

9691

Diag. Cht. No. LS-5

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. MI-20-1-77
Office No. H-9691

LOCALITY

State Michigan
General Locality Lake Huron
Locality Six Fathom Bank

19 77

CHIEF OF PARTY
Melvin J. Umbach

LIBRARY & ARCHIVES

DATE August 30, 1978

9691

*Area 7
Chts
14860*

HYDROGRAPHIC TITLE SHEET

H-9691

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-20-1-77

State MICHIGAN

General locality LAKE HURON

Locality SIX FATHOM BANK

Scale 1:20,000 Date of survey 8 JULY 1977 (JD 189) TO 17 JULY 1977 (JD 198)

Instructions dated APRIL 21, 1977 Project No. OPR-520-MI-77

Vessel NOAA SHIP MT MITCHELL S222

Chief of party CDR MELVIN J. UMBACH, NOAA

Surveyed by SEE REMARKS

Soundings taken by echo sounder, hand lead, pole ROSS MODEL 5000 FINELINE ECHO SOUNDER

Graphic record scaled by DAW, VEN, DRR, PMD, MEH, TDR, MLM, WGP

Graphic record checked by PWS, NGP, FDS, MAW, JTK, EEM, RAK

Protracted by N/A Automated plot by ~~NOS HYDROPLOT SYSTEM~~ CALCOMP 618

Verification by N/A

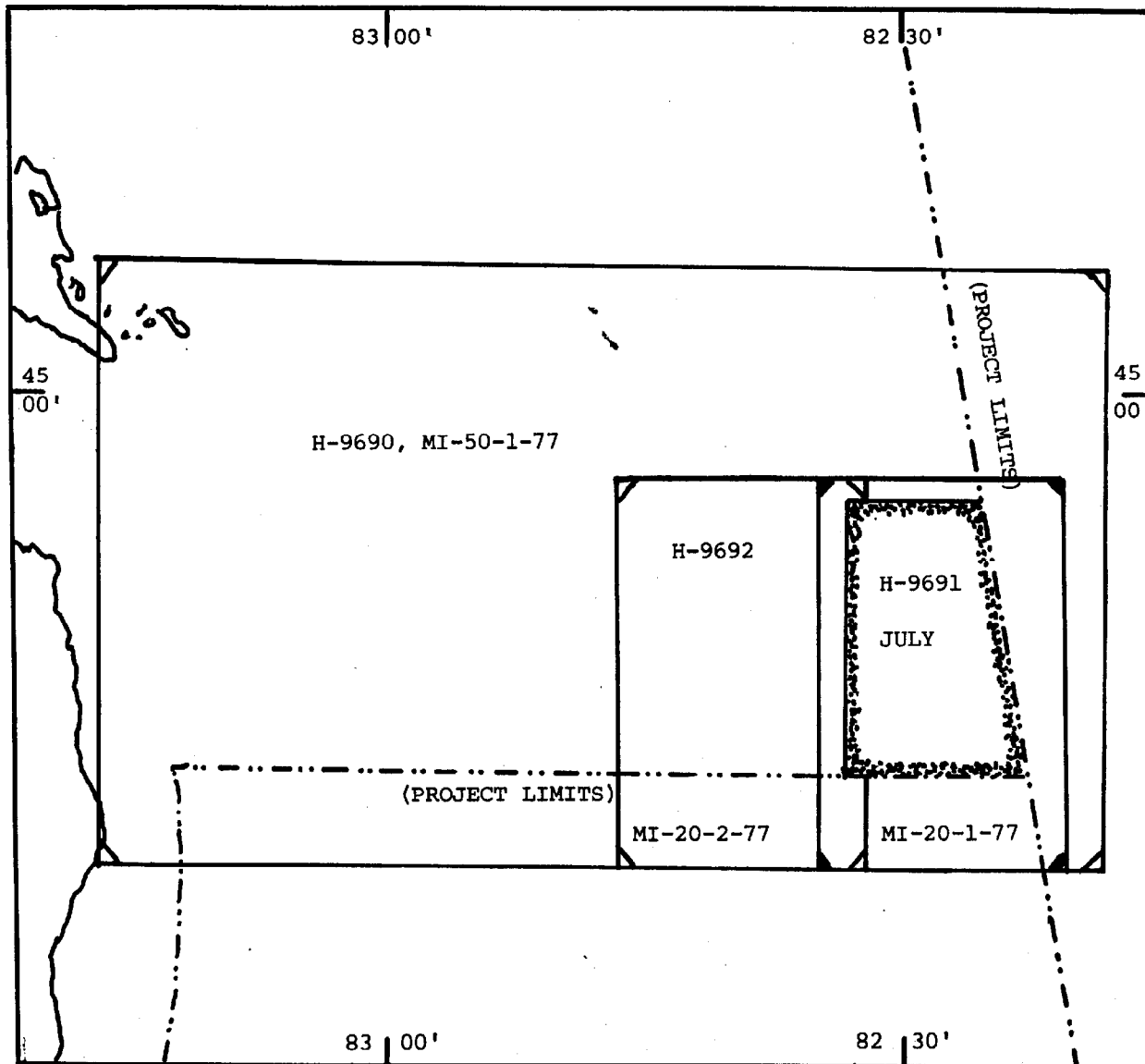
Soundings in ~~fathoms~~ feet at ~~NEW---NEET~~ LWD (IGLD 1955:576.8 FEET)

REMARKS: LTJG D.A. WALTZ, LTJG V.E. NEWELL, LTJG D.R. RICE, ENS P.M. DAUGHERTY,

ENS M.E. HENDERSON, ENS T.D. RULON, ENS M.L. MURPHY, ENS W.G. PRINGLE

LCDR G.B. MILLS

Applied to stds 12/18/78
AMB



Scale of Chart #14860

PROGRESS SKETCH

OPR-520-MI-77

H-9691
MI-20-1-77

NOAA SHIP MT. MITCHELL

JAMES S. MIDGLEY, CDR, NOAA
COMMANDING OFFICER

A. PROJECT

This survey was carried out in accordance with Project Instructions OPR-520-MI-77 issued 21 April 1977 and amended by Changes 1 through 3 dated 5 May 1977, 24 May 1977, 10 June 1977 respectively.

