

9719

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-20-4-77
Office No..... H-9719

LOCALITY

State Michigan
General Locality Lake Huron
Locality De Tour Passage to Martin Reef

19 77

CHIEF OF PARTY
James S. Midgley

LIBRARY & ARCHIVES

DATE December 28, 1978

6126

Area 7
Cat
14700
14800
14900
15000

HYDROGRAPHIC TITLE SHEET

H-9719

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-20-4-77

State MICHIGAN

General locality LAKE HURON

Locality DE TOUR PASSAGE to MARTIN REEF ~~LIGHT~~

Scale 1:20,000 Date of survey SEPTEMBER 17, 1977 to OCTOBER 17, 1977

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

Vessel NOAA SHIP MT MITCHELL S222 and Launches 1002 and 1004

Chief of party CAPT JAMES S. MIDGLEY, NOAA

Surveyed by SEE REMARKS

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

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

Graphic record checked by PWS, EEM, JTK, FDS, RMM

Protracted by N/A Automated plot by ~~HYDROPLOT SYSTEM~~

Verification by N/A Calcomp-618 (AMC)

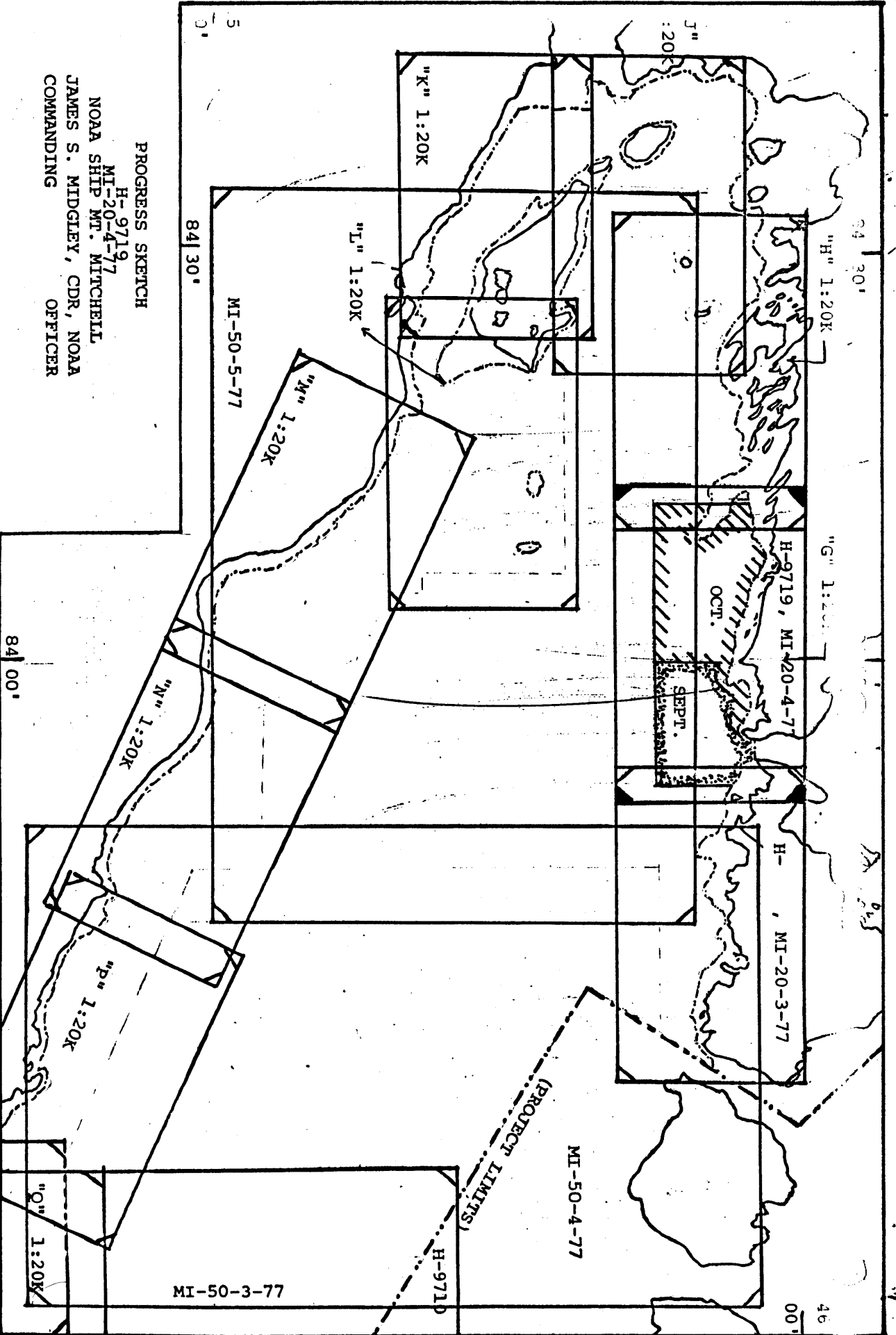
Soundings in ~~fathoms~~ feet at ~~NEW~~ ~~NEW~~ LWD (IGLD 1955: 576.8 ft.)
Nov. 27, 1977

