

9692

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-20-2-77**
Office No..... **H-9692**

LOCALITY

State **Michigan**
General Locality **Lake Huron**
Locality **Six Fathom Scarp**

19 77

CHIEF OF PARTY
Melvin J. Umbach

LIBRARY & ARCHIVES

DATE **August 28, 1978**

9692

0-7

HYDROGRAPHIC TITLE SHEET

H-9692

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-20-2-77

State MICHIGAN

General locality LAKE HURON

Locality SIX FATHOM ~~BANK~~ SCARP

Scale 1:20,000 Date of survey 13 JULY 1977 (JD 194) to 18 JULY 1977 (JD 199)

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, MEH, PMD, TDR, MLM, WDP

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

Protracted by N/A Automated plot by NOS HYDROPLOT SYSTEM

Verification by N/A AMC CALCOMP 618

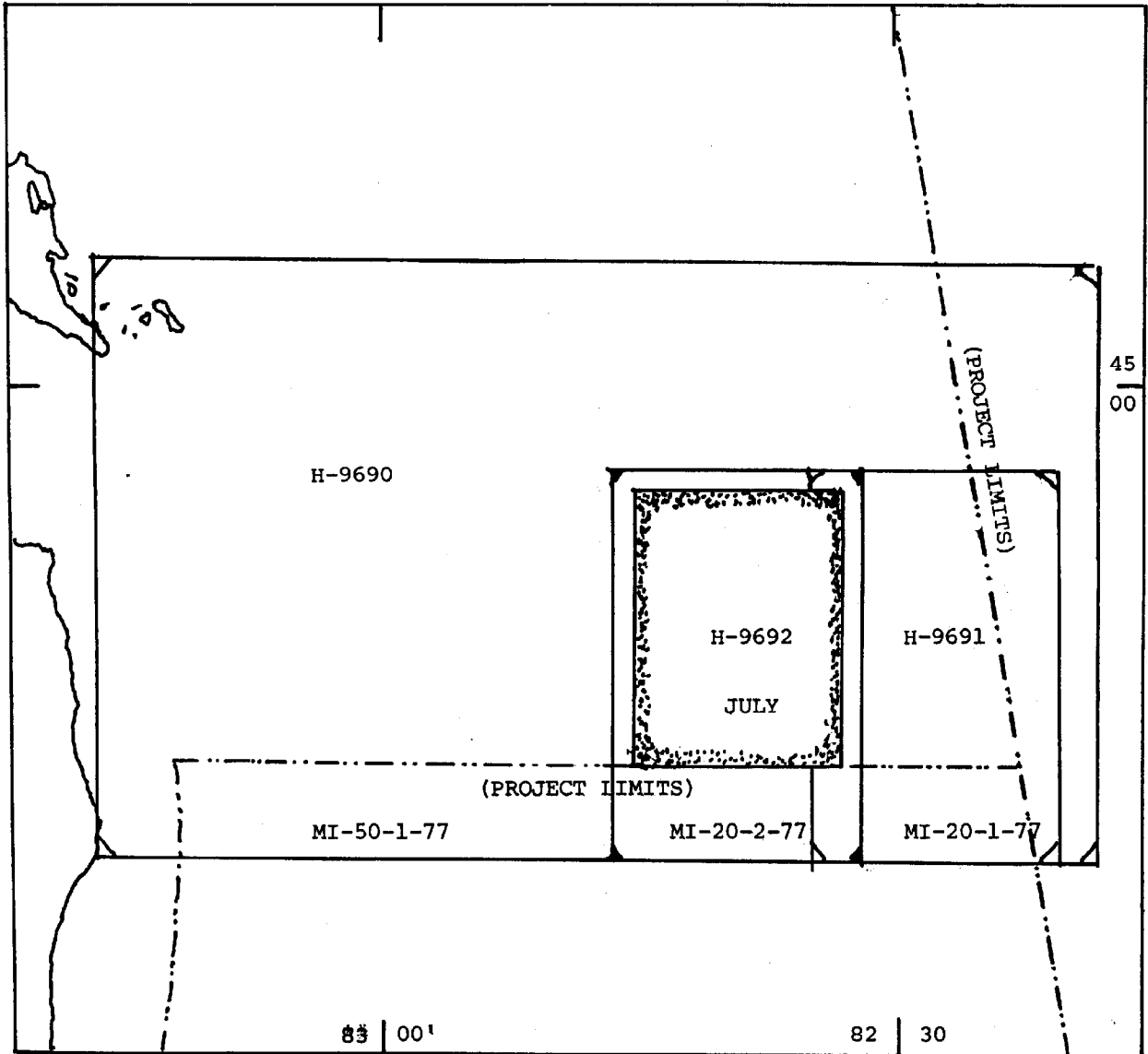
Soundings in ~~fathoms~~ feet at ~~MLW~~ ~~MLW~~ LWD (IGLD 1955 : 576.8 ft.)

REMARKS: LTjg D. A. WALTZ, LTjg V. E. NEWELL, ENS D. R. RICE, ENS M. E. HENDERSON, ENS P. M. DAUGHERTY, ENS T. D. RULON, ENS M. L. MURPHY, ENS W. D. PRINGLE

Notes in red by verifier. & QC

All times are Coordinated Universal Time (CUT).

Applied to slide 12/18/77
[Signature]



Scale of Chart #14860

PROGRESS SKETCH
 H-9692
 OPR-520-MI-77

NOAA SHIP MT MITCHELL

MELVIN J. UMBACH, 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 April 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 56. ⁸ 3'N | 44° ⁵ 56. ⁸ 3'N |
| 82° ⁴⁴ 35. ⁷ 0'W | 82° ³³ 20. ⁰ 0'W |
| 44°48. ⁷ 4'N | 44°48. ⁶ 4'N |
| 82° ⁴⁴ 35. ³ 0'W | 82° ³⁶ 20. ⁹ 0'W |

This survey was conducted between 13 July 1977 (JD 194) and 18 July 1977 (JD 199).