B. AREA SURVEYED

This survey was conducted in Lake Huron, offshore. The limits of the survey are described by lines connecting the following points in a clockwise manner:

44°5 ⁵ 6.0 ⁸ 'N	44°5 ⁵ 6.0 ⁸ 'N
82°33.4 ² 'W	82°25.2'W
44°43.2 ⁶ 'N	44°43.2 ⁴ 'N
82°33.4'W	82°23.0'W

This survey was conducted between 8 July 1977 (JD 189) and 17 July 1977 (JD 198).

C. SOUNDING VESSEL

Soundings for this survey were obtained by the NOAA SHIP MT MITCHEL S222 (Vessel Number 2220 for all survey records) utilizing a fully automated Hydroplot System.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

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

Equipment:	Serial Number:
Ross Model 5000 Fineline Depth Sounder	1053
Ross Model 4000 Transceiver	1050
Ross Digitizer	1050

Soundings were taken with a skeg transducer (antenna distance +32.0 m)*. ✓
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, digitizing errors were corrected, and the effects of the seas were meaned and corrected on the electronic corrector tape.

Phase calibration checks were made at frequent intervals. Any necessary adjustments were made and noted in the sounding volume and on the fathogram. In addition, any departures of the trace from the calibration due to phase differences were corrected during the scanning process.

*See parameter tape

Velocity corrections were obtained from 1 Nansen Cast and 1 XBT at the following locations:

Cast No:	Latitude:	Longitude:	Date:
D1-1	44°51'18.0"N	82°24'42.0"W	9 July 1977 (JD190)
XBT No:			
1	44°53'18.0"N	82°24'42.0"W	9 July 1977 (JD190)

Salinities determined by salinometer were found to be less than 0.2 parts per thousand and were negligible in determining sound velocities. Data obtained from the XBT agreed with the results of the Nansen Cast. Corrections for velocity were made from this Nansen Cast by using RK530. Velocity correction computations and a depth versus velocity correction curve was made. A printout of the velocity tape and all tables are included at the end of this report.

A draft of 14.0 feet was applied to all soundings during the on-line process. From the beginning to the end of the trip (5 July - 21 July), the after draft changed from 14'3" to 13'2". To determine the actual draft for the period 8 July - 17 July, a straight line plot was constructed from 5 July through 21 July. A draft correction was determined for every .2 feet. It was determined that a change in draft from 14.2 to 13.8 represents the draft for the survey period (8-17 July). A copy of settlement and squat corrections versus ship's speed is included. These corrections were determined on July 25, 1977 (JD206) in Lake Huron at St. Ignace, Michigan. The change in the draft along with the settlement and squat corrector is incorporated into the TC/TI tape and its printout is included with the survey data. A settlement and squat corrector of +0.2 is accurate for all survey speeds \pm 0.1 feet.

A vertical cast was conducted on June 18, 1977 (JD169) at Harrisville, Michigan to determine fathometer instrument error. The results are included in this report. The error was less than 0.1 feet and was considered to be zero due to the accuracy of the cast.

Water level corrections were not applied at the time of the survey. A copy of the request for the actual water levels for the area surveyed is included with this report.

E. HYDROGRAPHIC SHEETS

This survey was plotted on two mylar complot roll plotter sheets by the MT MITCHELL Hydroplot System. The skew used was 90, 21, 60, for both sheets. 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, initial and digitizing errors, and sound velocity.

They are not corrected for water levels, settlement and squat, and instrument error. The final smooth sheet will be plotted at the Atlantic Marine Center, 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
Paramenter Tapes
ASC II Signal Tapes
Transducer Corrector/Table Indicating Tape

F. CONTROL STATIONS

Electronic control stations used for this survey were:

Signal No:

100	Sturgeon Pt. Hydrotrac (H-7A-MI-77)	44°42'46.709"N	83°16'19.031"W
201	North Point Hydrotrac (Antenna)	45°02'26.767"N	83°16'25.508"W

All shore stations except 201 and 202 were located by personnel from the Operations Division, Atlantic Marine Center with assistance from MT MITCHELL Officers. A three leg traverse was run on June 28-29 by ship's personnel to locate station ANTENNA (201) and BEACH - North Point Del Norte (202). Neither station was monumented due to their location in the sand dunes but a third station (WOECK) was established at this time on high ground between the dunes and the woods. A copy of the geodetic abstracts and computations are included in the survey records.

