	53.93691		F-5-Vis 2/26/81	25641
Mill	(Green Cay Estate Mill)	17 45	39.4732	064 39	17.0526		F-5-Vis 2/26/81	25641
Tank		17 44	37.94	064 42	05.38	P-L 77Z(C)0103 12/17/77	F-5-Vis 2/26/81	25641 25645
Tank		17 44	29.07	064 42	48.17	P-L 77Z(C)0103 12/17/77	F-5-Vis 2/26/81	25641 25645

*Not smooth plotted*

*MC - F-5-Vis  
L-890(81), L-306(82)*

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT  
(If field Party, Ship or Office)

NOAA Ship Mt. Mitchell

STATE

St. Croix,  
U.S.V.I.

LOCALITY

Christiansted Harbor

DATE

2/26/81

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

**LANDMARKS FOR CHARTS**

ORIGINATING ACTIVITY

- HYDROGRAPHIC PARTY
- GEODETIC PARTY
- PHOTO FIELD PARTY
- COMPILATION ACTIVITY
- FINAL REVIEWER
- QUALITY CONTROL & REVIEW
- COAST PILOT BRANCH

(See reverse for responsible person.)

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	JOB NUMBER	H-9935 MI-10-1-81	SURVEY NUMBER	DATE	POSITION				METHOD AND DATE OF LOCATION (See instructions on reverse side)		CHART AFFECTE
						LATITUDE		LONGITUDE		OFFICE	FIELD	
						D.M. Meters	° /	D.P. Meters	//			
I149-MI-81, PE-81												
Church Spire	Charted as stack, should be church spire (Lutheran Church Spire 1919)				17 44	44.35096	064 42	21.03677			2/26/81 F-5-Vis	25641 25645
Church Spire	Charted as stack, should be church spire (Episcopal Church Spire 1919)				17 44	41.0272	064 42	29.7785			2/26/81 F-5-Vis	25641 25645
Chimney	(Little Princess Chimney)				17 45	31.3414	064 43	31.7774			2/26/81 F-5-Vis	25641 25645
R TR	(Radio Tower WSTX)				17 45	23.460	064 41	38.820			2/26/81 F-5-Vis	25641 25645
Clock	(Clock Steeple 1919)				17 44	53.4891	064 42	10.7322			2/26/81 F-5-Vis	25641 25645
Stack	Charted as one of twin chimneys, should be stack				17 45	07.28	064 42	59.38	P-L 77Z(C)9164 11/11/77		2/26/81 F-5-Vis	25641
Stack	Charted as one of twin chimneys, should be stack				17 45	07.35	064 42	58.64	P-L 77Z(C)9164 11/11/77		2/26/81 F-5-Vis	25641
Monument	(Recovery Hill)				17 44	11.35342	064 42	04.34331			2/26/81 F-5-Vis	25645
Windmill	Not Visible from Seaward-obscured by boat anchorage (Windmill)				17 44	57.03	064 42	18.08	P-L 77Z(C)0103 12/17/77		2/26/81 F-5-Vis	25645
Windmill	Not Identified Visually (Orange Grove Mill 1919)				17 44	58.8597	064 43	04.67949			2/26/81 F-Vis	25641 25645

*Not smooth plotted*

*re: F-5-Vis  
# L-890(81) : L-306(82)*

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT  
(Field Party, Ship or Office)

NOAA Ship Mt. Mitchell

STATE  
St. Croix,  
U.S.V.I.

LOCALITY

White Horse Point to Pull  
Point

DATE

2/26/81

(See reverse for responsible person)

ORIGINATING ACTIVITY  
 HYDROGRAPHIC PARTY  
 GEODETIC PARTY  
 PHOTO FIELD PARTY  
 COMPILATION ACTIVITY  
 FINAL REVIEWER  
 QUALITY CONTROL & REVIEW  
 COAST PILOT BRANCH

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
LANDMARKS FOR CHARTS

The following objects HAVE  been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO. I149-MI-81, PE-81

JOB NUMBER CM-7718

SURVEY NUMBER H-9935

DATUM NAD-27

METHOD AND DATE OF LOCATION  
(See instructions on reverse side)

CHART  
AFFECTED

CHARTING NAME

DESCRIPTION  
(Record reason for deletion of landmark or aid to navigation.  
Show triangulation station names, where applicable, in parentheses)

LATITUDE

LONGITUDE

D.M. Meters

D.P. Meters

OFFICE

FIELD

CHART  
AFFECTED

Not identified visually

Charted as stack, should be mill  
(Little Princess Mill)

Charted as stack, should be mill  
(Little Princess Mill, South)

Charted as stack, should be chimney  
(La Grande Princess Chimney - S.)

Charted as stack, should be mill  
(La Grande Princess Mill - N.)

25641  
25645

25641  
25645

25641  
25645

25641  
25645

25641  
25645

25641  
25645

*not smooth plotted.*

*MC - F.5-Vis  
L-890(81) & L-306(82)*



Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office)  
 NOAA Ship Mt. Mitchell

STATE  
 St. Croix, U.S.V.I.

LOCALITY  
 Approach to Christiansted Harbor (Scotch Bank)

DATE  
 2/26/81

ORIGINATING ACTIVITY  
 HYDROGRAPHIC PARTY  
 GEODETIC PARTY  
 PHOTO FIELD PARTY  
 COMPILATION ACTIVITY  
 FINAL REVIEWER  
 QUALITY CONTROL & REVIEW  
 COAST PILOT BRANCH

The following objects HAVE  BEEN INSPECTED FROM SEAWARD TO DETERMINE THEIR VALUE AS LANDMARKS.  
 (See reverse for responsible person.)