REMARKS: LCDR G. MILLS, LT D. WALTZ, LTjg D. RICE, LTjg M. HENDERSON

ENS P. DAUGHERTY, ENS T. RULON, ENS M. MURPHY, ENS W. PRINGLE

ENS T. BAINBRIDGE

Applied to stds 4/5/79
[Signature]



PROGRESS SKETCH

H-9719
 MI-20-4-77
 NOAA SHIP MT. MITCHELL
 JAMES S. MIDDLEY, CDR, NOAA
 COMMANDING OFFICER

SCALE OF CHART #14860

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, ~~25 May~~ 24 April 1977 and 10 June 1977 respectively.

B. AREA SURVEYED

This survey was conducted on the north end of Lake Huron between De Tour Passage and Martin Reef. The limits of the survey are roughly described by lines connecting the following points in a clockwise manner:

- (1) $45^{\circ}57.7'N$ $84^{\circ}08.0'W$ (2) $45^{\circ}56.4'N$ $83^{\circ}51.7'W$ (3) $45^{\circ}52.7'N$ $83^{\circ}51.7'W$ (4) $45^{\circ}53.0'N$ $84^{\circ}11.3'W$
10.0

This survey was conducted between 17 September 1977 (JD 269) and 17 October 1977 (JD 290).

C. SOUNDING VESSEL

Soundings for this survey were obtained by the NOAA SHIP MT MITCHELL S222 (Vessel Number 2220) and the following Launches:

- 1002 (Vessel Number 2225)
1004 (Vessel Number 2226)

utilizing a fully automated Hydroplot Systems.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

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

Equipment:	Serial Numbers:		
	Vesno 2220:	Vesno 2225:	Vesno 2226:
Ross Model 200C Recorder	- -	- -	1039
Ross Model 5000 Fineline Depth Sounder	1050	1053	- -
Ross Model 5000 Transceiver	1050	1053	1039
Ross Model 6000 Digitizer	1050	1039	1053

Soundings for the Mt Mitchell were taken with a skeg transducer (antenna distance +32.0 m). The antenna distance for all launches was 0. 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 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 fath-

gram. In addition, any departures of the trace from the calibration due to phase differences were corrected during the scanning process.

Velocity corrections were obtained from 1 Nansen Cast and 2 XBT'S on the following locations:

Cast No:	Latitude:	Longitude:	Date:
J8	45°55.8'N	84°03.6'W	03 Oct 1977 (JD 276)
XBT No:			
J6C	45°52.8'N	84°01.6'W	04 Oct 1977 (JD 277)
K3	45°53.2'N	84°08.3'W	17 Oct 1977 (JD 290)

Eight bar checks were taken during the survey showing agreement within 0.2 feet. Since most depths were greater than 50 feet the Nansen Cast and XBT'S were used exclusively in determining velocity correctors using RK 530. An explanation of how the velocities were derived along with printouts of the velocity tapes and all tables is included in the appendices. Salinities determined by salinometer were found to be less than .2 parts per thousand and were negligible in determining sound velocities.

A draft of 14.0 feet was applied to all soundings collected by the Mt Michell during the on line process. To determine actual drafts for this survey, a straight line plot was constructed using the after draft from the beginning and ending dates of each trip. A draft correction was determined for every 0.2 feet. The draft varied from 14.1 to 14.4 feet for this survey. Settlement and corrections for the ship were determined on July 25, 1977 (JD 206) in Lake Huron at St. Ignace, Michigan. A corrector of +.2 feet is accurate for all survey speeds \pm .1 feet. A copy of the data abstract for ship's speed versus settlement and squat correctors is included in the appendices.

A draft of 1.6 feet was applied to all soundings taken by the launches during the on line process. Changes in draft for both launches were insignificant. Settlement and squat corrections for the launches were determined on 1 September 1977 (JD 244) in Lake Huron at St. Ignace, Michigan. A copy of the field data and settlement and squat correctors versus launch RPM'S is included in the survey support data.

The change in the ship's draft along with the settlement and squat correctors for all vessels is incorporated into the TC/TI tape which is included in the survey data. A printout of this tape is included in the appendices.