C. SOUNDING VESSEL

All soundings for this survey were obtained by the NOAA SHIP MT MITCHELL 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 Model 6000 Digitizer | 1050 |

Soundings were taken with the 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 3 Nansen casts and 2 XBTs at the following locations:

| Cast No: | Latitude: | Longitude: | Date: |
|----------|----------------|----------------|------------------|
| D1-1 | 44° 51' 18.0"N | 82° 24' 42.0"W | 9 July (JD 190) |
| C3-3 | 45° 00' 16.2"N | 82° 45' 10.8"W | 13 July (JD 194) |
| C2-4 | 44° 52' 12.0"N | 82° 56' 00.0"W | 13 July (JD 194) |
| XBT No: | | | |
| 1 | 44° 48' 48.0"N | 84° 43' 48.0"W | 17 July (JD 198) |
| 2 | 44° 44' 48.0"N | 82° 41' 30.0"W | 17 July (JD 198) |

Salinities determined by salinometer were found to be less than 0.2 parts per thousand and were negligible in determining sound velocities. Corrections for velocity were made from these Nansen Casts and XBTs by averaging the temperatures from the 5 locations, then using RK 530. A depth versus velocity correction curve was made, and a printout of the velocity tape is included at the end of this report.

A draft of 14.0 feet was applied to all soundings during the on-line process. However, from the beginning to the end of the trip (5 July-21 July), a change of 1.0 foot in the after draft reading was noted - from 14.2 feet to 13.2 feet. An average draft of 13.5 represents the actual draft during the survey period (13-18 July). A copy of the settlement and squat corrections versus ship's speed is included. These correctors were determined on July 25, 1977 (JD 206) 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 vertical cast was conducted on June 18, 1977 (JD 169) at Harrisville, Michigan to determine fathometer instrument error. The results are included in this report. The error was less than 0.1 foot 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 offline 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 Corrector Tape
- Parameter Tapes
- ASCII Signal Tapes
- Transducer Corrector/Table Indicating Tape

F. CONTROL STATIONS

Electronic control stations used for this survey were:

| Signal No: | Signal Name: | Latitude: | Longitude: |
|------------|--|----------------|----------------|
| 100 | Sturgeon Point Hydro-trac (H-7A-MI-77) | 44°42'46.709"N | 83 16'19.031"W |
| 201 | North Point Hydro-trac (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 North Point Del Norte (202). Neither station was monumented due to their location in the sand dunes but a third station (WOELK) 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 Odum 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:

13 July (JD 194) through 18 July (JD 199)

The following Odum Offshore Hydrotrac equipment was used:

| Type: | Serial Number: |
|-----------------|----------------|
| Shipboard | |
| Master MDU | 121 |
| Master Receiver | 327 |
| Power Amplifier | 536 |
| Sawtooth | 8502 |

| Type: | Serial No: |
|-----------------------|------------|
| Shore Station 100 | |
| SDU | 216 |
| Power Supply (Sola) | 752 |
| Transmitter Amplifier | 538 |
| Coupler | 131 |
| 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: | Signal Name: | Position: | Code: | Serial Number: |
|----------|---------------------------------------|-------------------------------------|-------|---------------------|
| 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 | 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 Pt. Del Norte corrector was determined by comparison with the position determined by Del Nortes 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 amounted to 7.8% of the regular sounding lines. The crossline soundings generally agree within 2 feet of the main scheme soundings.

J. JUNCTIONS ✓ See Verifier's Report

This survey junctions with the southern limit of Canadian survey, registry number 3895, at a scale of 1:200,000, dated 1975. Junction soundings generally agree within 3 feet. Approximately 1.5 feet of this difference will be accounted for when water level data is incorporated into the survey.

The following surveys junction with the present survey, but were incomplete at the time of this report:

| Area of Junction: | Field No: | Reg No: | Scale: | Date: | Ship: |
|-------------------|------------|---------|----------|-------|-------|
| North | MI-50-1-77 | H-9690 | 1:50,000 | 1977 | S222 |
| East | MI-20-1-77 | H-9691 | 1:20,000 | 1977 | S222 |

K. COMPARISON WITH PRIOR SURVEYS

The following prior survey was conducted within the area of this survey - Survey No. I-1845, dated 1946, at a scale of 1:120,000. The soundings compare poorly with this survey. Randomly selected soundings from this prior survey generally agree within a range of 1 to 20 feet. This discrepancy is attributed to the improved quality of position control for this survey.

The surveys ^{H-9691} MI-20-1-77 and ^{H-9692} MI-20-2-77 were conducted to adequately define the pre-survey review item Six Fathom Bank, from the pre-survey review ^{CONCUR} for project OPR-520-MI-77 (5/10/77). ~~A least depth of 51 feet for MI-20-2-77 was found at latitude 44°53.45'N, longitude 82°34.20'W. 48 feet sounding at 44°53.27'N, 82°34.10'W, least depth on H-9692~~ ^{CONCUR 7/5}

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, and NOAA Chart 14864, 19th Edition, dated 12/4/76, at a scale of 1:120,000. Soundings transferred from these charts generally agree with this survey within a range of 1 to 20 feet, with a few discrepancies of up to 50 feet.

M. ADEQUACY OF THE SURVEY ✓

This survey is considered complete and adequate to supercede ⁵ prior surveys for charting. ^{CONCUR 7/5}

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 | 565.2 |
| Linear Nautical Miles of Crosslines | 44.3 |
| Linear Nautical Miles of Development | 80.5 |
| Total Nautical Miles of Hydrography | 690.0 |
| Total Miscellaneous Miles | 268.8 |
| Total Miles | 958.8 |
| Square Miles of Hydrography | 77 |
| Total Number of Positions | 1896 |
| Nansen Casts | 0 |
| XBTs | 2 |
| Bottom Samples | 56 |

P. MISCELLANEOUS

None

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

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

| Program Name: | Version: |
|--|----------|
| RK111 Range-Range Real Time | 1/30/76 |
| RK201 Grid, Signal, and Lattice Plot | 4/18/75 |
| RK211 Range-Range Non-Real Time Plot | 1/15/76 |
| RK300 Utility Computations | 2/10/76 |
| PM360 Electronic Tape Abstract | 2/2/76 |
| RK530 Velocity Correction Computations | 5/10/76 |
| RK561 H/R Geodetic Calibration | 2/19/75 |
| RK602 Extended Line Oriented Editor | 5/21/75 |