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	DATUM		POSITION		METHOD AND DATE OF LOCATION (See instructions on reverse side)		CHARTS AFFECTED
		JOB NUMBER	SURVEY NUMBER	LATITUDE	LONGITUDE	OFFICE	FIELD	
I149-MI-81, PE-81			H-9135 MI-10-1-81	NAD-27				
Mill Tower	(Boutzberg Mill 1919)	17 44	55.32567	064 40	40.63417		2/26/81 F-5-Vis	25645
Mill	Charted as HO., should be Mill (Shoy's Mill 1919)	17 45	25.08140	064 40	53.93691		2/26/81 F-5-Vis	25641

APPENDIX "I"

Not smooth plotted.  
 Re - F-5-Vis  
 4 L-890/81 = 1-306(82)

NONFLOATING AID FOR CHARTS

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT (If field Party, Ship or Office)  
 St. Croix, U.S.V.I.  
 LOCALITY  
 Christiansted Harbor

NOAA Ship Mt. Mitchell  
 DATE  
 03/30/81

The following objects HAVE  BEEN INSPECTED FROM SEAWARD TO DETERMINE THEIR VALUE AS LANDMARKS.  
 OPR PROJECT NO. I1149-NI-81, PE-81  
 JOB NUMBER H-9935  
 SURVEY NUMBER MI-10-1-81  
 DATUM NAD-27

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	POSITION		METHOD AND DATE OF LOCATION (See instructions on reverse side)	CHA AFFE.
		LATITUDE	LONGITUDE		
LIGHT	LIGHT #9 - FI G 2.5 sec. 16ft.	17 45	064 41	Outside limits of hydro	F-2-6-L 3/30/81 25645
DYEN	DAYBEACON#10 - R	17 45	064 42	Outside limits of hydro	F-2-6-L 3/30/81 25645
LIGHT	LIGHT #11 - Qk FI G 16 ft.	17 45	064 41	Outside limits of hydro	F-2-6-L 3/30/81 25645
DYEN	DAYBEACON#2 - Sign Missing	17 45	064 41	Outside limits of hydro	F-2-6-L 3/30/81 25645
DYEN	DAYBEACON "CH" - BW	17 45	064 42	Outside limits of hydro	F-2-6-L 3/30/81 25645
LIGHT	LIGHT #13 - Lt. FI G 4sec. 16ft.	17 45	064 42	Outside limits of hydro	F-2-6-L 3/30/81 25645
DYEN	DAYBEACON#16	17 44	064 42	off smooth sheet	F-2-6-L 11/18/80 25645
LIGHT	LIGHT #7 - FI G 4sec. 16ft. 4M Signal #410	17 45	064 41	Plotted on smooth sheet	F-2-6-L 11/18/81 25645
FRONT RANGE LIGHT	Christiansted Harbor Channel Entrance Range Front Light Signal #400	17 45	064 41	Plotted on smooth sheet	F-2-6-L 11/18/80 25645
Rear Range Light	(Two, 1924 - Entrance Range Rear Lt.)	17 45	064 41	Not smooth sheet Plotted	2/26/81 F-5-Vis 25645

NO 2530(86), L-890(81), L-306(82)

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT  
(Field Party, Ship or Office)

NOAA Ship Mt. Mitchell

STATE  
St. Croix,  
U.S.V.I.

LOCALITY  
Christiansted Harbor

DATE  
3/30/81

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
**NONFLOATING AIDS TO NAVIGATION FOR CHARTS**

The following objects HAVE  **HAVE NOT**  been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO. I149-MI-81, PE-81  
JOB NUMBER H-9935  
SURVEY NUMBER MI-10-1-81

DATUM  
NAD-27

POSITION

LATITUDE		LONGITUDE	
D.M. Meters	° /	D.P. Meters	//
56.16	064 41	58.93	
10.606	064 42	48.03866	
55.791	064 42	56.2111	

CHARTING NAME  
(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)

Light  
Christiansted Harbor Wharf Light-West  
Light  
Christiansted Harbor Water Intake Lts.  
Light  
Christiansted Harbor Wharf Light-East

*Mc-L-899(81), L-306(82)*

METHOD AND DATE OF LOCATION  
(See instructions on reverse side)

OFFICE	FIELD
P-L 77Z(C)0103 12/01/77	F-5-Vis 2/26/81
<i>Outside limits of Hydro</i>	F-2-6-J 3/30/81
<i>P-I Outside limits of Hydro</i>	F-5-Vis 2/26/81

CHARTS AFFECTED

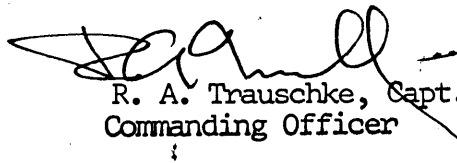
25645  
25645  
25645

ORIGINATING ACTIVITY

- HYDROGRAPHIC PARTY
  - GEODETIC PARTY
  - PHOTO FIELD PARTY
  - COMPILATION ACTIVITY
  - FINAL REVIEWER
  - QUALITY CONTROL & REVIEW GRP.
  - COAST PILOT BRANCH
- (See reverse for responsible personnel)

APPROVAL SHEET

The field work on this Hydrographic Survey was under my daily supervision. The boat sheet and records have been reviewed and approved by me.



R. A. Trauschke, Capt. NOAA  
Commanding Officer

HYDROGRAPHIC TITLE SHEET

H-9935

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.

MI-10-1-81/82

State U. S. Virgin Islands

General locality St. Croix

Locality ~~Salt River to Pull Point~~ Approaches to Christiansted Harbor

Scale 1:10,000 Date of survey 27 FEB - 30 MAR 1982

Instructions dated 27 November 1981 Project No. OPR-I149-MI/PE-82

Vessel NOAA Ship Mt. Mitchell (VESNO 2220), Launch 1017 (VESNO 2224)

Chief of party Capt. J. Austin Yeager, NOAA

Surveyed by Ship's officers (see remarks)

Soundings taken by echo sounder, ~~XXXXXXXX~~ EDO Raytheon UCR, Ross 5000 Model Fineline  
Echo Sounder (UER Records)

Graphic record scaled by RW, EM, JW, JZ, DC, SV, CM, BC, CS, DH

Graphic record checked by RW, EM, JW, JZ, DC, SV, CM, BC, CS, DH

Protracted by N/A Automated plot by Hydroplot System

Verification by \_\_\_\_\_

Soundings in fathoms and tenths ~~XXX~~ at ~~XXX~~ MLLW (Gulf Coast Datum)

REMARKS: OIC: ENS. Henegar ENS. Crews

FOO: LT. Perrin

LT. Varney

LTJG Zabitchuck

ENS. Peters

ENS. Rossmann

ENS. Coakley

ENS. Orris

ENS. McLean

A. PROJECT

This survey was carried out as additional work on H-9935 in accordance with project instructions OPR-1149-MI/PE-82 issued 27 November 1981 and amended by changes 1 through 4 dated 21 December 1981, 11 January 1982, 25 January 1982, 2 March 1982, as well as supplemental instructions dated 18 November 1981.