G. HYDROGRAPHIC POSITION CONTROL

An OdOm Offshore Hydrotrac system, operating at a frequency of 1618.650 Khz, in Range Range mode, was used to provide positioning control on the following days:

8 July 1977 (JD189) through 17 July 1977 (JD198).

The following Odum Offshore Hydrotrac equipment was used:

Type:	Shipboard	Serial Number:
	Master MDU	121
	Master Receiver	327
	Power Amplifier	536
	Sawtooth	8502
	Shore Station 100	
	SDU	216
	Power Supply (Sola)	752
	Transmitter Amplifier	537
	Coupler	133
	Shore Station 201	
	SDU	215
	Power Supply (Sola)	754
	Transmitter Amplifier	537
	Coupler	133

A frequency of 1620.38 Khz was used in the parameters to compensate for the difference in propagation velocity between salt and fresh water.

The following Del Norte equipment and stations were used for calibration of Hydrotrac:

Station No:	Signal Name:	Position:	Code:	Serial No:
105	Sturgeon Point Lt Del Norte	44°42'45.770"N 83°16'21.650"W	72	248 Antenna 125
125	South Point Del Norte(H-2A-MI-77)	44°52'56.290"N 83°18'51.414"W	74	1135 Antenna 127
202	North Point Del Norte (BEACH)	45°02'27.248"N 83°16'24.808"W	76	1063 Antenna 088

Initially the Del Norte was calibrated over a measured baseline. To ensure no drift due to movement of the equipment to the station location, the Del Norte was calibrated again using sextant fixes with a check angle each and comparing observed ranges with computed values by use of the Hydroplot Calibration program RK 561. Only those fixes with inverses less than five (5) meters were accepted. On JD 191 the North Point Del Norte corrector was determined by comparison with the position determined by Del Norte at South Point and Sturgeon Point Light. The resultant correctors were used for this entire survey. Land path effects on Hydrotrac

precluded calibration by sextant fix. Therefore, calibration was accomplished by comparing Hydrotrac values with values computed from Del Norte positioning at 5 sites (see Calibration Volume).

Whenever it was necessary to establish a whole lane count, a buoy established by the Canadian Hydrographic Survey (Latitude 44°46'51.206"N, Longitude 82°24'50.780"W) was circled.

The lane count was constantly monitored by the Survey Department, by comparing the navigation interface readout with a running count on the sawtooth recorder. Lane jumps were thus detected and confirmed at calibrations and buoy circlings. Undetected lane jumps were determined by off line rescanning of the sawtooth record. An abstract of the calibration data is included with the records accompanying this report.

H. SHORELINE

There was no shoreline within the limits of this survey.

I. CROSSLINES

Crosslines were run at least 45° to the main scheme sounding lines. Mileage of crosslines run amounted to 8.7% of the regular sounding lines. The crossline soundings generally agree within 1 foot of the main scheme soundings.

J. JUNCTIONS

This survey junctions with the following surveys:

Area of Junction:	Field No:	Reg No:	Scale:	Date:	Ship:
1. South	Canadian Survey	3895	1:200,000	1975	
2. East	Canadian Survey	(Preliminary)	1:50,000	1977	Bayfield
3. West	MI-20-1-77	H-9692	1:20,000	1977	S222
4. North	MI-50-1-77	H-9690	1:50,000	1977	S222

Junctions with the Canadian Survey (1975) generally agree within five feet. This will be reduced approximately 1.8 feet with the incorporation of the water level reductions. Four soundings disagree greater than ten feet but it is in an area of rough topography.

The Canadian Survey (1977) is a preliminary survey and junctions fairly well with this survey (H-9691). The junctions generally agree within seven feet. Final comparisons should be made with the final copy of this Canadian Survey (1977) when it becomes available.

Contemporary Surveys, MI-20-2-77 and MI-50-1-77, junction well with MI-20-1-77, as contour lines can be extended from MI-20-1-77 to the two adjoining surveys without discontinuity.

K. COMPARISON WITH PRIOR SURVEYS

The following prior survey was conducted within the area of this survey:

Survey No:	Date:	Scale:
1 - 1845	1946	1:120,000

The soundings compared poorly with this survey. Randomly selected soundings from this survey generally agree within 40 feet. This discrepancy may be attributed to the improved quality of position control for this survey. *concur JPS*

The following are findings regarding pre-survey review items for Project 520-MI-77:

The surveys MI-20-1-77 and MI-20-2-77 were conducted to adequately define the pre-survey review item Six Fathom Bank, from the pre-survey review for Project OPR 520-MI-1977 (5/10/77). A least depth of 45³ feet for *Pos. 566 2nd out* MI-20-1-77 was found at Latitude 44°48.85'N, Longitude 82°26.40'W within *Pos. 684 1 out* 200 meters of charted depth 42 feet. The shoalest charted sounding on Six Fathom Bank is six fathoms charted at Latitude 44°48', Longitude 82°32'. This area showed no shoaling whatsoever in general depth of 110 to 120 feet. The nearest least depth of 51³ feet was found 2 nautical miles NE of this position. It is recommended that this six fathom sounding be deleted from the chart. **Pos. 1282 4th out*

L. COMPARISON WITH CHART

This area is covered by NOAA Chart 14860, 24th Edition, dated 10/25/75, at a scale of 1:500,000. Soundings from this survey compare poorly with the present survey, generally agreeing within 30 feet. Four charted depths are within one-half mile of a comparable sounding from this present survey. This discrepancy may be due to the improved position control for this survey.

M. ADEQUACY OF THE SURVEY

This survey is considered complete and adequate to supercede prior surveys for charting.