S. REFERENCE TO REPORTS

Horizontal Control Report - to be submitted at end of season to NGS

Respectfully Submitted:

Virginia E. Newell

Virginia E. Newell, Lt (jg), NOAA

APPROVAL SHEET

MI-20-2-77

H-9692

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

Cerald B. Mills

for Melvin J. Umbach
Commander, NOAA
Commanding

SIGNAL NAMES TAPE PRINTOUT
MI-28-2-77

| | | |
|-----|-------------------------------------|-------------|
| 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 | 250 | 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 | 52 | 56290 | 083 | 18 | 02310 | 139 | 0000 | 000000 |
| 201? | 4 | 44 | 52 | 56290 | 083 | 18 | 51414 | 250 | 0000 | 000000 |
| 201 yes | 4 | 45 | 02 | 26767 | 083 | 16 | 25508 | <u>250</u> | 0000 | 162038 |
| 202 | 4 | 45 | 02 | 27248 | 083 | 16 | 24808 | 254 | 0000 | 000000 |

*Not 250 S-7 254
Not documented*

VERTICAL CAST - HARRISVILLE, MI. (June 18, 1977) S.D. 169
 LAT. 44° 39.7' N LONG. 83° 16.4' W

Ship Launch Mt Mitchell-9222
 Survey No. MI-20-2-77
 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 | 47.9 | +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 ORR | | |
| | | | | | | Checked by VEJ | | |

VERTICAL
CAST

SD 169

PORT #1

| | | | | | | |
|-------------------|------------------|------------------|-------------------|-------------------|----------------|------|
| 145336 | 00243 | 00003 | 168201 | 168201 | 114 | - #2 |
| 145413 | 00242 | 00004 | 168201 | 168201 | 110 | - #2 |
| 145414 | 00242 | 00005 | 168201 | 168201 | 110 | - #2 |
| 145413 | 00243 | 00006 | 168201 | 168201 | 106 | - #3 |
| 145440 | 00243 | 00007 | 168201 | 168201 | 103 | - #4 |
| 145622 | 00243 | 00008 | 168201 | 168201 | 100 | - #5 |

24.11

STBD

| | | | | | | |
|------------|-------|-------|--------|--------|-----|------|
| 145825 | 00243 | 00009 | 168201 | 168201 | 091 | - #1 |
| 145836 | 00242 | 00010 | 168201 | 168201 | 091 | - #2 |
| 145843 | 00245 | 00011 | 168201 | 168201 | 090 | - #3 |
| 2 - 145852 | 00244 | | 168201 | 168201 | 090 | - #3 |
| 145924 | 00247 | 00012 | 168201 | 168201 | 090 | - #4 |
| 145923 | 00246 | 00013 | 168201 | 168201 | 090 | - #5 |
| 3 - 150122 | 00249 | | 168201 | 168201 | 100 | - #5 |

24.16

AUG 24.34 ES
24.16 LL
.16

150352 00251 168201 168201 121

SETTLEMENT AND SQUAT

MT MITCHELL 1977 Field Season

The settlement and squat test for the MT MITCHELL (S222) was conducted July 25, 1977 on Lake Huron, approximately one-half mile off the Coast Guard pier at St. Ignace, Michigan, using a Zeiss Ni-2 Level (S/N 142936), positioned at the end of the pier. Wave height was one foot and the wind was from 000° at 14 knots. To determine possible water level changes during the test, the height of water on the lee side of the pier was measured before, during, and after the level sightings; no change was observed.

A temporary buoy with a scope of 1.05 was deployed in 105 feet of water one-half mile from the end of the pier, and a series of readings was taken starting and ending no more than a ship's length from the buoy at idle, half, and standard speeds as the ship passed the buoy. Two passes, one port and one starboard, were made perpendicular to the pier at each speed on headings of 240° and 060°, respectively. An initial reading was taken at the beginning of the test with the ship dead in the water alongside the buoy. A portable tide staff (graduated in tenths of feet) was positioned on the center of the fantail cargo hatch cover located amidships to allow a clear line of sight to the onshore observer. The displacement of the staff from the skeg transducer was approximately 3 feet aft. Since all hydrography in Lake Huron was to be recorded using this transducer, the settlement and squat correctors were only determined at one location.

A draft reading of 14.0 feet was taken before the test. The ship was carrying four launches - two Pacific Plastics launches in davits 3 and 4 and two Jensen launches in davits 5 and 6. Settlement and squat was run using both engines and various pitch and rpm combinations as determined from a speed curve established May 1977 offshore Cape Henry, Virginia. The ship carried a full load of fuel and no fuel was transferred during the test.

Included is an abstract of the data obtained, suggested correctors versus ship speed, the graph of ship speed versus settlement and squat correctors, the "C" shot determination of instrument error, and the ship's speed curve.

Respectfully Submitted,

Virginia E. Newell

Virginia E. Newell
LT(jg), NOAA

*This calibration was
meaningless as the
depth was 105 ft.
and the S222 was
only 1.05 -
In shoaled depths
the S222 is
greater and
more important
we are with out
knowledge of
the correction
R.H. Carsten*

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 |

VESSEL = 2220

DATE = 9-20 JULY 1977

TIME =

LATITUDE = 044/20/00.00

LONGITUDE = 082/40/00.00

TYPE OF OBSERVATION = AVERAGE MI20-2-77

| CAST-DEPTH (SURFACE) (M) | TEMP (DEG C) | SALINITY (0/00) | SND VEL (M/SEC) |
|-----------------------------|-----------------|--------------------|--------------------|
| 0000.0 | 12.75 | 00.00 | 1458.18 |
| 0010.0 | 09.98 | 00.00 | 1447.54 |
| 0020.0 | 06.67 | 00.00 | 1433.83 |
| 0030.0 | 05.04 | 00.00 | 1426.78 |
| 0040.0 | 04.30 | 00.00 | 1423.58 |
| 0050.0 | 04.21 | 00.00 | 1423.33 |
| 0060.0 | 04.22 | 00.00 | 1423.53 |
| 0065.0 | 04.19 | 00.00 | 1423.47 |
| 0075.0 | 03.98 | 00.00 | 1422.66 |
| 0100.0 | 03.90 | 00.00 | 1422.69 |
| 0150.0 | 03.85 | 00.00 | 1423.24 |