B. AREA SURVEYED

This survey was conducted in St. Croix, U.S. Virgin Islands, <sup>Whitehorse Rock</sup> ~~between Salt River~~ and Pull Point. The limits of the area surveyed are roughly described by lines connecting the following points in a clockwise manner:

17°45'50"N	064°45'21"W
17°48'30"N	064°45'21"W
17°48'30"N	064°38'30"W
17°45'50"N	064°38'30"W

This survey was conducted between 20 February 1982 (J.D. 051) and 30 March 1982 (J.D. 089).

C. SOUNDING VESSEL

Soundings for the survey were obtained by the NOAA Ship MT MITCHELL S-222 (VESNO 2220) and Jensen LAUNCH 1017 (VESNO 2224).

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

The following equipment was used to obtain soundings for the survey:

<u>Equipment</u>	<u>VESNO</u>	<u>Serial Number</u>	<u>Julian Dates</u>
Raytheon UGR	2220	170 432	62-63,75,85,89
Digitrak Model 261C	2220	202 433	62
Edo Transceiver Model 248-1	2220	219 431	62-63,75,85,89
Digitrak Mode 261-C	2220	226	63,75,85,89
Ross Fathometer	2224	1087 IDN	53-54, 61-62
Digitizer	2224	1079 413	53-54, 61-62
Transceiver	2224	1078 ID	53-54, 61-62
Inverter	2224	1079 ID	53-54, 61-62

All survey records were scanned by trained survey department personnel and checked by the officer in charge. Peaks and deeps considered significant that occurred between soundings were inserted and digitizing errors were corrected on the electronic corrector tape.

Phase calibration or scale checks were made at frequent intervals. Any necessary adjustments were made and noted in the sounding volume and on the fathogram. Any departures of the trace from the calibration due to phase differences were connected during the scanning process.

Velocity corrections were obtained from 2 Nansen casts at the following locations and dates:

<u>Cast Number</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Date</u>
1	17°52'12"	064°49'24"	20 Feb. 1982
2	17°53'54"	064°41'18"	25 March 1982

The first Nansen cast was used for corrections to all plotted data since it agreed favorably with the second cast. An explanation of how sound velocities were derived along with all tables and printouts of velocity tapes is included in Appendix D. Six barchecks were taken during the survey showing agreement within  $\pm 0.1$  fathom. Comparison with the velocity correction graph of Nansen cast one disclosed the need of an instrument error correction of  $+0.1$  fathom for LAUNCH 2224. This correction is included in the sounding correction abstract and TC/TI tape listing in Appendix D.

A draft of 2.3 fathoms was applied to all soundings collected by the MT MITCHELL during the on-line process. Settlement and squat corrections for the ship were determined on 26 July 1981 (J.D. 207) at Cape Charles, Virginia. A corrector of  $+0.3$  feet is accurate for all ship survey speeds  $\pm 0.1$  feet. This corrector being so insignificant when sounding in fathoms, zero is applied on the TC/TI tape. A copy of the data abstract for ship's speed versus settlement and squat is included in Appendix D. A draft of 0.2 fathoms was applied to all soundings taken by the launch during the on-line process. Settlement and squat correctors for the launches were determined on 09 February 1982 (J.D. 040) at San Juan Harbor, Puerto Rico from pier 10. This correction is insignificant when sounding in fathoms so that a 0.0 corrector is applied on the TC/TI tape. A copy of the field data and settlement and squat corrector versus launch RPM's is included in Appendix D.



This survey was conducted using predicted tides based on daily predictions at Galveston, Texas (#3277) from the tide tables, 1982 and corrected for time and range at Charlotte Amalie, St. Thomas, U. S. Virgin Islands (station #975-1639). Tide correctors were applied to on-line data. A copy of the request for smooth tides in the survey area is included in Appendix B.

Due to an approximate 30 fathom difference between ship and launch work, it was necessary "not to smooth plot" launch data deeper than 130 fathoms and ship data shoaler than 120 fathoms. The disagreement between launch and ship depths in the steep slope junctions areas is apparently due to the wider beam of the ~~Raytheon~~ <sup>EDO</sup> UGR, used on the ship, and the narrow beam Ross ~~fathometer~~ <sup>echo sounder</sup> used in the launch. Best agreement between the launch and ship soundings was at the 125 fathom depth contour. A few holidays exist in junctioning in this manner, but positional junctioning is assured in all areas. In most cases, the ship soundings were shoaler than the launch soundings. Although not inked on the field sheet, 125 fathom contours for the ship and launch work show good agreement considering the steep slope in the ~~junction~~ <sup>overlap</sup> area.

Ship and launch soundings beyond the limits aforementioned are plotted on a separate sheet along with other questionable soundings. Launch ~~fathometer~~ <sup>echo sounder</sup> printouts with dual traces for which the correct depth was not discernable are included on this sheet.

In addition, a section of ship hydrography between Latitude  $17^{\circ}47'50''$  and  $17^{\circ}48'30''$  and Longitude  $64^{\circ}40'30''$  to  $64^{\circ}45'00''$  showed discrepancies between ~~Julian Dates~~ <sup>Days</sup> 63, 75, and 85. Traces from ~~Julian date~~ <sup>Day</sup> 85 are less noisy and are considered more accurate than the other two days. Both days were compared with ~~Julian day~~ <sup>Day</sup> 085, and the day(s) in error was "not smooth plotted". The positions "not smooth

plotted" for the launch and ship are annotated in the sounding volume and on the printouts. They are also indexed in the front of each sounding volume and noted on the position abstracts of Appendix G.

Additional questionable soundings were discovered after smooth plotting the launch data. They are undoubtedly due to minor positional errors in an area of extreme slope. The questionable soundings are as follows: *concur*

<u>Depths (fathoms)</u> <i>(un corrected)</i>	<u>Latitude</u>	<u>Longitude</u>
66 at 77	17°45'55"	64°42'45"
69 between 61-64	17°45'53"	64°42'38"
37-45 inside 43	17°45'55"	64°42'06"
43-55 inside 49	17°45'55"	64°42'05"
73 inside 57	17°45'55"	64°42'03"

#### E. HYDROGRAPHIC SHEETS

This survey was plotted on 4 mylar complot roll plotter sheets by the MT MITCHELL. Hydroplot system with a skew of 0, 21, 54. The survey was plotted off-line using an electronic corrector tape and a velocity corrector tape. Soundings on the field sheets are corrected for draft, predicted tides, initial and digitizing errors and sound velocity. They are not corrected for smooth tides, settlement and squat, and instrument error. The final smooth sheet will be plotted at the Atlantic Marine Center CAM3, Norfolk, Virginia.