N. AIDS TO NAVIGATION

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

O. STATISTICS

Linear Nautical Miles of Main Scheme Hydrography	484.0
Linear Nautical Miles of Crosslines	42.0
Linear Nautical Miles of Development	77.4
Total Linear Miles of Hydrography	603.4
Total Miscellaneous Miles	432.5
Total Miles	1035.9
Square Miles of Hydrography	75
Total Number of Positions	1782
Nansen Casts	1
XBTS	1
Bottom Samples	51

P. MISCELLANEOUS

A series of comparison soundings were made with the Canadian Survey Ship Bayfield at the U.S./Canadian boundary. Detached position Numbers are 531 - 539. The results of this and other comparisons will be written at the end of the field season. *DATA NOT PLOTTED, DATA USED FOR SHIP BOARD COMPARISON ONLY.*

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

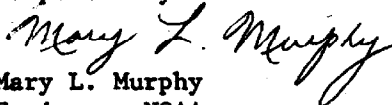
The following Hydroplot Programs were used to acquire and process data for this survey:

	Program Name:	Version:
RK 111	Range-Range Real time	1-30-76
RK 201	Grid, Signal, and Lattice Plot	4-18-75
RK 211	Range-Range Non-Real Time Plot	1-15-76
RK 300	Utility Computations	2-10-76
PM 360	Electronic Tape Abstract	2-02-76
RK 530	Velocity Correction Computations	5-10-76
RK 561	H/R Geodetic Calibration	2-19-75
RK 602	Extended Line Oriented Editor	5-21-75

S. REFERENCE TO REPORTS

Horizontal Control Report - to be submitted at the end of the season to National Geodetic Survey.

Respectfully Submitted:


Mary L. Murphy
Ensign, NOAA

APPROVAL SHEET

MI-20-1-77

H-9691

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

LCDR Gerald B. Mills

for Melvin J. Umbach
Commander, NOAA
Commanding

VERTICAL CAST - HARRISVILLE, MI. (June 18, 1977) J.D. 169

Ship Launch: Mt Mitchell-9222
 Survey No. _____
 OPR No. 520-MI-77
 L.L. No. Ship's Feet

Record of simultaneous leadline and echo sounder comparisons

Echo Sounder No. Ross #1053

Julian Day	Date (1977)	L.L. Sndg. (to Rail)	L.L. Corr. (± below)	L.L. Depth	Echo Sndg. Digitized	Echo Sndg. Corr. (± below)	Echo Depth	L.L. Depth - Echo Depth
169	6/18							
	Port # 1	48.2	+0.11	48.31	24.3	23.6	47.7	+0.41
	2	48.4	+0.14	48.54	24.2	23.6	47.8	+0.74
	3	48.3	+0.13	48.43	24.0	23.6	47.6	+0.83
	4	48.6	+0.16	48.76	24.3	23.6	47.9	+0.86
	5	48.3	+0.13	48.43	24.3	23.6	47.9	+0.53
								+0.67 Ave.
	Stbd # 1	47.4	+0.13	47.53	24.3	23.6	47.9	-0.37
	2	47.3	+0.14	47.44	24.2	23.6	47.8	-0.36
	3	47.4	+0.13	47.53	24.5	23.6	48.1	-0.57
	4	47.5	+0.12	47.62	24.7	23.6	48.3	-0.68
	5	47.5	+0.12	47.62	24.6	23.6	48.2	-0.58
								-0.51 Ave.
							Ave. of Port & Stbd	+0.08
	± L.L. Corr							
	46.81	+0.19						
	47.92	+0.08						
	48.81	+0.19						
	* Distance from rail to transducer				23.7 Ft			
	Velocity Correction				-0.1 Ft			
						Computed by ORP		
						Checked by KEV		

SETTLEMENT AND SQUAT CORRECTORS

July 25, 1977 - Lake Huron

Speed (kts)	Correction (ft)
1	0
2	0
3	0
4	0
5	0.1
6	0.1
7	0.1
8	0.1
9	0.2
10	0.2
11	0.2
12	0.2
13	0.3

VELOCITY CORRECTION TABLE OPTIONS:

- 0) NO TABLE
 - 1) IN FEET
 - 2) IN FATHOMS
 - 3) IN METERS
- DRAFT = 14.3

ACTUAL DEPTH (SURFACE)
MINUS VELOCITY
CORRECTION
(FT)

VELOCITY
CORRECTION
(FT)

0016.46	-0000.06
0050.09	-0000.38
0083.76	-0001.74
0134.30	-0003.07
0210.18	-0005.12
0294.47	-0007.40
0420.88	-0010.78
0589.40	-0015.25

SIGNAL NAMES PRINTOUT

MI-20-1-77

100	H-7A-MI-77	STURGEON POINT HYDROTRAC	AMC OPS
105		STURGEON POINT LT. DEL NORTE	AMC OPS
110	H-8A-MI-77	ALOONA	AMC OPS
115	H-6A-MI-77	MCCOY'S	AMC OPS
120	H-5A-MI-77	BLACK RIVER NORTH	AMC OPS
125	H-2A-MI-77	SOUTH POINT DEL NORTE	AMC OPS
201		NORTH POINT HYDROTRAC ANTENNA	MT MITCHELL
202		NORTH POINT DEL NORTE	MT MITCHELL

SIGNAL TAPE PRINTOUT

100	4	44	42	46709	083	16	19031	250	0000	162038
105	4	44	42	45770	083	16	21650	139	0000	000000
110	4	44	46	00909	083	17	28580	139	0000	000000
115	4	44	48	29664	083	17	37789	139	0000	000000
120	4	44	49	44579	083	18	02310	139	0000	000000
201	4	45	02	26767	083	16	25508	250 ⁴	0000	162038
202	4	45	02	27248	083	16	24808	254	0000	000000



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
NOAA SHIP MT MITCHELL S222
C/O General Delivery
St. Ignace, Michigan 49781

Date : September 19, 1977

Reply to Attn. of

To : Director, National Ocean Survey (Attn: C331)

From : *[Signature]*
Act. Commanding Officer, NOAA SHIP MT MITCHELL S222

Subject: Water Level Data For Survey H-9691

It is requested that verified water level stages (using Greenwich Mean Time) from the water level gages listed below be forwarded to the Processing Division (CAM 3), Atlantic Marine Center, Norfolk Virginia 23510.