VELOCITY CORRECTION TABLE OPTIONS:

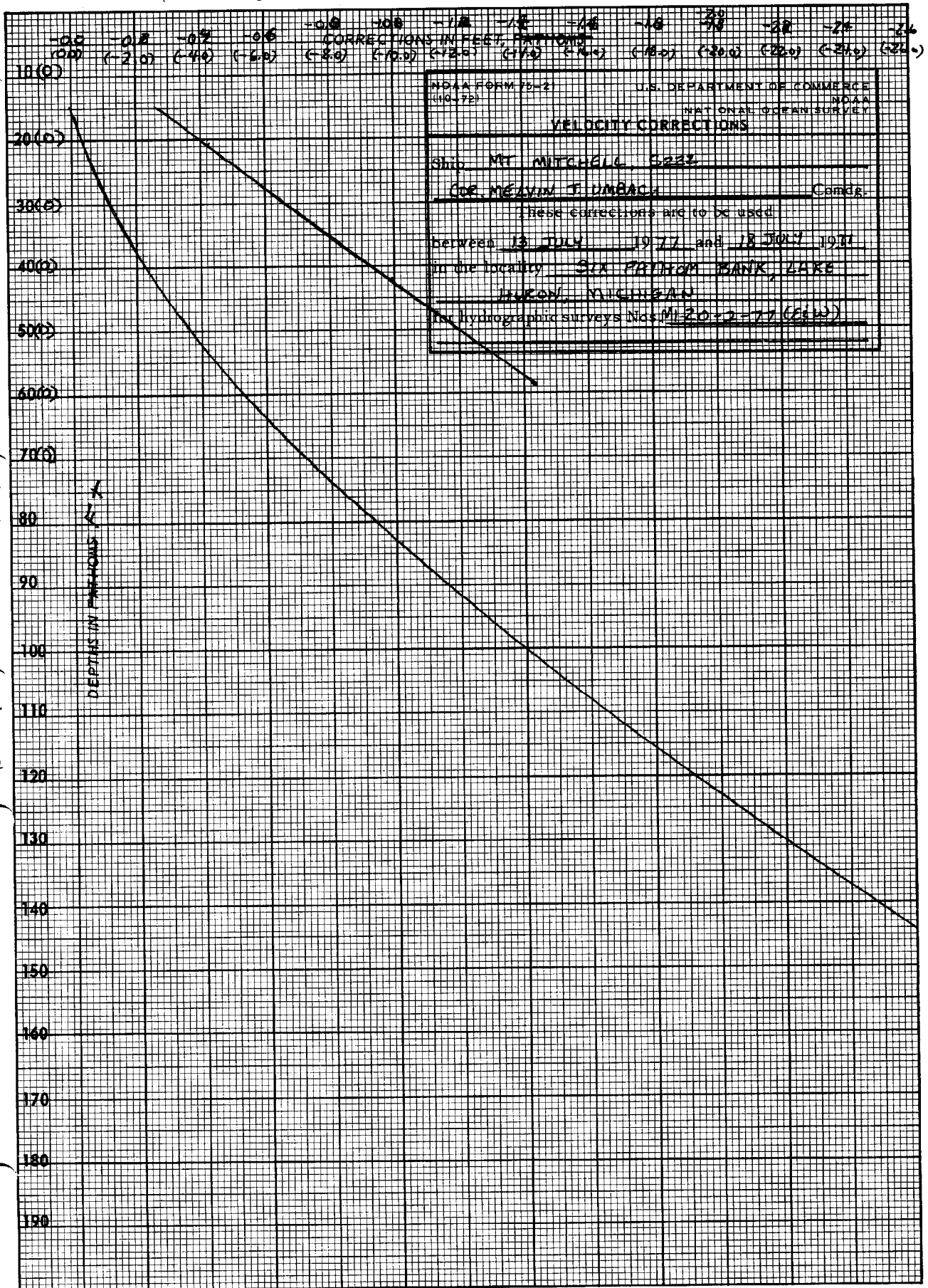
- 0) NO TABLE
- 1) IN FEET
- 2) IN FATHOMS
- 3) IN METERS

1

DRAFT = 14.0

| ACTUAL DEPTH (SURFACE) MINUS VELOCITY CORRECTION (FT) | VELOCITY CORRECTION (FT) |
|--|--------------------------------|
| 0016.41 | -0000.01 |
| 0049.57 | -0000.36 |
| 0083.03 | -0001.01 |
| 0116.65 | -0001.82 |
| 0150.35 | -0002.71 |
| 0184.04 | -0003.60 |
| 0209.32 | -0004.26 |
| 0234.59 | -0004.93 |
| 0293.59 | -0006.51 |
| 0420.01 | -0009.91 |
| 0588.51 | -0014.37 |

(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)