All field records and the following tapes have been forwarded to the Atlantic Marine Center:

Master Range/Range Data Tapes

Electronic Corrector Tapes

Velocity Correction Tape

Parameter

Signal Tapes

TC/TI Tape

#### F. CONTROL STATIONS

Del Norte electronic control stations were used as follows:

<u>Signal Number and Name</u>	<u>Latitude</u>	<u>Longitude</u>
200 Buck Island Light, 1980	17°47'19.987"	064°37'10.175" <i>off sheet limits</i>
400 Christiansted Front Range Light, 1980	17°45'25.424"	064°41'41.593"

All stations were located by personnel from the Operations Division, Atlantic Marine Center, with assistance from MT MITCHELL officers in 1980. Stations were recovered, erected and maintained by ship's personnel. Both stations are of Third Order, Class I accuracy for further information on these control stations refer to the Horizontal Control Report for OPR-II49-MI/PE-8I submitted by CAMI01.

#### G. HYDROGRAPHIC POSITION CONTROL

Del Norte positioning was used for vessel numbers 2220 and 2224 from 20 February 1982 (*Day* J.D. 051) to 26 March 1982 (*Day* J.D. 085). The following Del Norte equipment was used on the following dates:

<u>Station Number and and Name or Location</u>	<u>Equipment</u>	<u>Serial Number</u>	<u>Code</u>	<u>Days Julian Dates</u>
200 Buck Island Light, <i>1980</i>	Remote	1062 262	76 74	61-63, 75, 85 51-55
400 Christiansted Front Range Light, <i>1980</i>	Remote	264	78	51-55, 61-63, 75, 85
VESNO 2220	Master	180	---	55, 62-63, 75, 85
	DMU	620	---	55, 62-63, 75, 85
	Parallel Buffer	127	---	55, 62-63, 75, 85
VESNO 2224	Master	277	---	51-54
	DMU	429	---	51-54
	Parallel Buffer	123	---	51-54
	Master	189	---	61-62
	DMU	912	---	61-62

Non Data Days (51-52, 55, 60)

Each Del Norte Master/DMU pair was calibrated with each remote over a measured baseline. In addition for VESNO 2220, the Del Norte was calibrated daily using three point sextant fixes and comparing observed ranges with computed values by use of Hydroplot Calibration Program RK 561. A simultaneous check fix was taken with each calibration. Generally, only those fixes with inverses less than five meters were accepted. Below are listed the visual stations used:

<u>Visual Stations</u>	<u>Latitude</u>	<u>Longitude</u>
L-200 Buck Island Light, <i>1980</i>	17°47'19.987"	064°37'10.175"
C-420 Christiansted Radio Mast	17°45'23.546"	064°41'38.905"
R-540 Little Princess Chimney	17°45'31.341"	064°43'31.777"
R-600 Salt 2, <i>1980</i>	17°47'02.614"	064°44'55.987"

*Not smooth plotted*

The daily and baseline calibrations and correctors are included in the supplemental data file. Comparisons between the results of the two methods of calibration are

also included in this file. For Julian Days 62 and 63, the average of the daily correctors was used. For Julian days 75 and 85 the baseline correctors were used, since the average of the daily correctors was within 3 meters (the repeatability of Del Norte) of the baseline correctors:

For LAUNCH 2224, static point calibrations were done at the beginning and end of each day alongside Christiansted Channel Marker #7. The calculations for the inverse distances from Buck Island Light and Christiansted Front Range Light to the Channel Marker are included in the supplemental data file along with an abstract of daily and baseline calibrations. Daily correctors were used for each day of launch work.

The signal tape list and source names list can be found in Appendix F.

H. SHORELINE

None *See Eval. Rept*

I. CROSSLINES

Crosslines were run at least 45 degrees to the mainscheme sounding lines. Crossline mileage amounted to about 11% for the ship and 16% for the launch of the regular sounding lines. Crossline soundings generally agree within  $\pm 8$  fathoms of the regular lines or 1% of the depth. Comparisons beyond this range are as follows:

<u>VESNO</u>	<u>M/S Depth</u> <i>(uncorrected)</i>	<u>XL Depth</u> <i>(uncorrected)</i>	<u>Difference</u>	<u>Position</u>
2220	299	308	+9	17°48'09" 64°39'28"
	334	346	+12	17°48'29" 64°39'12"

<u>VESNO</u>	<u>M/S Depth</u>	<u>XL Depth</u>	<u>Difference</u>	<u>Position</u>
2220	1009	997	-12	17°48'10" 64°42'49"
	703	716	+13	17°47'18" 64°42'46"
	973	960	-13	17°48'03" 64°42'51"
	865	881	+16	17°47'44" 64°42'52"
	233	222	-11	17°47'11" 64°43'58"
	997	975	-22	17°48'29" 64°43'05"
2224	40	59	+19	17°46'07" 64°41'44"
	30	46	+16	17°46'13" 64°41'38"
	80	93	+13	17°46'35" 64°41'22"
	75	84	+9	17°46'45" 64°41'13"
	109	97	-12	17°47'05" 64°39'57"

For all comparisons, slight differences in position along steep slope and irregular bottom contribute to these discrepancies between mainscheme and crosslines. *CONCUR*

J. JUNCTIONS *See Eval Rept*

This survey junctions with the following surveys:

<u>Area of Junction</u>	<u>Field #</u>	<u>Reg. #</u>	<u>Scale</u>	<u>Date</u>	<u>Ship</u>
<del>Southwest</del>	<del>MI-10-1-81</del>	<del>H-9935</del>	<del>1:10,000</del>	<del>1981</del>	<del>MT. MITCHELL</del>
East	MI-10-2-81	H-9936	1:10,000	1981	MT. MITCHELL

<u>Area of Junction</u>	<u>Field #</u>	<u>Reg. #</u>	<u>Scale</u>	<u>Date</u>	<u>Ship</u>
South	MI-5-2-81	H-9929	1:5,000	1981	MT. MITCHELL
Southeast	MI-5-1-81	H-9930	1:5,000	1981	MT. MITCHELL
North	MI-80-1-82	H-10004	1:80,000	1982	MT. MITCHELL

The junctions for this survey (H-9935) between the 1981 and 1982 launch work agreed from +3 to -5 fathoms in the western section of the survey. There were two exceptions as listed below:

<u>1982-Depths</u>	<u>1981</u>	<u>Latitude</u>	<u>Longitude</u>	
87	56	17°46'15"	064°43'33"	<i>areas of steep bottom slope.</i>
110	66	17°46'17"	064°43'33"	

The ship soundings in the western section range from 0 to 30 fathoms shallower than the 1981 launch work for 64% of the depth compared. The other 36% range up to 62 fathoms shallower. Considering the different fathometers used, this is comparable to the ship/launch junction for 1982. A holiday between ship and 1981 launch work exists between Latitude 17°47'30", and 17°48'00" and Longitude 64°45'00" and 64°45'30", but a positional junction by data "not smooth plotted" is assured. Along the eastern section of H-9935, the launch work for 1982 ranges between 13 and 66 fathoms deeper than the 1981 launch work is apparently due to minor positional errors in an area where the slope of the bottom is extreme. A holiday exists in the eastern section between latitude 17°47'00" and 17°47'30" and Longitude 64°39'00" and 64°39'30". so that a junction is not possible between the <sup>1982</sup>ship and the 1981 launch work. A positional junction, however, is assured by data "not smooth plotted".