Gage:	Latitude:	Longitude:
Harrisville, MI (907-5059)	44°39.6'N	83°17.2'W
Alpena, MI (907-5065)	45°03.6'N	83°25.8'W

It is requested that the time and height correctors for each gage be zoned as per Project Instructions ~~for the area described with~~ the following corner points:

44°56.0'N	44°56.0'N
82°33.4'W	82°25.2'W
44°43.2'N	44°43.2'N
82°33.4'W	82°23.0'W

This information is requested for the following periods:

8 July (JD 189) - 17 July (JD 198) 1977

ATLANTIC MARINE CENTER

TIDE NOTE

NOAA Ship

1. Project No: OPR-520-MI-772. Vessel/~~Field Unit~~: MT MITCHELL (MSS)

3. Year: 1977 4. Meridian Time Zone: GMT

5. Tide Station Name: HARRISVILLE, MICHIGAN (907-5059)

6. Position: Lat. 44 ° 39.6 ' N. Long. 83 ° 17.2 ' W

7. Plane of Reference: ~~MLLW~~ ^{MD}, MLLW corresponds to _____ feet on the tide staff for the period _____

8. Hourly Heights: Standard Gauge, furnished from Rockville.

Scaled and logged from field marigrams.

9. Tidal Zoning: Not applicable.

By two or more gauges automatically zoned

By applying tidal differences and constants

for the area(s): a. _____

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

b. _____

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

c. Include additional areas on separate sheets.

10. Remarks: All Times and Dates used on the survey are Greenwich Mean Time

ATLANTIC MARINE CENTER

TIDE NOTE

NOAA Ship

1. Project No: OPR-520-MI-772. Vessel/~~Field Unit~~: MT MITCHELL (MSS)

3. Year: 1977 4. Meridian Time Zone: GMT

5. Tide Station Name: ALPENA, MICHIGAN (907-5065)

6. Position: Lat. 045 ° 03.6 ' N. Long. 083 ° 25.8 ' W

7. Plane of Reference: ^{LWD} MLLW, MLLW corresponds to _____ feet on the tide staff for the period _____.

8. Hourly Heights: Standard Gauge, furnished from Rockville.

Scaled and logged from field marigrams.

9. Tidal Zoning: Not applicable.

By two or more gauges automatically zoned.

By applying tidal differences and constants

for the area(s): a. _____

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

b. _____

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

c. Include additional areas on separate sheets.

10. Remarks: All Times and Dates used on the survey are Greenwich Mean Time

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

WATER LEVEL NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center: CAM3

Hourly heights are approved for

Water Level Station Used: Harrisville, Michigan (907-5059)

Period: July 8-17, 1977

HYDROGRAPHIC SHEET: H-9691

OPR-520-MI-77

Locality: Lake Huron

Plane of reference: Low Water Datum (IGLD 1955 : 576.8 Feet)

Remarks: Zoning not required.

Philip C. Morris
Chief, Water Level Section

Don M. Spellman 10/30/78
Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

H-9691

Name on Survey	Source of Name											
	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				
SIX FATHOM BANK												1
LAKE HURON												2
												3
												4
												5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
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												18
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												20
												21
												22
												23
												24
												25

APPROVED

Chas. E. Harrington

CHIEF GEOGRAPHER - CBX8

23 OCT. 1978

APPROVAL SHEET
FOR
SURVEY H- 9691

- 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 Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date: 15-August-1978

Signed: _____

Title: Act. Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

H-9691

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS		7 <i>MYLAR</i>	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS		2	
DESCRIP-TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES	<i>1</i>					
CAHIERS	1		1			
VOLUMES		<i>1</i>				2
BOXES						

T-SHEET PRINTS (List)

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	TOTALS
POSITIONS ON SHEET			1750
POSITIONS CHECKED		1750	
POSITIONS REVISED		1	
SOUNDINGS REVISED		93	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	11		
VERIFICATION OF CONTROL		1	
VERIFICATION OF POSITIONS		35	
VERIFICATION OF SOUNDINGS		76	
COMPILATION OF SMOOTH SHEET		12	
APPLICATION OF TOPOGRAPHY		0	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		1	
COMPARISON WITH PRIOR SURVEYS & CHARTS		2	
VERIFIER'S REPORT		5	
OTHER		7	
TOTALS	11	139	150
Pre-Verification by S. Kelley	Beginning Date 10/18/77	Ending Date 10/20/77	
Verification by S. Kelley, D. Mason, R. Roberson	Beginning Date 10/25/77	Ending Date 07/28/78	
Verification Check by H. Smith	Time (Hours) 6	Date 08/01/78	
Marine Center Inspection by Hydrographic Inspection Team (AMC)	Time (Hours) 5	Date 08/09/78	
Quality Control Inspection by F.P. SAULSBURY	Time (Hours) 25	Date 10/19/78	
Requirements Evaluation by D.J. Hill	Time (Hours) 2	Date 11/21/78	

Case: GX 11/3/78 1 pm.