VELOCITY CORRECTOR TAPE PRINTOUT

MI-20-2-77

| | | | | | | |
|--------|---|------|------|-----|--------|--------|
| 000284 | 1 | 0000 | 0001 | 000 | 222000 | 020277 |
| 000455 | 1 | 0002 | | | | |
| 000583 | 1 | 0004 | | | | |
| 000692 | 1 | 0006 | | | | |
| 000786 | 1 | 0008 | | | | |
| 000872 | 1 | 0010 | | | | |
| 000960 | 1 | 0012 | | | | |
| 001041 | 1 | 0014 | | | | |
| 001119 | 1 | 0016 | | | | |
| 001193 | 1 | 0018 | | | | |
| 001267 | 1 | 0020 | | | | |
| 001540 | 1 | 0025 | | | | |
| 001720 | 1 | 0030 | | | | |
| 001900 | 1 | 0035 | | | | |
| 002120 | 1 | 0040 | | | | |
| 002290 | 1 | 0045 | | | | |
| 002480 | 1 | 0050 | | | | |
| 002670 | 1 | 0055 | | | | |
| 002860 | 1 | 0060 | | | | |
| 003040 | 1 | 0065 | | | | |
| 003230 | 1 | 0070 | | | | |
| 003410 | 1 | 0075 | | | | |
| 003600 | 1 | 0080 | | | | |
| 003780 | 1 | 0085 | | | | |
| 003930 | 1 | 0090 | | | | |
| 004170 | 1 | 0095 | | | | |
| 004360 | 1 | 0100 | | | | |
| 004540 | 1 | 0105 | | | | |
| 004720 | 1 | 0110 | | | | |
| 004900 | 1 | 0115 | | | | |
| 005090 | 1 | 0120 | | | | |
| 005270 | 1 | 0125 | | | | |
| 005470 | 1 | 0130 | | | | |
| 005660 | 1 | 0135 | | | | |
| 005840 | 1 | 0140 | | | | |
| 999999 | 1 | 0140 | | | | |



NATIONAL OCEAN SURVEY
NOAA SHIP MT MITCHELL S222
439 West York Street
Norfolk, Virginia 23510

Date : August 3, 1977

Reply to Attn. of:

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

From : *Lawrence M. White*
Commanding Officer, NOAA SHIP MT MITCHELL S222

Subject: Water Level Data For Survey H-9692

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, Michigan (907-5059) | 44°39.6'N | 83°17.2'W |
| Alpena, Michigan (907-5065) | 45°03.5'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 within the following corner points:

| | |
|-----------|-----------|
| 44°56.3'N | 44°56.3'N |
| 82°35.0'W | 82°20.0'W |
| 44°40.4'N | 44°40.4'N |
| 82°35.0'W | 82°20.0'W |

This information is requested for the following periods:

13 July (JD 194) - 18 July (JD 199) 1977

Station 5059 :
 Harrisville, Michigan on Lake Huron

D7, f4

| EST | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
|------|--------|--------|--------|--------|--------|--------|--------|---------|--|
| 0100 | 578.36 | 578.43 | 578.40 | 578.41 | 578.60 | 578.52 | 578.45 | 578.54 | |
| 0200 | 578.38 | 578.46 | 578.48 | 578.43 | 578.41 | 578.59 | 578.45 | 578.57 | |
| 0300 | 578.38 | 578.49 | 578.45 | 578.45 | 578.49 | 578.59 | 578.47 | 578.51 | |
| 0400 | 578.33 | 578.41 | 578.40 | 578.45 | 578.60 | 578.58 | 578.45 | 578.57 | |
| 0500 | 578.36 | 578.48 | 578.47 | 578.41 | 578.54 | 578.55 | 578.43 | 578.57 | |
| 0600 | 578.40 | 578.38 | 578.43 | 578.42 | 578.60 | 578.48 | 578.43 | 578.56 | |
| 0700 | 578.40 | 578.47 | 578.40 | 578.50 | 578.52 | 578.49 | 578.43 | 578.55 | |
| 0800 | 578.42 | 578.53 | 578.44 | 578.48 | 578.60 | 578.50 | 578.47 | 578.57 | |
| 0900 | 578.33 | 578.33 | 578.35 | 578.44 | 578.63 | 578.47 | 578.51 | 578.50 | |
| 1000 | 578.37 | 578.50 | 578.35 | 578.47 | 578.56 | 578.47 | 578.51 | 578.52 | |
| 1100 | 578.44 | 578.42 | 578.47 | 578.46 | 578.55 | 578.43 | 578.46 | 578.48 | |
| 1200 | 578.26 | 578.50 | 578.37 | 578.54 | 578.48 | 578.43 | 578.53 | 578.55 | |
| 1300 | 578.44 | 578.48 | 578.43 | 578.52 | 578.55 | 578.43 | 578.57 | 578.53 | |
| 1400 | 578.52 | 578.41 | 578.39 | 578.53 | 578.50 | 578.43 | 578.58 | 578.44 | |
| 1500 | 578.37 | 578.48 | 578.36 | 578.54 | 578.51 | 578.45 | 578.57 | 578.44 | |
| 1600 | 578.46 | 578.42 | 578.46 | 578.51 | 578.54 | 578.43 | 578.61 | 578.56 | |
| 1700 | 578.49 | 578.50 | 578.43 | 578.56 | 578.54 | 578.43 | 578.59 | 578.52 | |
| 1800 | 578.44 | 578.48 | 578.48 | 578.56 | 578.58 | 578.47 | 578.56 | 578.54 | |
| 1900 | 578.38 | 578.47 | 578.50 | 578.58 | 578.56 | 578.41 | 578.53 | 578.53 | |
| 2000 | 578.32 | 578.32 | 578.40 | 578.57 | 578.50 | 578.43 | 578.58 | 578.57 | |
| 2100 | 578.39 | 578.37 | 578.43 | 578.58 | 578.48 | 578.45 | 578.51 | 578.47 | |
| 2200 | 578.44 | 578.37 | 578.43 | 578.54 | 578.49 | 578.45 | 578.51 | 578.53 | |
| 2300 | 578.35 | 578.35 | 578.42 | 578.51 | 578.53 | 578.48 | 578.55 | 578.47 | |
| 2400 | 578.45 | 578.30 | 578.44 | 578.50 | 578.54 | 578.48 | 578.58 | 578.56 | |
| MEAN | 578.40 | 578.43 | 578.42 | 578.50 | 578.54 | 578.48 | 578.51 | 578.53 | |
| EST | 25 | 26 | 27 | 28 | 29 | 30 | 31 | | |
| 0100 | 578.56 | 578.66 | 578.52 | 578.44 | 578.36 | 578.33 | 578.30 | MONTHLY | |
| 0200 | 578.48 | 578.61 | 578.51 | 578.42 | 578.36 | 578.39 | 578.28 | MAXIMUM | |
| 0300 | 578.45 | 578.55 | 578.52 | 578.40 | 578.32 | 578.43 | 578.29 | 578.78 | |
| 0400 | 578.33 | 578.56 | 578.52 | 578.42 | 578.35 | 578.39 | 578.30 | 0530/06 | |
| 0500 | 578.48 | 578.56 | 578.45 | 578.40 | 578.34 | 578.41 | 578.29 | | |
| 0600 | 578.56 | 578.58 | 578.44 | 578.40 | 578.33 | 578.40 | 578.35 | | |
| 0700 | 578.42 | 578.58 | 578.41 | 578.39 | 578.29 | 578.48 | 578.20 | MONTHLY | |
| 0800 | 578.44 | 578.59 | 578.43 | 578.37 | 578.34 | 578.42 | 578.32 | MINIMUM | |
| 0900 | 578.45 | 578.59 | 578.44 | 578.39 | 578.32 | 578.43 | 578.23 | 577.95 | |
| 1000 | 578.58 | 578.59 | 578.45 | 578.38 | 578.38 | 578.46 | 578.20 | 0710/31 | |
| 1100 | 578.55 | 578.59 | 578.49 | 578.37 | 578.33 | 578.46 | 578.30 | | |
| 1200 | 578.53 | 578.60 | 578.49 | 578.38 | 578.38 | 578.49 | 578.13 | | |
| 1300 | 578.54 | 578.65 | 578.49 | 578.41 | 578.39 | 578.43 | 578.25 | MONTHLY | |
| 1400 | 578.59 | 578.63 | 578.48 | 578.38 | 578.35 | 578.44 | 578.17 | MEAN | |
| 1500 | 578.60 | 578.63 | 578.46 | 578.38 | 578.39 | 578.37 | 578.22 | 578.44 | |
| 1600 | 578.53 | 578.64 | 578.46 | 578.38 | 578.48 | 578.37 | 578.40 | | |
| 1700 | 578.52 | 578.63 | 578.46 | 578.38 | 578.41 | 578.38 | 578.36 | | |
| 1800 | 578.50 | 578.63 | 578.48 | 578.42 | 578.41 | 578.34 | 578.32 | | |
| 1900 | 578.50 | 578.57 | 578.43 | 578.32 | 578.42 | 578.34 | 578.34 | | |
| 2000 | 578.58 | 578.57 | 578.43 | 578.42 | 578.36 | 578.37 | 578.41 | P = | |
| 2100 | 578.50 | 578.58 | 578.42 | 578.40 | 578.45 | 578.32 | 578.45 | partial | |
| 2200 | 578.51 | 578.56 | 578.41 | 578.38 | 578.39 | 578.32 | 578.45 | record | |
| 2300 | 578.50 | 578.56 | 578.44 | 578.36 | 578.43 | 578.28 | 578.38 | | |
| 2400 | 578.56 | 578.54 | 578.45 | 578.38 | 578.38 | 578.31 | 578.49 | | |
| MEAN | 578.51 | 578.59 | 578.46 | 578.39 | 578.37 | 578.39 | 578.31 | | |