The soundings along the junction between the launch work of this survey and H-9936 differs between a range of 55 and 66 fathoms. It appears from the 125 fathom contour that the one line of overlap from H-9936 is in error possibly due to a positional error in an area of steep bottom profile. The ship agrees with 92% of the H-9936 soundings within +1 to -34 fathoms. This is comparable to the launch/ship junction of the survey. The other 8% of soundings for the ship range to 66 fathoms shallower.

The soundings alongside the junction between the launch work for this survey and H-9930 agree from -5 to +9 fathoms. Exceptions are as follows:

<u>H-9935</u>	<u>H-9930</u>	<u>Difference</u>	<u>Position</u>
74	52	+22	17°46'22" 64°41'03"
70	49	+21	17°46'56" 64°40'49"
66	53	+13	17°47'03" 64°40'10"
56	43	+13	17°47'04" 64°39'57"
55	40	+15	17°46'22" 64°41'01"
62	52	+10	17°47'03" 64°40'12"
90	50	+40	17°47'04" 64°40'06"
56	74	-18	17°47'05" 64°39'48"

For the junction between H-9935 and H-9929, 86% of the soundings agree within +2 fathoms and 13% within ±6 fathoms. Below is listed the only problem sounding along the junction:



<u>H-9935</u>	<u>H-9929</u>	<u>Difference</u>	<u>Position</u>
33	44	-11	17°45'54" 64°41'57"

The soundings along the junction between this survey and H-10004 agree within 1% of the depth for 82% of the depth compared. Using a 1.5 mm shift, 100% agreement was achieved.

Generally, junction comparisons are good considering the steepness of the bottom profile and the use of different beam width echo sounders.

#### K. COMPARISONS WITH PRIOR SURVEYS

Prior surveys number H-4653a and H-4652a at 1:20,000 scale and H-4629b W.D. at 1:10,000 scale were conducted in 1924-25, 1924-26 and 1924-25, respectively within the area of this survey. All depths for the ship compared were deeper than the clearances of prior survey H-4629b W.D. The same applies for LAUNCH 2224 with the following

exceptions: *Do not concur, because effective drag depths are in feet, while pres. survey scgs. are in fathoms.*

<u>H-4629b W.D.</u> <i>(Eff. drag depths in feet)</i>	<u>H-9935</u> <i>(uncorrected scgs in fathoms)</i>	<u>Positions</u>
$\frac{0}{29}$	28	17°45'52" 64°42'19"
	28	17°45'52" 64°42'18"
	27	17°45'56" 64°42'56"
$\frac{0}{22.5}$	18	17°45'55" 64°43'01"
15	12	17°45'49" 64°42'51"
	14	17°45'49" 64°42'50"

<u>H-4629b W.D</u>	<u>H-9935</u>	<u>Positions</u>
	13	17°45'49" 64°42'49"
	14	17°45'49" 64°42'47"

Ships and launch depths compared with prior survey H-4652a and H-4653a ranged from 1 to 187 fathoms shallower. Considering the irregularity and steepness of the bottom along with the difference in positioning and sounding methods used and the depths involved, these comparisons are tolerable.

#### L. COMPARISON WITH THE CHART

This area is covered by the following NOAA Charts:

<u>Chart Number</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
25641	18th	28 November 19 <del>7</del> <sup>8</sup> 1	1:100,000
25645	9th	26 April 1980	1: <del>100,000</del> <sup>10,000</sup>

Charted depths for 25641 generally agree with this survey from -21 to +251 fathoms.

This disagreement is attributed to the difference in scale between the chart and the survey when making comparisons and slight positional errors along the extreme slope and irregular bottom.

Chart 25645 ranges from 5 to 102 fathoms deeper than this survey. These differences can be attributed reasons as stated above and for prior surveys. It is recommended that this survey data be used in lieu of prior survey data used on the chart.

M. ADEQUACY OF THE SURVEY

This survey is considered complete and adequate to supersede prior surveys for charting. *concur*

N. AIDS TO NAVIGATION

All aids to navigation are as listed in 1981 description report for this survey area with the addition of Coakley Bay Light as described on NOAA Form 76-40 in

Appendix "I".

*Coakley Bay Light falls off limit of pres. survey - only approx. pos. given in 76-40.*

O. STATISTICS

	Ship	Launch	Total
Linear Nautical Miles of Hydrography	133.75	44.85	178.6
Linear Nautical Miles of Crossline	14.85	7.25	22.1
Total Linear Miles of Hydrography	148.6	52.1	200.7
Total Miscellaneous Miles	92.4	80.0	172.4
Total Miles Run	241	132.1	373.1
Square Miles of Hydrography	---	---	12
Total Number of Positions	784	481	1265
Nansen Casts	2	---	2
Vertical Cast	1	---	1
Bottom Samples	10	---	10

P. MISCELLANEOUS

Sounding lines were run parallel to the contours near shore in order to provide a safe turning margin for the ship.