REGISTRY NO. H-9691

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 REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY NO. 9691

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 REQUIRED _____ INITIALS JAC

REMARKS:

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9691

FIELD NO. MI-20-1-77

Michigan, Lake Huron, Six Fathom Bank

SURVEYED: July 8 through July 17, 1977

SCALE: 1:20,000

PROJECT NO.: OPR-520

SOUNDINGS: Ross Model 5,000
Fineline Recorder

CONTROL: Odom Offshore
Hydrotrac
(Range-Range)

Chief of Party	M. J. Umbach
Surveyed by	G. B. Mills
.....	V. E. Newell
.....	D. R. Rice
.....	D. A. Waltz
.....	P. M. Daugherty
.....	M. E. Henderson
.....	M. L. Murphy
.....	W. G. Pringle
.....	T. D. Rulon
Automated Plot by	CALCOMP-618 Plotter (AMC)
Verified and Inked by	R. G. Roberson <i>RG</i>
	July 24, 1978

1. Introduction

- a. No unusual problems were encountered during verification.
- b. Projection parameters were revised and inserted into the Descriptive Report.

2. Control and Shoreline

- a. Control is adequately discussed in Sections F and G of the Descriptive Report. It should be noted that the frequency used for processing the survey at the marine center was 1620.38 kHz, as required by the project instructions.
- b. There is no shoreline within the survey area.

3. Hydrography

- a. Crosslines are in good agreement with the regular hydrography. Depths vary from 1 to 3 feet.
- b. The standard depth curves were adequately delineated.

c. Developments run were adequate to delineate the bottom configuration and least depths.

4. Condition of Survey

All pertinent data for this survey is adequate and conforms to the requirements established by the Hydrographic Manual, except as follows:

A water level approval note has not been received for this survey. It is suggested that this approval note be obtained by Quality Control Branch and inserted into the Descriptive Report.
rec'd & inserted during a.c.

5. Junctions

Junctions were effected with the following surveys:

H-9690 (1977) to the north ✓OK
 H-9692 (1977) to the west ✓OK
 3895 (1975) to the south (Canadian survey) - *no junction was made*

The junction to the south with Canadian Hydrographic Service (CHS) survey 3895 was adequate. Contours were not drawn because there is a discontinuity of depth units, and the Canadian sheet scale is 1:200,000 and U. S. scale 1:20,000. A copy of the Canadian survey is included in the survey records. ✓

6. Comparison With Prior Survey

1-1845 (1946) 1:120,000

Comparison shows ^{some} agreement within 1 to 10 feet; however, in some areas variances are major. Major variances are at the following approximate locations:

<u>Prior Survey</u> <u>Depth</u>	<u>Location</u>	<u>Difference</u>
527	44°55'50", 82°27'15"	50 feet
324	44°52'20", 82°27'30"	120 feet
240	44°50'30", 82°27'30"	95 feet
57	44°47'50", 82°27'50"	30 feet
139	44°45'20", 82°25'50"	35 feet
582	44°54'55", 82°30'05"	90 feet
162	44°53'30", 82°31'00"	280 feet
324	44°52'20", 82°27'30"	120 feet
114	44°52'20", 82°28'15"	305 feet
120	44°50'20", 82°33'00"	30 feet
52	44°50'15", 82°28'50"	80 feet
69	44°47'55", 82°28'05"	35 feet

Cat. 14860 5493

- 7 fms - 42 ft. Lat. 44° 49.00', Long 82° 22.10'
- 8 fms - 48 ft. Lat. 44° 47.20', Long 82° 29.80'
- 80 fms - 480 ft. Lat. 44° 53.50', Long 82° 28.30'
- 16 fms - 96 ft. Lat. 44° 47.60', Long 82° 30.20'
- 77 fms - 462 ft. Lat. 44° 47.90', Long 82° 22.20' - off limits

14860-5493

All measurements were adequate to delineate the bottom continuation and least depths.

4. Condition of Survey

All pertinent data for this survey is adequate and conforms to the requirements established by the Hydrographic Manual, as follows:

A water level approval note has not been received for this survey. It is suggested that this approval note be obtained by the Quality Council Branch and forwarded into the Hydrographic Manual.

5. Junctions

Junctions were effected with the following surveys:

- 3885 (1975) to the south (Canadian survey)
- 3885 (1975) to the west
- 3885 (1975) to the north

The junction to the south with Canadian Hydrographic Service (CHS) survey 3885 was adequate. Connections were not drawn because of the lack of depth notes, and the Canadian chart scale is 1:20,000. A copy of the CHS survey is included in the survey records.