A vertical cast was conducted on June 18, 1977 at Harrisville, Michigan to determine fathometer instrument error for the ship. The results are included in this report. The error was less than .1 feet and was con-

sidered to be zero due to the accuracy of the cast. The eight bar checks throughout the survey showed an instrument error of less than 0.2 feet for the fathometers in both launches and was considered to be zero. 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 in the appendices.

E. HYDROGRAPHIC SHEETS

This survey was plotted on one mylar complot roll plotter sheet by the MT MITCHELL Hydroplot System with a skew of 0,21,60. 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
- Parameter Tapes
- ASC II Signal Tapes
- Transducer Corrector/Table Indicating Tape

F. CONTROL STATIONS

Hydrotrac electronic control stations used for this survey were:

Signal Number and Signal Name:	Latitude:	Longitude:
207 H-17-MI-77 Presque Isle "Turcotte"	45°20'56.482"N	83°29'06.080"W
300 H-13-MI-77 Forty Mile Pt Hydrotrac	45°29'11.010"N	83°54'48.836"W
400 H-20-MI-77 Lafayette Pt Hydrotrac	45°46'18.807"N	84°21'23.562"W

Del Norte electronic control stations were used as follows:

Signal Number and Signal Name:	Latitude:	Longitude:
420 Spectacle Reef Light	45°46'22.892"N	84°08'16.802"W
449 H-34-MI-77 Boot Offset	45°57'20.997"N	84°15'42.146"W
450 Martin Reef Light	45°54'47.292"N	84°08'54.953"W
460 Huron Point USLS	45°57'56.051"N	84°04'09.839"W
500 H-1-UP-77 Zahara	45°57'46.364"N	83°59'41.850"W
600 H-25-MI-77 Pt. De Tour	45°57'18.728"N	83°54'59.656"W

All shore stations were located by personnel from the Operations Divi-

sion, Atlantic Marine Center with assistance from Mt Mitchell Officers. Stations were erected and maintained by ship's personnel.

G. HYDROGRAPHIC POSITION CONTROL

An Odum Offshore Hydrotrac system, operating at a frequency of 1618.650 Khz, in Hyperbolic mode, was used to provide positioning control for Vesno 2225 only on 17 September 1977 (JD 260). The equipment serial numbers are as follows:

Vessel or Shore Station:	Equipment:	Serial No:
Launch #1002 (Vesno 2225)	Receiver	327
	Parallel Buffer	107
Slave 1 (207)	SDU	215
	Power Amplifier	539
	Coupler	135
Master (300)	MDU	122
	Power Amplifier	536
	Coupler	133
Slave 2 (400)	SDU	216
	Power Amplifier	538
	Coupler	131

All ship hydrography and bottom samples on this survey used Hydrotrac positioning control in the Range-Range mode. This ship work was accomplished on the following dates:

21 September 1977 (JD 264) through 17 October 1977 (JD 290)

The equipment serial numbers are as follows:

Vessel or Shore Station:	Equipment:	Serial No:
Mt Mitchell S222	MDU	121
	Master Receiver	328
	Power Amplifier	537
	Coupler	134
Station 300	SDU	214
	Power Amplifier	536
	Coupler	135
Station 400	SDU	216
	Power Amplifier	538
	Coupler	131

A frequency of 1620.38 Khz was used on the Hydroplot signal tape to compensate for the difference in propagation velocity between salt and fresh water. This dummy frequency corresponds to a propagation velocity of 299350 Km/sec.

Del Norte positioning was used for both launches from 17 September 1977 (JD 260) through 6 October 1977 (JD 279) and to check Hydrotrac lane count for the ship.

Station No. and Signal Name:	Equipment:	Serial No:	Code:	Dates:
Mt Mitchell (Vesno 2220)	DMU	173		
	Master	273A	78	9/17-10/17/77
	360° Antenna	056		
	Parallel Buffer	123		
Launch 1002 (Vesno 2225)	DMU	123		9/17-10/6/77
	Master	1060	76	
	360° Antenna	053		
	Parallel Buffer	132		
Launch 1004 (Vesno 2226)	DMU	190		9/17-10/6/77
	Master	159	78	
	360° Antenna	168		
	Parallel Buffer	124		
420 Spectacle Reef Light	Remote	1135	74	9/18-10/20/77
	180° Antenna	88		
449 H-34-MI-77 Boat Offset	Remote	245	78	10/3-10/7/77
	180° Antenna	125		
450 Martin Reef Light	Remote	1063	76	9/18-10/13/77
	180° Antenna	60		
460 Huron Point USLS	Remote	248	72	10/2-10/7/77
	360° Antenna	054		
500 H-1-UP-77 Zahara	Remote	248	72	9/29-10/2/77
	87° Antenna	068		
600 H-25-MI-77 Pt De Tour	Remote	245	78	9/29-10/3/77
	180° Antenna	125		

Each Del Norte Master/DMU pair was calibrated with each remote over a measured baseline. In addition, when visibility permitted, the Del Norte was calibrated using three point sextant fixes and comparing observed ranges with computed values by use of Hydroplot Calibration Program RK561. A simultaneous check fix was taken with each calibration. Generally, only

those fixes with inverses less than five (5) meters were accepted. Correctors determined during the morning calibration were averaged with others during the day resulting in one corrector per station per day.