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

The following Hydroplot programs were used to acquire and process the survey data:

<u>Program Number</u>	<u>Program Name</u>	<u>Version</u>
RK 111	Range-Range Real Time Plot	01/30/76
RK 201	Grid, Lattice, & Signal Plot	04/18/75
RK 211	Range-Range Non-Real Time Plot	01/15/76
RK 300	Utility Computations	10/21/80
RK 330	Data Format and Check	05/04/76
PM 360	Electronic Corrector Abstract	02/02/76
AM 500	Predicted Tide Generator	11/10/72
RK 530	Velocity Correction Computations	05/10/76
RK 561	H/R Geodetic Calibration	02/19/75
AM 602	Extended Line Oriented Editor	05/21/75
RK 612	High Speed Print-out	03/23/78

S. REFERENCE TO REPORTS

1981            Descriptive Reports OPR-1149-MI/PE-81 (H-9929, 9930, 9935,9936)  
1981-1982      Horizontal Control Report OPR-1149-MI/PE-81/82  
1981-1982      Coast Pilot Report

Respectively submitted,

*Robert D. Henegar*

Robert D. Henegar  
ENS, NOAA,

## SIGNAL TAPE LIST

MI-10-1-81/82

H-9935

200	4	17	47	19987	064	37	10175	250	0110	000000
400	4	17	45	25424	064	41	41593	250	0014	000000
410	4	17	45	32992	064	41	41609	139	0000	000000
420	4	17	45	23546	064	41	38905	139	0000	000000
540	4	17	45	31341	064	43	31777	139	0000	000000
600	4	17	47	02614	064	44	55987	139	0027	000000

APPENDIX "F"

SIGNAL NAMES/NUMBERS LISTING SOURCE AMC OPS OA/CAM 101 OPR-I149-MI/PE-82

MI-10-1-81 H-9935

<u>STA NO.</u>	<u>NAME</u>	<u>FIELD COMP. 1980</u>	<u>SOURCE</u>		<u>RECOVERED</u>
			<u>QUAD #</u>	<u>STA #</u>	
200	BUCK ISLAND LIGHT	*			MI82
400	CHRISTIANSTED RANGE LIGHT	*			MI82
410	CHRISTIANSTED CHANNEL MARKER #7	*			MI82
420	CHRISTIANSTED RADIO MAST	*			MI82
540	LITTLE PRINCESS CHIMNEY		170644	1078	MI82
600	SALT 2	*			MI82

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT  
(Field Party, Ship or Office)  
NOAA ship *MT MITCHELL*

STATE  
*ST Croix, U.S.V.I.*

LOCALITY  
*Salt River to Pull Point*

DATE  
*1-March-82*

The following objects HAVE  HAVE NOT  been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.  
*OPR-I 149-MZ/PE*

JOB NUMBER  
*82*

SURVEY NUMBER  
*MI-10-1-81/82*

DATUM  
*Puerto Rico Datum*

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NONFLOATING AIDS OR LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY  
 HYDROGRAPHIC PARTY  
 GEODETIC PARTY  
 PHOTO FIELD PARTY  
 COMPILATION ACTIVITY  
 FINAL REVIEWER  
 QUALITY CONTROL & REVIEW  
 COAST PILOT BRANCH  
(See reverse for responsible personnel)

CHARTING NAME  
*Cookley Bay LT*

DESCRIPTION  
(Record reason for deletion of landmark or aid to navigation.  
Show triangulation station names, where applicable, in parentheses.)  
*\* Cookley Bay LT  
FL 6 4 Sec 16 ft 3M "1"*

POSITION  
LATITUDE  
LONGITUDE  
D.M. Meters  
D.P. Meters  
*17° 46' 01.1" N  
64° 38' 13.6" W*

METHOD AND DATE OF LOCATION  
(See instructions on reverse side)  
OFFICE  
FIELD  
*San Juan  
F-1-6-L  
3-1-82*

CHARTS AFFECTED  
*25829  
25841*



## APPROVAL SHEET

The field work on this Hydrographic Survey was under my daily supervision. The boat sheet and records have been reviewed and approved by me.

  
J. Austin Yeager

Captain, NOAA

Commanding Officer

ne 23, 1981

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

Tide Station Used (NOAA Form 77-12): 975-1364 Christiansted, St. Croix, VI

Period: March 10 - 28, 1981

HYDROGRAPHIC SHEET: H-9935

OPR: I-149

Locality: North shore of St. Croix, VI

Plane of reference (mean lower low water): 3.42 ft.

Height of Mean High Water above Plane of Reference is 0.78 ft.

REMARKS: Zone direct.

*Donal Carver*  
for Chief, Datums and Information Branch

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NO.: H-9935

Number of positions	1637
Number of soundings	3197
Number of control stations	7

	<u>TIME-HOURS</u>	<u>DATE COMPLETED</u>
Preprocessing Examination	25	19 JUL 1982
Verification of Field Data	606	13 DEC 1985
Quality Control Checks	110	
Evaluation and Analysis	59	15 MAY 1986
Final Inspection	25	23 MAY 1986
TOTAL TIME	825	
Marine Center Approval		18 JUN 1986

Transmittal letter of survey and survey records will be included in the Descriptive Report to identify the records accompanying the survey.

JULY 9, 1982

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

Tide Station Used (NOAA Form 77-12): 975-1364 CHRISTIANSTED, V.I.

Period: FEBRUARY 22-MARCH 30, 1982

HYDROGRAPHIC SHEET: H-9935

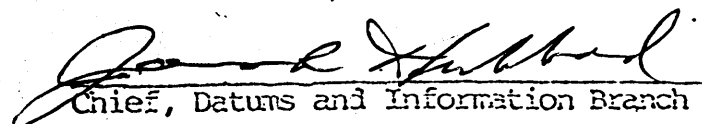
OPR: I-149

Locality: NORTH COAST OF ST. CROIX, V.I.

Plane of reference (mean lower low water): 3.65 FT

Height of Mean High Water above Plane of Reference is 0.81 FT

REMARKS: ZONE DIRECT

  
Chief, Datums and Information Branch

GEOGRAPHIC NAMES

H-9935

Name on Survey	A	B	C	D	E	F	G	H	K
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST	

CARIBBEAN SEA										1
CHENAY BAY										2
CHRISTIANSTED HARBOR										3
GREEN CAY										4
LITTLE PRINCESS										5
PRUNE BAY										6
PULL POINT										7
SAINT CROIX										8
U.S. VIRGIN ISLANDS (title)										9
WHITEHORSE ROCK	Whitehorse Rock					see	DIRCOMP	11-2-87		10
										11
										12
										13
										14
										15
										16
										17
										18
						Approved:				19
										20
						<i>Charles B. Harrington</i>				21
						Chief Geographer - N	CG2x5			22
						APR	3	1986		23
										24
										25