6. Comparison with Prior Survey

1-1945 (1945) 1:100,000

Comparison shows agreement within 1 to 1.5% in most areas. Major variances are noted at the following approximate locations:

Depth	Location	1:100,000 Survey
30	44° 47.15' N, 82° 28.15' W	30
32	44° 50.15' N, 82° 28.15' W	32
34	44° 52.15' N, 82° 28.15' W	34
36	44° 54.15' N, 82° 28.15' W	36
38	44° 56.15' N, 82° 28.15' W	38
40	44° 58.15' N, 82° 28.15' W	40
42	44° 59.15' N, 82° 28.15' W	42
44	44° 59.15' N, 82° 28.15' W	44
46	44° 59.15' N, 82° 28.15' W	46
48	44° 59.15' N, 82° 28.15' W	48
50	44° 59.15' N, 82° 28.15' W	50
52	44° 59.15' N, 82° 28.15' W	52
54	44° 59.15' N, 82° 28.15' W	54
56	44° 59.15' N, 82° 28.15' W	56
58	44° 59.15' N, 82° 28.15' W	58
60	44° 59.15' N, 82° 28.15' W	60
62	44° 59.15' N, 82° 28.15' W	62
64	44° 59.15' N, 82° 28.15' W	64
66	44° 59.15' N, 82° 28.15' W	66
68	44° 59.15' N, 82° 28.15' W	68
70	44° 59.15' N, 82° 28.15' W	70
72	44° 59.15' N, 82° 28.15' W	72
74	44° 59.15' N, 82° 28.15' W	74
76	44° 59.15' N, 82° 28.15' W	76
78	44° 59.15' N, 82° 28.15' W	78
80	44° 59.15' N, 82° 28.15' W	80

Handwritten note: Close by 1:100,000 scale

The differences between the surveys can be attributed to advancements in survey equipment and methods.

It should be noted that the Project Instructions (Section 4.9) state, "Since these surveys do not meet contemporary survey specifications for vessel positioning, it is not expected that a good depth comparison will be achieved with 1977 surveys."

~~Considering the larger scale, sounding line density, and developments on the present survey, This survey is adequate to supersede the prior survey in the common area.~~

7. Comparison With Chart 14860 (24th Edition, October 25, 1975)

a. Hydrography

General comparison with the chart is ~~good~~ ^{poor}. The following soundings are major differences:

^{1-1845 - 51ft ✓ 8fms}
Charted 48-foot sounding at approximately 44° 50' 20", 82° 28' 30" ✓
is approximately 45 feet shoaler than the surrounding hydrography.

^{✓ 11fms 80 (107-174 depths on 1-2104) in blue on 1-2104(1958)}
Charted 66-foot sounding at approximately 44° 49' 05", 82° 31' 30" ✓
is approximately 60 feet shoaler than the surrounding hydrography. (187)

^{6 fms with danger curve - tint - 6 fms. Six Fathom Bank ✓ in blue on 1-2104}
Charted 36-foot sounding at approximately 44° 48' 05", 82° 32' 00" ^{See Critique}
is approximately 75 feet shoaler than the surrounding hydrography.

^{1-1845 44ft 14fms ✓ 1-18}
Charted 84-foot sounding at approximately 44° 47' 25", 82° 28' 45" ✓
is approximately 20 feet shoaler than the surrounding hydrography. (24) (2250) (NW)

^{33fms 199ft close - 1-1845}
Charted 198-foot sounding at approximately 44° 50' 35", 82° 25' 50" ✓
is approximately 290 feet shoaler than the surrounding hydrography. (1-1845) (NW)

^{16fms - 97ft - 1-1845}
Charted 96-foot sounding at approximately 44° 47' 50", 82° 25' 05" ✓
is approximately 25 feet shoaler than the surrounding hydrography. (44) (NW)

^{22fms - 131ft - 1-1845}
Charted 132-foot sounding at approximately 44° 45' 15", 82° 26' 05" ✓
is approximately 25 feet shoaler than the surrounding hydrography. X

Presurvey Review Item #1 - Six Fathom Bank - was developed with several least depths being obtained: ^{this item covers about 50% of the survey area.}

A least depth of 43 feet at 44° 48' 49.88", 82° 26' 22.56". ^{Chart 7 fms}

A least depth of 55 feet at 44° 48' 23.10", 82° 27' 25.42".

A least depth of 50 feet at 44° 49' 16.02", 82° 29' 42.62"; 44° 49' 18.04"; 44° 49' 19.63", 82° 29' 25.73"; 44° 49' 12.65", 82° 29' 50.91", and 44° 49' 21.52", 82° 29' 11.82".

A least depth of 59 feet at 44° 48' 57.18", 82° 27' 56.00".

The charted 6-fathom (36-foot) sounding at approximately 44° 48' 05", 82° 32' 00" should be carefully evaluated. This office had no source for the sounding. The data obtained on this survey indicates that the sounding does not exist as charted, and should be deleted. It is recommended that a thorough search of all available pertinent data be made to ascertain the source and credibility of the charted sounding. Based on this research a decision as to retention or deletion should be made.

*See QC,
Critique*

This survey is adequate to supersede charted hydrography in the common area.

*CONCUR
JPS*

b. Aids to Navigation

There are no aids to navigation in the survey area. ✓

8. Compliance With Instructions

This survey complies with the Project Instructions. ✓


9. Additional Field Work

This is a good basic survey; no additional field work is recommended. *CONCUR*


Inspection Report
H-9691


Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the survey have been incorporated within the Verifier's Report.