Results of these daily calibrations showed changes in correctors of up to 13 meters from day to day and as much as 3 meters from morning to afternoon. It is presumed that this drift is caused by possible atmospheric absorption of the Del Norte signal or some other reduction of signal strength. EED is exploring this possibility at this time. Nevertheless, this data still meets the accuracy requirements for the scale of this survey.

Three times during the survey Del Norte readings were checked by coming alongside a small buoy (Mt Mitchell #6) established in 40 feet of water with 1 to 1 scope. Navigation buoy "2PR" (latitude 45°55'31.5"N and longitude 84°12'33.7"W) was also used for this purpose. Results from both of these buoys showed discrepancies up to 12 meters. Therefore, the previous Del Norte/Visual calibration was used to determine the Del Norte correctors.

While using Hydrotrac positioning 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. 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 10.3% of the regular sounding lines. The crossline soundings generally agree within 2 feet of the main scheme soundings with some greater disagreement in areas of very rough bottom topography.

J. JUNCTIONS

This survey junctions with the following survey:

Area of Junction:	Field No:	Reg No:	Scale:	Date:	Ship:
East	MI-20-3-77	H-9721	1:20,000	1977	Mt Mitchell
South	MI-50-5-77	H-9718	1:50,000	1977	Mt Mitchell
West	MI-20-5-77	H-9726	1:20,000	1977	Mt Mitchell

This survey junctions with the following survey: Cont'd

Area of Junction:	Field No:	Reg No:	Scale:	Date:	Ship:
North	- -	1-2256A	1:15,000	1965-69	U.S. Lake Survey
North	- -	1-2257	1:15,000	1965-69	U.S. Lake Survey
North	- -	12258	1:15,000	1965-69	U.S. Lake Survey

Good junctions were made with MI-20-3-77 and MI-50-5-77 with most depths agreeing with 2 feet. An excellent junction was made with MI-20-5-77 and contours continue smoothly to this sheet. ✓

Predicted lake water levels were not applied to this survey. For junction comparisons with the U.S. Lake Survey work 2 feet was subtracted from this survey's soundings (predicted lake level was approximately 2 feet above Great Lakes Low Water Datum). After applying this correction this survey junctioned well with all three U.S. Lake Survey sheets with most depths agreeing within 2 to 3 feet. Depths near 45°56.7'N and 84°02.1'W disagreed with those of 1-2257 by as much as 30 feet but is probably due to poor position control of the old survey. The extremely rough bottom around De Tour Passage created some junctioning problems but depths generally agree within 5 feet. ✓ concur See Q.C. Report, para. 4.

Junctioning between the 2 launches, and the launches and the ship were very good with most soundings agreeing within 1 to 2 feet.

K. COMPARISON WITH PRIOR SURVEYS See Verifier's Report

The only prior survey available in the area of this survey was Survey 1-1838 done by the U.S. Lake Survey in 1945 at a scale of 1:120,000. Only a few soundings from the prior survey were within the limits of this survey. These soundings generally agree within 3 feet of the depths from the present survey. There were no presurvey review items within the survey limits of this sheet. ✓ concur

L. COMPARISON WITH CHARTS See Verifier's Report

This area is covered by NOAA Chart 14882, 25th Edition, April 17, 1976 at 1:40,000 scale and Chart 14880, 24th Edition, February 5, 1977, at 1:120,000 scale. Randomly selected soundings from these charts generally agree within 2 feet. However, 2 charted soundings from Chart 14882 disagree greatly with this survey. ① A 56[✓] foot charted sounding at latitude 45°56.2'N longitude 83°54.8'W is between two survey depths of 84 feet and 102 feet. ② A charted 44[✓] foot depth at latitude 45°56.5'N and longitude 83°54.2'W is near a survey depth of 88 feet. There were no indications of any shoaling at ^{the latter} ~~either~~ location. The probable cause of this discrepancy is the improved positioning control of this survey.

① Indications of a shoal are present in the vicinity. 56 ft. depth from 1-1373 (1916) was brought forward to supplement present survey. ✓

② Concur. See Ver. Report, para 7.9.