U.S. Department of Commerce
 NOAA, NOS Rockville, Maryland
 Great Lakes Water Levels, C3314

JULY 1977
 : WATER LEVELS IN FEET :
 : IGLD (1955) :

Station 5059 :
 Harrisville, Michigan on Lake Huron

D7,74

| EST | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 ✓ |
|------|--------|--------|--------|--------|--------|--------|--------|----------|
| 0100 | 578.19 | 578.59 | 578.40 | 578.41 | 578.37 | 578.32 | 578.41 | 578.44 |
| 0200 | 578.34 | 578.60 | 578.37 | 578.41 | 578.28 | 578.38 | 578.44 | 578.50 |
| 0300 | 578.26 | 578.63 | 578.42 | 578.38 | 578.24 | 578.25 | 578.40 | 578.52 |
| 0400 | 578.30 | 578.65 | 578.36 | 578.37 | 578.55 | 578.27 | 578.49 | 578.58 |
| 0500 | 578.30 | 578.60 | 578.36 | 578.37 | 578.03 | 578.40 | 578.48 | 578.60 |
| 0600 | 578.36 | 578.59 | 578.39 | 578.44 | 578.20 | 578.28 | 578.40 | 578.41 |
| 0700 | 578.40 | 578.65 | 578.36 | 578.40 | 578.35 | 578.57 | 578.47 | 578.42 |
| 0800 | 578.45 | 578.63 | 578.38 | 578.47 | 578.31 | 578.34 | 578.41 | 578.51 |
| 0900 | 578.45 | 578.60 | 578.36 | 578.43 | 578.46 | 578.12 | 578.41 | 578.54 |
| 1000 | 578.45 | 578.67 | 578.37 | 578.47 | 578.39 | 578.38 | 578.43 | 578.55 |
| 1100 | 578.47 | 578.65 | 578.38 | 578.44 | 578.57 | 578.47 | 578.40 | 578.46 |
| 1200 | 578.52 | 578.66 | 578.39 | 578.40 | 578.73 | 578.30 | 578.47 | 578.51 |
| 1300 | 578.55 | 578.63 | 578.42 | 578.40 | 578.22 | 578.25 | 578.56 | 578.61 ✓ |
| 1400 | 578.63 | 578.60 | 578.36 | 578.36 | 578.39 | 578.40 | 578.41 | 578.49 |
| 1500 | 578.43 | 578.59 | 578.44 | 578.43 | 578.51 | 578.55 | 578.39 | 578.58 |
| 1600 | 578.52 | 578.58 | 578.30 | 578.48 | 578.26 | 578.35 | 578.40 | 578.53 |
| 1700 | 578.38 | 578.47 | 578.28 | 578.36 | 578.44 | 578.55 | 578.52 | 578.43 |
| 1800 | 578.46 | 578.57 | 578.36 | 578.48 | 578.28 | 578.47 | 578.51 | 578.43 |
| 1900 | 578.53 | 578.45 | 578.39 | 578.40 | 578.43 | 578.49 | 578.43 | 578.52 |
| 2000 | 578.46 | 578.48 | 578.45 | 578.50 | 578.38 | 578.47 | 578.39 | 578.49 |
| 2100 | 578.60 | 578.43 | 578.43 | 578.48 | 578.35 | 578.50 | 578.49 | 578.58 |
| 2200 | 578.60 | 578.43 | 578.37 | 578.42 | 578.36 | 578.29 | 578.33 | 578.64 |
| 2300 | 578.57 | 578.45 | 578.42 | 578.41 | 578.35 | 578.41 | 578.52 | 578.52 |
| 2400 | 578.57 | 578.45 | 578.33 | 578.43 | 578.41 | 578.43 | 578.41 | 578.50 |
| MEAN | 578.45 | 578.57 | 578.38 | 578.42 | 578.37 | 578.39 | 578.44 | 578.52 |