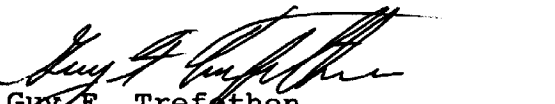
Examined and Approved:
Hydrographic Inspection Team
Date:


Robert A. Trauschke, CDR, NOAA
Chief, Processing Division


Absent
Charles H. Nixon, CAPT, NOAA
Chief, Operations Division


R. D. Sanocki
Technical Assistant
Processing Division


C. Douglas Mason, LT, NOAA
Chief, Electronic Data
Processing Branch


Guy F. Trefethen
Team Leader
Verification Branch

Approved/Forwarded


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



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

C352/FPS

October 23, 1978

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

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury *F. P. Saulsbury*
Quality Evaluator

SUBJECT: Quality Control Report for H-9691 (1977), Michigan, Lake
Huron, Six Fathom Bank

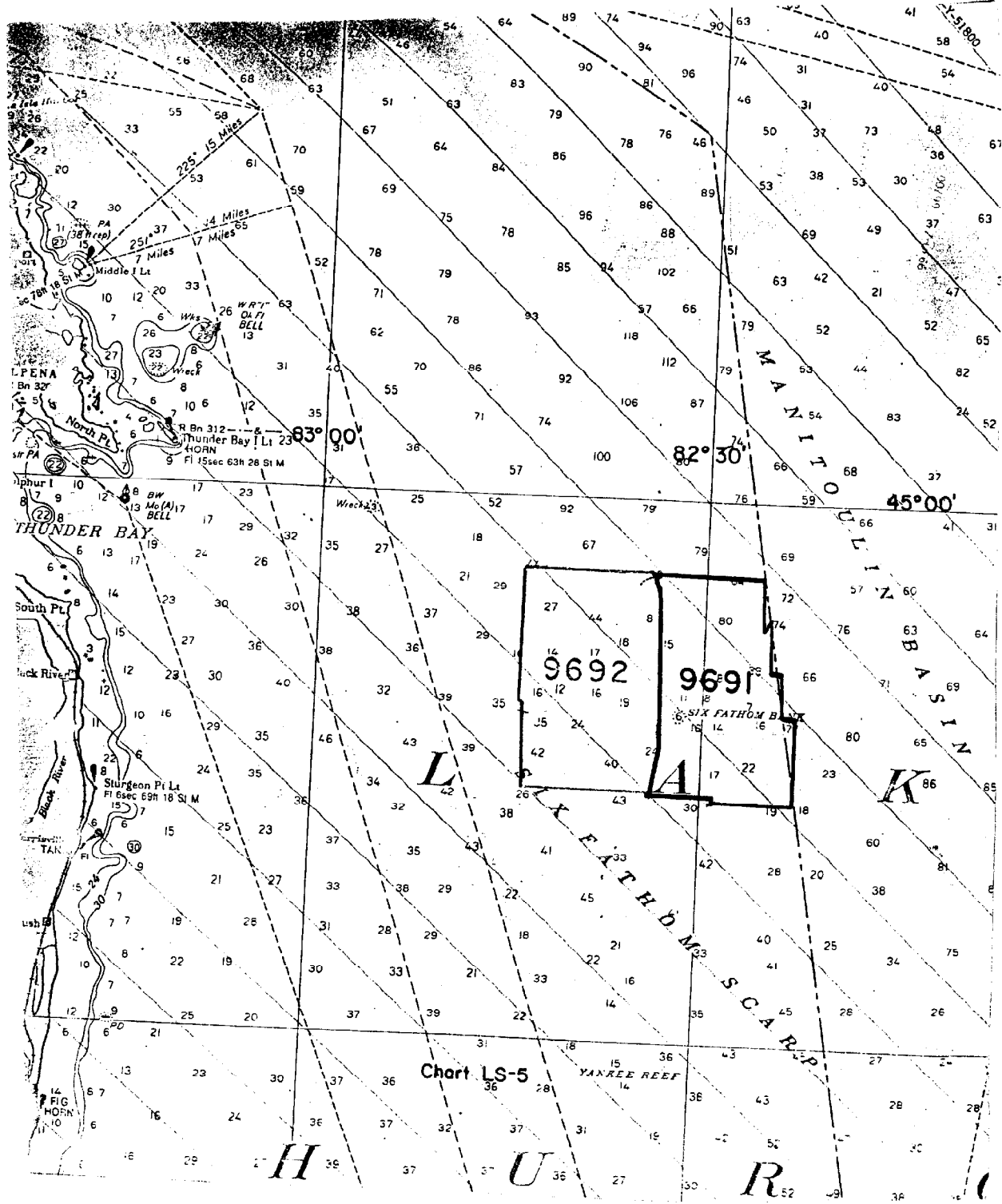
A quality control inspection of H-9691 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as stated in the Verifier's Report, the HIT Report, and as follows:

1. Some depth curves were revised to delineate bottom configuration as soundings indicated. A few brown curves were added to emphasize rises.
2. The junction on the north with H-9690 (1977) is adequate and was addressed in the critique of that survey. The junction on the west with H-9692 (1977) is adequate. Overlapping depth curves were made coincidental during quality control inspection.
3. Contrary to the verifier's opinion, the comparison of present survey soundings and charted hydrography on chart 14860 is considered generally poor.
4. The comparison of the most recent prior survey 1-2104 (1958), not mentioned by the hydrographer or the verifier, is considered reasonably good.
5. Presurvey Review Item 1 - Least depth of 6 fathoms (36 feet) charted in latitude $44^{\circ}48.25'$, longitude $82^{\circ}32.00'$ from an undetermined source prior to the date of the present survey.



The 6 fathoms is charted in present depths of about 120 feet. The present development is considered to discredit the 6 in its charted position and it should be disregarded. A 43-foot shoal about 4 miles to the northeastward is the only comparable feature in the area and probably represents the feature originally indicated by the 6-fathom sounding.

cc:
C35
C351



RECORD OF APPLICATION TO CHARTS

H-9691

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. _____

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
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
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