M. ADEQUACY OF THE SURVEY

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

N. AIDS TO NAVIGATION

There are no aids to navigation within the limits of this survey. However, positions were determined for 2 buoys near the survey area. Crab Island Shoal Lighted Bell Buoy 4 (L.L. #1451) and Buoy 2 (No L.L. #). De Tour Reef Light was also used to check Del Norte readings. A detailed evaluation of these aids to navigation are not included here since they are outside the survey area.

O. STATISTICS

	Ship:	Launch:	Total:
Linear Nautical Miles of Main Scheme Hydrography	271.5	184.5	456.0
Linear Nautical Miles of Crosslines	24.5	22.5	47.0
Linear Nautical Miles of Development	15.5	15.5	31.0
Total Linear Miles of Hydrography	311.5	232.5	534.0
Total Miscellaneous Miles	254	142.5	396.5
Total Miles	565.5	365	930.5
Square Miles of Hydrography	24	36	60
Total Number of Positions	2009	909	2918
Nansen Casts	1	0	1
Bottom Samples	31	0	31
XBT'S	2	0	2

P. MISCELLANEOUS

Inshore shoal soundings were not developed for least depths since they were within the area of the junction surveys. XBT K3 and U.S. Lake Survey 1-2256 both also apply to MI-20-5-77 (H-9726) and are included with that survey's records.

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

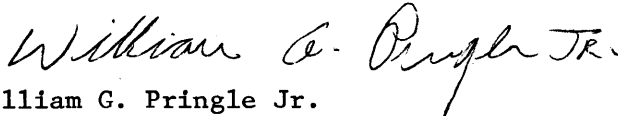
The following Hydroplot Programs were used to acquire and process data for this survey: Cont'd

Program Name:	Version:
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
RK 330 Data Check and Reformat	5-04-76
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

None

Respectfully Submitted:



William G. Pringle Jr.
Ensign, NOAA

APPROVAL SHEET

MI-20-4-77

H-9719

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

LCOR Gerald Q. Mill
for James S. Midgley
Captain, NOAA
Acting Commanding Officer

SIGNAL NAMES TAPE PRINTOUT
MI-20-4-77 OPR520-77
H-9719

207 ✓	PRESQUE ISLE "TURCOTTE" HYDTOTRAC	(H-17-MI-77)	AMC OPS *
300 ✓	FORTY MILE POINT HYDROTRAC	H-13-MI-77	AMC OPS *
400 ✓	LAFAYETTE POINT HYDTOTRAC	(H-20-MI-77)	AMC OPS *
420 ✓	SPECTACLE REEF LIGHT	MICH. QUAD 450841 #1029	
446	POINT FUYARDS	(H-35-MI-77)	AMC OPS
447	MARQUETTE ISLAND	(H-33-MI-77)	AMC OPS
449 ✓	BOOT OFFSET	(H-34-MI-77)	AMC OPS *
450 ✓	MARTIN REEF LIGHT	MICH. QUAD 450841 #1021	
460 ✓	HURON PT. USLS	MICH QUAD 450841 1016	
500 ✓	ZAHARA	(H-1-UP-77)	AMC OPS *
510 ✓	DETOUR REEF LIGHT	MICH. QUAD 450834 #1005	
600 ✓	POINT DETOUR	(H-25-MI-77)	AMC OPS *
610 ✓	CREAM CITY POINT	(H-22-MI-77)	AMC OPS
615	GRAVEL ISLAND	(H-27-MI-77)	AMC OPS
620	TRAVERSE POINT	(H-23-MI-77)	AMC OPS

* Field positions pending adjustment.

SIGNAL TAPE PRINTOUT
MI-20-4-77 OPR520-MI-77
H-9719

207	4	45	20	56482	083	29	06080	250	0000	162038
300	4	45	29	11010	083	54	48836	250	0000	162038
400	4	45	46	16296	084	21	23111	250	0000	162038
420	4	45	46	22892	084	08	16802	139	0000	000000
446	4	45	55	54732	084	22	39119	139	0000	000000
447	4	45	56	23021	084	21	17902	139	0000	000000
449	4	45	57	20997	084	15	42146	250	0000	000000
450	4	45	54	47292	084	08	54953	250	0000	000000 ←
460	4	45	57	56051	084	04	09839	139	0000	000000 ✓
500	4	45	57	46364	083	59	41850	250	0000	000000 ←
510	4	45	56	56791	083	54	11207	139	0000	000000
600	4	45	57	18728	083	54	59656	250	0000	000000 ✓
610	4	45	55	58549	083	47	09640	139	0000	000000
615	4	45	55	53493	083	46	07375	139	0000	000000
620	4	45	55	49785	083	42	56286	139	0000	000000

Determination of Velocity Corrections:

Simultaneous Nansen Casts and XBT'S disagreed from -2.2°C to $+1.2^{\circ}\text{C}$ with 70% of all temperatures agreeing with 0.5°C . Since the errors caused by the use of XBT'S were small, they were used alone at one station for velocity determination.