| EST | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0100 | 578.49 | 578.54 | 578.31 | 578.37 | 578.42 | 578.45 | 578.35 | 578.40 |
| 0200 | 578.35 | 578.49 | 578.40 | 578.28 | 578.50 | 578.46 | 578.29 | 578.41 |
| 0300 | 578.30 | 578.47 | 578.38 | 578.24 | 578.42 | 578.47 | 578.26 | 578.43 |
| 0400 | 578.46 | 578.50 | 578.38 | 578.35 | 578.46 | 578.39 | 578.41 | 578.42 |
| 0500 | 578.50 | 578.43 | 578.37 | 578.21 | 578.40 | 578.41 | 578.36 | 578.44 |
| 0600 | 578.57 | 578.42 | 578.37 | 578.33 | 578.47 | 578.51 | 578.36 | 578.47 |
| 0700 | 578.50 | 578.41 | 578.37 | 578.30 | 578.40 | 578.41 | 578.35 | 578.45 |
| 0800 | 578.54 | 578.43 | 578.37 | 578.38 | 578.47 | 578.41 | 578.41 | 578.38 |
| 0900 | 578.49 | 578.41 | 578.34 | 578.35 | 578.52 | 578.47 | 578.44 | 578.41 |
| 1000 | 578.61 | 578.41 | 578.36 | 578.37 | 578.51 | 578.37 | 578.45 | 578.42 |
| 1100 | 578.48 | 578.42 | 578.33 | 578.35 | 578.51 | 578.41 | 578.31 | 578.43 |
| 1200 | 578.54 | 578.43 | 578.42 | 578.32 | 578.55 | 578.46 | 578.39 | 578.45 |
| 1300 | 578.49 | 578.43 | 578.42 | 578.36 | 578.55 | 578.45 | 578.44 | 578.44 |
| 1400 | 578.53 | 578.41 | 578.38 | 578.38 | 578.53 | 578.40 | 578.49 | 578.46 |
| 1500 | 578.51 | 578.43 | 578.41 | 578.35 | 578.53 | 578.21 | 578.39 | 578.44 |
| 1600 | 578.50 | 578.43 | 578.35 | 578.35 | 578.56 | 578.34 | 578.44 | 578.40 |
| 1700 | 578.47 | 578.37 | 578.37 | 578.41 | 578.58 | 578.37 | 578.41 | 578.40 |
| 1800 | 578.51 | 578.36 | 578.37 | 578.40 | 578.51 | 578.33 | 578.39 | 578.40 |
| 1900 | 578.46 | 578.31 | 578.37 | 578.44 | 578.50 | 578.36 | 578.42 | 578.46 |
| 2000 | 578.49 | 578.38 | 578.43 | 578.44 | 578.50 | 578.38 | 578.42 | 578.41 |
| 2100 | 578.46 | 578.39 | 578.38 | 578.50 | 578.55 | 578.11 | 578.35 | 578.43 |
| 2200 | 578.48 | 578.41 | 578.33 | 578.44 | 578.57 | 578.38 | 578.35 | 578.39 |
| 2300 | 578.48 | 578.32 | 578.30 | 578.48 | 578.50 | 578.36 | 578.51 | 578.40 |
| 2400 | 578.48 | 578.38 | 578.33 | 578.52 | 578.54 | 578.48 | 578.44 | 578.39 |
| MEAN | 578.49 | 578.42 | 578.37 | 578.37 | 578.50 | 578.39 | 578.39 | 578.42 |

ATLANTIC MARINE CENTER

TIDE NOTE

1. Project No: OPR-520-MI-77 2. Vessel/~~Field Unit~~: NOAA Ship MT MITCHELL (MSS-301)
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: ^{LWD} ~~MLW~~ 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 sheet(s).

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

CA13-3
3-25-71

ATLANTIC MARINE CENTER

TIDE NOTE

1. Project No: OPR-520-MI-772. Vessel/~~Field Unit~~: NOAA Ship MT MITCHELL (DSS-02)
3. Year: 1977 4. Meridian Time Zone: GMT
5. Tide Station Name: ALPENA, MICHIGAN (907-5065)
6. Position: Lat. 45 ° 03.5' N. Long. 83 ° 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 sheet(s).

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 13 - 18, 1977

HYDROGRAPHIC SHEET: H-9692

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. Spillman 10/30/78
Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

H-9692

| 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 | GRAND McNALLY ATLAS | U.S. LIGHT LIST | | | | |
| LAKE HURON | | | | | | | | | | | | 1 |
| SIX FATHOM SCARP (runs across survey) | | | | | | | | | | | | 2 |
| | | | | | | | | | | | | 3 |
| | | | | | | | | | | | | 4 |
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APPROVED
Chas. E. Harrington
 CHIEF GEOGRAPHER -C3x8
 25 OCT. 1978