ATLANTIC MARINE CENTER  
EVALUATION REPORT

REGISTRY NO.: H-9935

FIELD NO.: MI-10-1-81

U.S. Virgin Islands, St. Croix, Approaches to Christiansted Harbor

SURVEYED: March 10 to March 28, 1981  
February 20 to March 30, 1982

SCALE: 1:10,000

PROJECT NOs.: OPR-I149 MI/PE-81  
OPR-I149 MI/PE-82

SOUNDINGS: Ross Model 5000  
Fineline Echo Sounder  
EDO Echo Sounder with  
Universal Graphic Recorder

CONTROL: Range/Azimuth  
Del Norte/Theodolite (Wild T-2)  
Range/Range Del Norte

Chief of Party ..... R. A. Trauschke (1981)  
J. A. Yeager (1982)

Surveyed by ..... K. W. Perrin  
..... E. S. Varney  
..... J. Zabitchuck  
..... K. P. Peters  
..... F. W. Rossmann  
..... B. L. Coakley  
..... A. E. Orris  
..... C. N. McLean  
..... N. L. Crews  
..... J. L. Long  
..... R. D. Henegar

Automated Plot by.....Xynetics 1201 Plotter (AMC)

1. INTRODUCTION

- a. There were no unusual methods of surveying performed during this survey.
- b. The survey was conducted in both 1981 and 1982 and separate field reports were submitted for each part of the survey. These reports were combined as a final Descriptive Report during the processing of the survey.
- c. Changes in the Descriptive Report were made in red during office processing.

## 2. CONTROL AND SHORELINE

a. The source of the control is adequately described in sections F and G in both parts of the combined Descriptive Report.

b. Shoreline originates with Class III registered shoreline maps TP-00002, TP-00003, and TP-00004 all of 1977. The three shoreline maps consist of two parts, the shoreline map and a photobathymetric overlay. Depths transferred to the smooth sheet in red were determined by photobathymetric methods using photographs of 1977. These depths were transferred from the overlays and provide supplemental information for unsurveyed areas and areas not adequately surveyed by the hydrographer.

Differences exist between the photobathymetric survey and the shoreline map with respect to the location of ledges and reefs. Where reefs and, in some cases, ledges are shown on the shoreline map, depths of 1 to 3 feet are found on the photobathymetric survey. In these areas, the ledges and reefs from the shoreline map are shown on the smooth sheet. Most of the reef symbols depicted alongshore in the vicinity of Little Princess on the smooth sheet originate with zero or negative soundings from the photobathymetric survey.

The submerged reef line that only extends from latitude 17°45'49"N, longitude 64°43'20"W to latitude 17°46'04"N, longitude 64°43'50"W was not completed on the shoreline map.

## 3. HYDROGRAPHY

a. Depths at crossings are generally in good agreement, except in some areas where minor differences exist between hydrographic and bathymetric data.

b. The standard depth curves from the 3-fathom depth curve to the 50-fathom depth curve are adequately delineated. Unresolved depth differences noted between the 50-fathom depth curve and the 200-fathom depth curve precluded the completion of the 50- and 100-fathom depth curves. (See section 4.a of this report.) Inshore soundings and depth curves were applied from the photobathymetric data.

c. The development of the bottom configuration and the determination of least depths are considered adequate beyond the 3-fathom depth curve, except as noted in section 4 of this report.

## 4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records, and reports comply with the requirements of the Hydrographic Manual, with the following exceptions:

a. Many sounding differences in areas of overlap between the 1981 work and the 1982 work were not properly resolved. Several holidays exist in depths between 50 and 150 fathoms.

b. A number of unresolved discrepancies in sounding data at crossings and along adjacent lines between the 50- and 200-fathom depth curves precluded the smooth plotting of these data. These discrepancies are attributed to running

sounding lines parallel to the steep slope in the area. The delineation of depth curves on the field sheets would have identified improbable data during the survey. Also, observations for comparison purposes should have been made at various depths by sounding simultaneously with the Ross and UGR systems in these areas.

c. It was necessary for the verifier to rescan the bottom profile trace in many places on the echograms during survey processing.

#### 5. JUNCTIONS

Adequate junctions were effected with H-9929 (1981) on the south, H-9999 (1982) on the west, H-9936 (1981) on the east, and H-10004 (1982) on the north during the evaluation of this survey. The junction with H-9930 (1981) on the south was effected during verification.

#### 6. COMPARISON WITH PRIOR SURVEYS

- a. H-4629a (1924-26) 1:10,000
- H-4652a (1924-26) 1:20,000
- H-4653a (1924-25) 1:20,000

These prior surveys taken together cover the entire area of the present survey. While there are areas of agreement, a comparison of prior and present survey depths beyond the 20-fathom depth curve reveals significant differences along the steep slopes. In shoaler depths, only minor differences of approximately 1-fathom or less indicate a relatively stable bottom. Differences are readily attributable to steep slopes, irregularity of the bottom, and the surveying methods employed.

The present survey is considered adequate to supersede these prior surveys within the common area.

- b. H-4629b (1924-26)WD 1:10,000
- H-4652b (1924-26)WD 1:20,000

These wire-drag surveys cover a portion of the present survey. No conflicts between present depths and effective wire-drag depths were found.

Two soundings have been carried forward from H-4652b WD to supplement the present survey.

#### 7. COMPARISON WITH CHART 25641(18th Edition, November 28, 1981) 25645(7th Edition, April 26, 1980)

##### a. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration, supplemented by miscellaneous sources.



The visible wreck, PA charted at latitude 17°47'13"N, longitude 64°44'50"W originates with miscellaneous sources (Local Notice to Mariners 49 of 1977 and Chart Letter 942 of 1979) and was reported to be the M/V CUMULUS. The wreck located in 2 to 3 feet of water at latitude 17°47'08"N, longitude 64°45'06"W on H-9999 was identified as the M/V CUMULUS on the present survey. It is recommended that the wreck be charted at the new position as shown on the present survey.

b. Aids to Navigation

There are no charted aids to navigation within the limits of the present survey.

8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the project instruction except as noted in sections 3 and 4 of this report.

9. ADDITIONAL FIELD WORK

This is an adequate basic survey and no additional field work is recommended at this time.

*F. L. Saunders*

\_\_\_\_\_  
F. L. SAUNDERS  
Cartographic Technician  
Verification of Field Data

*Lisa Quinlan*

\_\_\_\_\_  
LISA QUINLAN  
Cartographer  
Standards Section (N/CG242)  
Evaluation and Analysis


*for Leroy G. Grace*

\_\_\_\_\_  
R. R. HILL  
Senior Cartographic Technician  
Verification Check

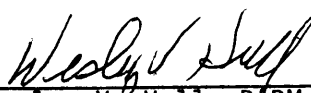
Inspection Report  
H-9935

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 survey complies with National Ocean Service (NOS) requirements except as noted in the Evaluation Report. The survey records comply with NOS requirements except where noted in the Evaluation Report.