Station:	Latitude:	Longitude:	Date:
J8 (Nansen)	$45^{\circ}55.8'N$	$84^{\circ}03.6'W$	10-03-77 (JD 276)
J6C (XBT)	$45^{\circ}52.8'N$	$84^{\circ}01.6'W$	10-04-77 (JD 277)
K3 (XBT)	$45^{\circ}53.2'N$	$84^{\circ}08.3'W$	10-17-77 (JD 290)

The Nansen Cast and XBT #J6C were in good agreement and were averaged together to obtain correctors for all hydrography until October 11, 1977 (JD 284). The correctors for the final day of hydrography (October 17 - JD 290) were obtained from XBT #K3.

VELOCITY TAPE PRINTOUT

VESNO 2220 TABLE 1

000608	0	0000	0001	000	222000	020477
001002	1	0002				
001121	1	0004				
001227	1	0006				
001327	1	0008				
001487	1	0010				
001700	1	0015				
001914	1	0020				
002080	1	0025				
002280	1	0030				
999999	1	0035				

VESNO 2220 TABLE 3

000226	0	0000	0003	000	222000	020477
000416	1	0002				
000590	1	0004				
000760	1	0006				
000911	1	0008				
001126	1	0010				
001408	1	0015				
001625	1	0020				
001810	1	0025				
002020	1	0030				
999999	1	0035				

VELOCITY TAPE PRINTOUT

VESNO 2225 TABLE 2

000625	0	0000	0002	000	222500	020477
000984	1	0002				
001109	1	0004				
001220	1	0006				
001319	1	0008				
001477	1	0010				
001694	1	0015				
001908	1	0020				
002090	1	0025				
002270	1	0030				
999999	1	0035				

VESNO 2226 TABLE 2

000625	0	0000	0002	000	222600	020477
000984	1	0002				
001109	1	0004				
001220	1	0006				
001319	1	0008				
001477	1	0010				
001694	1	0015				
001908	1	0020				
002090	1	0025				
002270	1	0030				
999999	1	0035				

VESSEL = 2220,2225,2226

DATE = 10/17/77

TIME = 185500

LATITUDE = 045/53/12.00

LONGITUDE = 084/08/18.00

TYPE OF OBSERVATION = XBT K-3

TABLE 3

CAST-DEPTH (SURFACE) (M)	TEMP (DEG C)	SALINITY (0/00)	SND VEL (M/SEC)
0000.0	10.56	00.00	1449.71
0010.0	09.67	00.00	1446.21
0020.0	09.61	00.00	1446.12
0030.0	07.83	00.00	1438.89
0050.0	05.00	00.00	1426.84
0053.0	05.00	00.00	1426.88

VESSEL =2220,2225,2226

DATE =3&4 OCT 1977

TIME =1751-1816 2216 GMT

LATITUDE = 045/54/18.00

J-8
45/55/48

J6C
45/52/48
84/01/36

LONGITUDE = 084/02/36.00

84/03/36

TABLE 2 - Launches
TABLE 1 - Ship

TYPE OF OBSERVATION =AVE NAUSEN J-8 XBT J6C

CAST-DEPTH (SURFACE) (M)	TEMP (DEG C)	SALINITY (0/00)	SND VEL (M/SEC)
0000.0	13.37	00.00	1460.50
0010.0	13.35	00.00	1460.58
0020.0	13.27	00.00	1460.44
0030.0	08.85	00.00	1443.24
0040.0	06.27	00.00	1432.40
0050.0	05.17	00.00	1427.68
0060.0	04.61	00.00	1425.31

VELOCITY CORRECTION TABLE OPTIONS:

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

1

DRAFT = 14.0

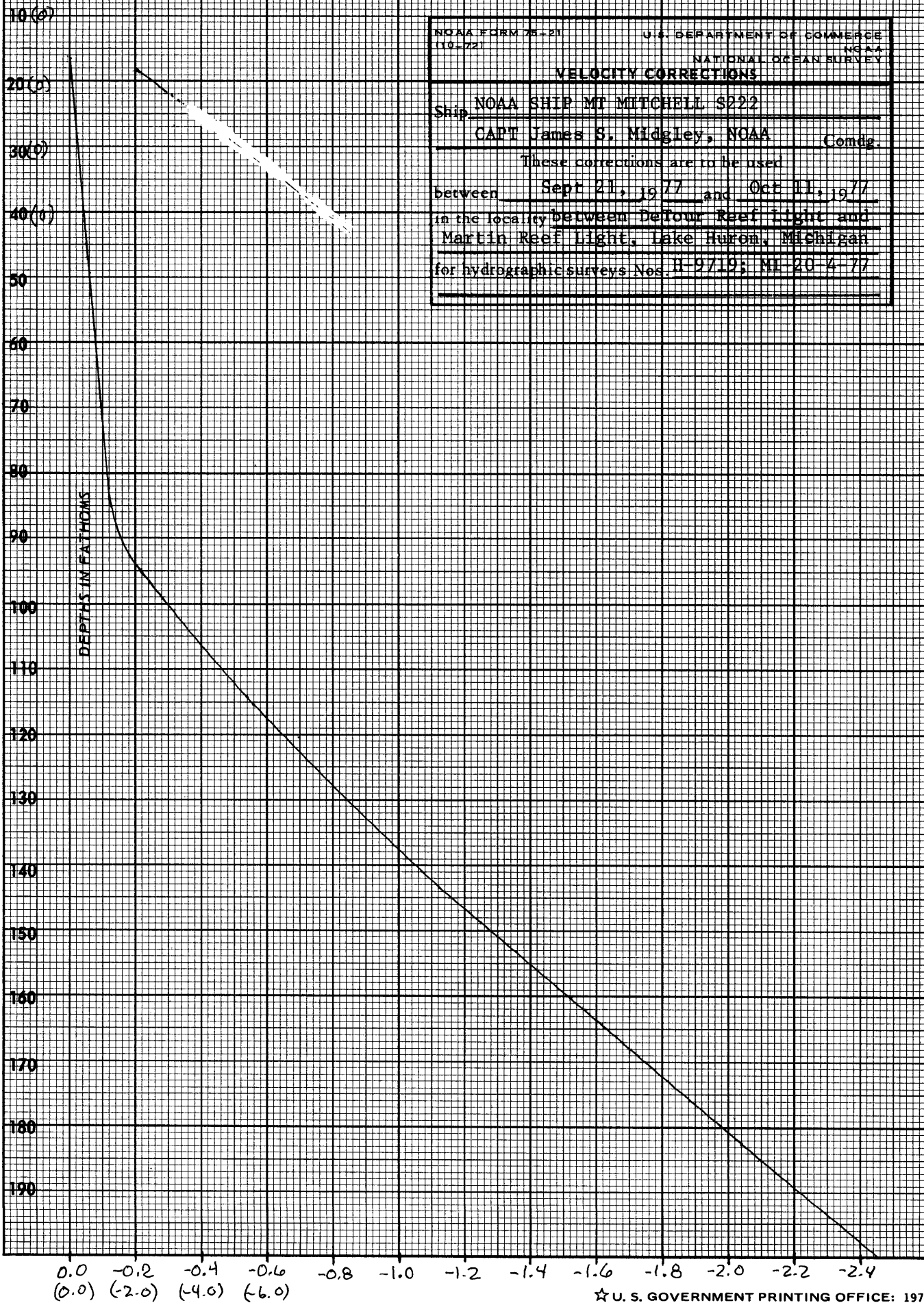
TABLE 1

ACTUAL DEPTH (SURFACE) MINUS VELOCITY CORRECTION (FT)	VELOCITY CORRECTION (FT)
0016.41	-0000.00
0049.27	-0000.06
0082.14	-0000.12
0115.39	-0000.56
0148.89	-0001.25
0182.49	-0002.04
0216.14	-0002.89

CORRECTIONS IN FEET, FATHOMS TABLE 1

NOAA FORM 25-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA SHIP MT MITCHELL S222</u>	
Commander <u>CAPT James S. Midgley, NOAA</u> Comdg.	
These corrections are to be used between <u>Sept 21, 1977</u> and <u>Oct 11, 1977</u> in the locality between <u>DeTour Reef Light and</u> <u>Martin Reef Light, Lake Huron, Michigan</u> for hydrographic surveys Nos. <u>H-9719; MI-20-4-77</u>	

(For deep water add a 0 to these figures)



KE 20 X 20 TO THE INCH 46 1240
7 X 10 INCHES
MADE IN U.S.A.
KEUFFEL & ESSER CO.