APPROVAL SHEET
FOR
SURVEY H-9692

- 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: 14-August-1978

Signed: _____

Title: Ad. Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

H-9692

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

| RECORD DESCRIPTION | | AMOUNT | RECORD DESCRIPTION | | AMOUNT | |
|--------------------|---------------|----------------------|------------------------------------|------------|---------------|----------------------------|
| SMOOTH SHEET | | 1 | BOAT SHEETS & PRELIMINARY OVERLAYS | | 6 | |
| 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 | | | | | | |
| CAHIERS | 1 | | | | | |
| VOLUMES | | | | | | 1 |
| 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 | | | 1892 |
| POSITIONS CHECKED | | 1892 | |
| POSITIONS REVISED | | 0 | |
| SOUNDINGS REVISED | | 77 | |
| SOUNDINGS ERRONEOUSLY SPACED | | | |
| SIGNALS (CONTROL) ERRONEOUSLY PLOTTED | | | |
| | TIME - HOURS | | |
| CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION) | 2 | 0 | |
| VERIFICATION OF CONTROL | | 1 | |
| VERIFICATION OF POSITIONS | | 19 | |
| VERIFICATION OF SOUNDINGS | | 48 | |
| COMPILATION OF SMOOTH SHEET | | 22 | |
| APPLICATION OF TOPOGRAPHY | | 0 | |
| APPLICATION OF PHOTOBATHYMETRY | | 0 | |
| JUNCTIONS | | 3 | |
| COMPARISON WITH PRIOR SURVEYS & CHARTS | | 5 | |
| VERIFIER'S REPORT | | 6 | |
| OTHER | | 0 | |
| | | | |
| TOTALS | 2 | 104 | 106 |

| | | |
|--|----------------------------|-------------------------|
| Pre-Verification by G. Trefethen | Beginning Date 09/15/77 | Ending Date 09/15/77 |
| Verification by J. Wilson, F. Saunders, R. Roberson | Beginning Date 09/22/77 | Ending Date 07/20/78 |
| Verification Check by H. Smith | Time (Hours) 6 | Date 07/25/78 |
| Marine Center Inspection by Hydrographic Inspection Team (AMC) | Time (Hours) 4 | Date 08/08/78 |
| Quality Control Inspection by F.P. Saulsbury | Time (Hours) 2.1 | Date 10-24-78 |
| Requirements Evaluation by O.J. Hill | Time (Hours) 2 | Date 11/21/78 |

Cons. G.K. Myer 11/21/78 1 kw.

REGISTRY NO. H-9692

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. H-9692

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 5-27-82 TIME REQUIRED _____ INITIALS JAC

REMARKS:

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9692

FIELD NO. MI-20-2-77

Michigan, Lake Huron, Six Fathom ~~Bank~~ Scarp

SURVEYED: July 13 through July 18, 1977

SCALE: 1:20,000

PROJECT NO.: OPR-520

SOUNDINGS: Ross Model 5,000
Fineline Depth Sounder

CONTROL: Odom Offshore
Hydrotrac
(Range-Range)

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

1. Introduction

a. There were no unusual problems encountered during verification.

b. New projection parameters were prepared 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 this survey at the marine center was 1620.380 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; however, it is felt that line spacing of less than 100 meters would have provided better delineation of Six Fathom Bank. *Bottom delineation is good, closer line spacing may have provided lesser depths.*

4. Condition of Survey

FPS

All pertinent data for this survey is adequate and conforms to 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.

5. Junctions

Junctions were effected with the following surveys:

- H-9690 (1977) to the north and west ✓
- H-9691 (1977) to the east ✓
- 3895 (1975) to the south (Canadian survey) *no junction 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. Canadian sheet scale is 1:200,000 and U. S. scale 1:20,000. A copy of the Canadian survey is included with the survey records. ✓

6. Comparison With Prior Survey

1-1845 (1946) 1:120,000

Comparison with the prior survey is good, with depths varying + or - 1 to 10 feet.

The differences between the surveys may be attributed to advances with survey methods and equipment.

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 the developments on the present survey, this survey is adequate to supersede the prior survey in the common area.

*CONCUR
FPS*

7. Comparison With Charts 14860 (24th Edition, October 25, 1975)
14864 (19th Edition, December 4, 1976)

a. Hydrography

Comparison with the charts is adequate, with depths generally varying from 1 to 20 feet.

There are several notable exceptions:

(27 fms) *from 1-1845 (1942)* ^{lat 44° 53.60', long 82° 41.70'}
 Charted 162-foot sounding at approximately 44° 53' 45", 82° 42' 30" is 73 feet shoaler than the depth obtained on the present survey. *(167 ft on pres. survey, 550 meters S.E. of chd 162' sdg. discredited by present survey depths)*

(14 fms) *from undermined source*
 Charted 84-foot sounding at approximately 44° 51' 30", 82° 42' 00" is 41 feet shoaler than depths obtained on the present survey. *Charted 84 ft. sdg. discredited by present survey. 84 ft. depths found 1 1/4 miles S.E. of chd 84' sdg. on present survey.*

Presurvey Review Item #1 - Six Fathom Bank - The 48-foot sounding at approximately 44° 53' 30", 82° 34' 30" was investigated and a 48-foot sounding was located at 44° 53' 27.96", 82° 34' 10.69".

~~It is recommended that this sounding be retained as charted.~~
Chart depths as shown on present survey. JPS

The present survey is adequate to supersede the charted hydrography in the common areas. *concur JPS*

b. Aids to Navigation

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

8. Compliance With Project Instructions

The present survey complies with Project Instructions. ✓

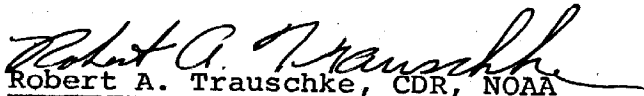
9. Additional Field Work

This is a good basic survey and no additional field work is recommended. *concur JPS*


Inspection Report
H-9692


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


Billy J. Stephenson
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 24, 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-9692 (1977), Michigan, Lake
Huron, Six Fathom Scarp

A quality control inspection of H-9692 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. A few depth curves were revised to better delineate bottom configuration. A few brown curves were added to emphasize rises.
2. The junctions on the north and west with H-9690 (1977) and on the east with H-9691 (1977) are adequate and were addressed in the critiques of those surveys.
3. The comparison between the most recent prior survey 1-2104 (1958) and the present survey, made during quality control inspection, is generally good with depths varying plus or minus 1 to 10 feet. This prior survey was not mentioned in the Verifier's Report.

cc:
C35
C351



MINIRANGER CALIBRATION CHECK FROM TYONEK 1909,1960 - 1042.2M

NORTH PIER LIGHT (TYONEK LUMBER PIER)

61/02/37.299 N 151/09/35.410 W

MINIRANGER CALIBRATION CHECK FROM TYONEK 1909,1960 - 1198.6M