Inspected

  
George K. Myers  
Chief, Standards Section (N/CG242)  
Hydrographic Surveys Branch

Approved

  
Wesley V. Hull, RADM, NOAA  
Director, Atlantic Marine Center

DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Survey  
Washington, D.C.

Hydrographic Index No. 130C

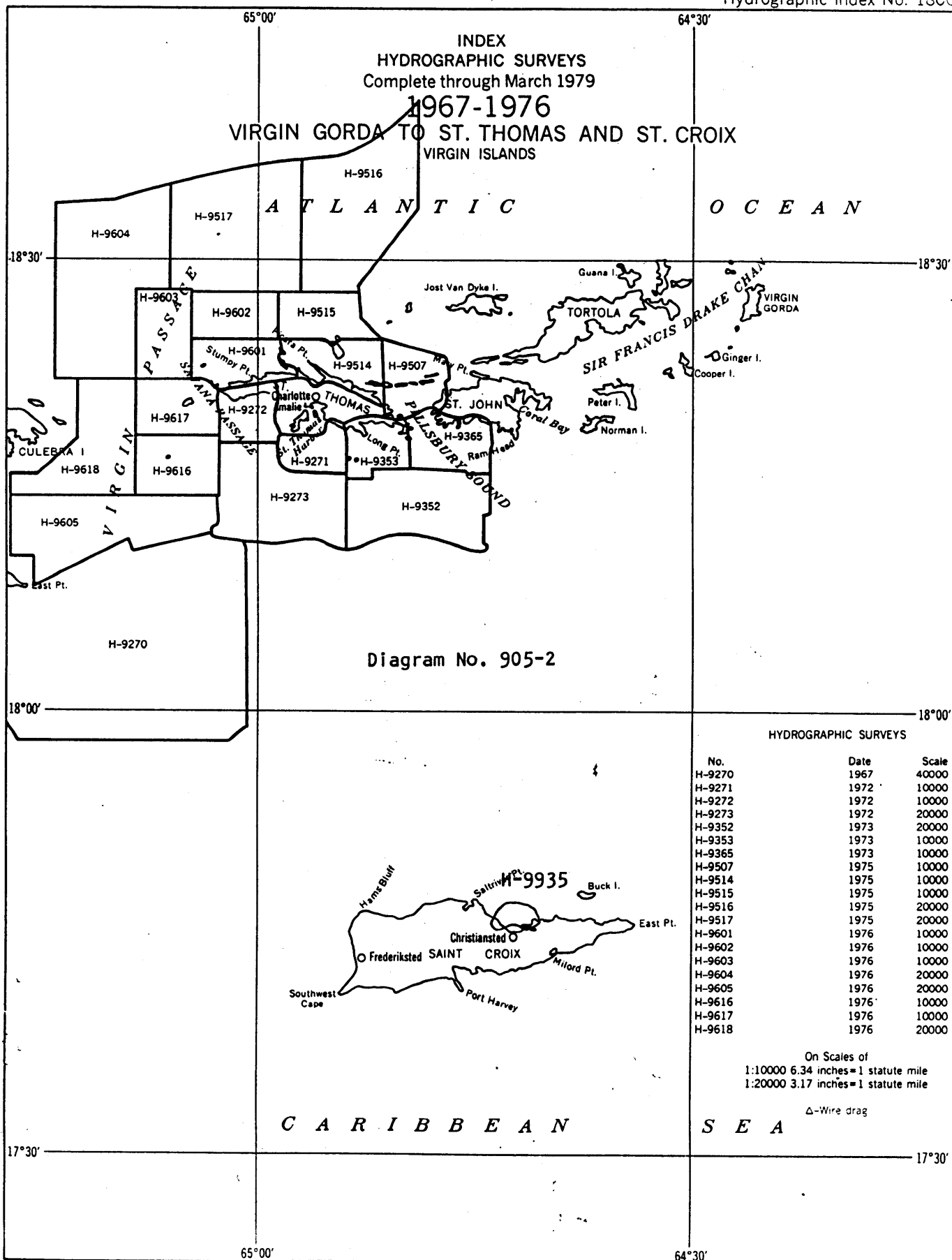


Diagram No. 905-2

HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-9270	1967	40000
H-9271	1972	10000
H-9272	1972	10000
H-9273	1972	20000
H-9352	1973	20000
H-9353	1973	10000
H-9365	1973	10000
H-9507	1975	10000
H-9514	1975	10000
H-9515	1975	10000
H-9516	1975	20000
H-9517	1975	20000
H-9601	1976	10000
H-9602	1976	10000
H-9603	1976	10000
H-9604	1976	20000
H-9605	1976	20000
H-9616	1976	10000
H-9617	1976	10000
H-9618	1976	20000

On Scales of  
1:10000 6.34 inches = 1 statute mile  
1:20000 3.17 inches = 1 statute mile

△-Wire drag

MARINE CHART BRANCH  
**RECORD OF APPLICATION TO CHARTS**

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9935

**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
25645	8/19/86	F.B. Power	Full Part Before After Marine Center Approval Signed Via <i>inspection</i> Drawing No. #16
25636	8/19/86	F.B. Power	Full Part Before After Marine Center Approval Signed Via <i>inspection</i> Drawing No. #1
25632	8/19/86	F.B. Power	Full Part Before After Marine Center Approval Signed Via <i>inspection</i> Drawing No. #1
25634	8/19/86	Fannie Power	Full Part Before After Marine Center Approval Signed Via <i>inspection</i> Drawing No. #1
<del>25641</del>	<del>8/19/86</del>	<del>F.B.P.</del>	<del>Full Part Before After Marine Center Approval Signed Via <i>inspection</i> Drawing No. <i>Applied through chs. 25632, 25634</i></del>
<del>25640</del>	<del>8/19/86</del>	<del>F.B. Power</del>	<del>Full Part Before After Marine Center Approval Signed Via <i>inspection</i> Drawing No. <i>Applied through ch. 25641</i></del>
25641	5-23-90	Ed Martin	Full Part Before After Marine Center Approval Signed Via Drawing No. 31 thru 25645 drg 17
25640	6-26-90	Ed Martin	Full Part Before After Marine Center Approval Signed Via Drawing No. 35 thru 25641 drg 31
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.