VELOCITY CORRECTION TABLE OPTIONS:

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

1

DRAFT = 1.6

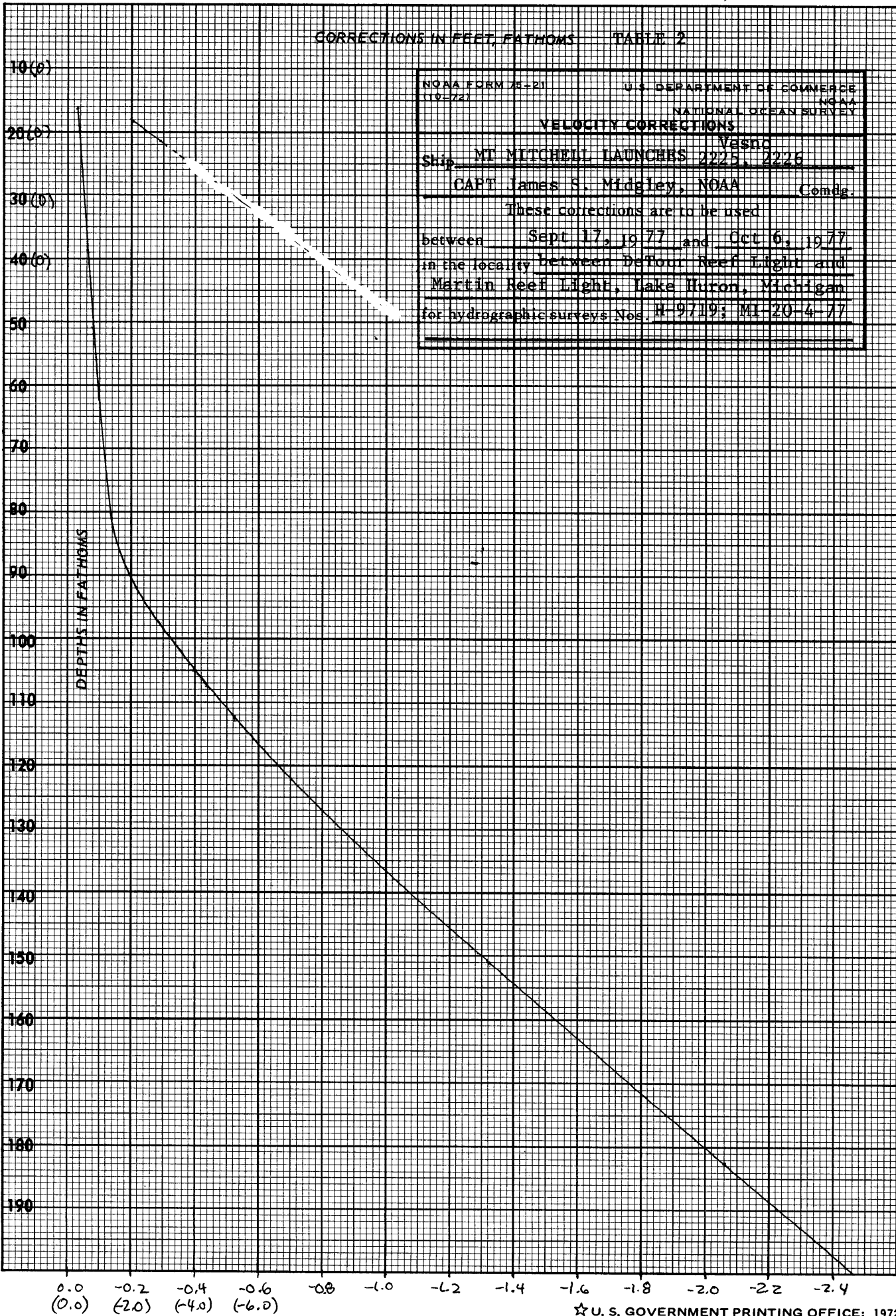
TABLE 2

ACTUAL DEPTH (SURFACE) MINUS VELOCITY CORRECTION (FT)	VELOCITY CORRECTION (FT)
0016.43	-0000.03
0049.29	-0000.08
0082.16	-0000.14
0115.41	-0000.58
0148.91	-0001.27
0182.51	-0002.06
0216.16	-0002.91

CORRECTIONS IN FEET, FATHOMS TABLE 2

NOAA FORM 78-201 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Vessel	
Ship <u>MT MITCHELL LAUNCHES 2225, 2226</u>	
Comdg.	
CAPT James S. Midgley, NOAA	
These corrections are to be used	
between <u>SEPT 17, 1977</u> and <u>OCT 6, 1977</u>	
in the locality between <u>DeTour Reef Light</u> and <u>Martin Reef Light, Lake Huron, Michigan</u>	
for hydrographic surveys Nos. <u>H-9719; MI-20-4-77</u>	

(For deep water add a 0 to these figures)



KE 20 X 20 TO THE INCH 46 1240
 7 X 10 INCHES
 MADE IN U. S. A.
 KEUFFEL & ESSER CO.

VELOCITY CORRECTION TABLE OPTIONS:

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

K-3

1
DRAFT = 14.0

TABLE 3

ACTUAL DEPTH (SURFACE)
MINUS VELOCITY
CORRECTION
(FT)

VELOCITY
CORRECTION
(FT)

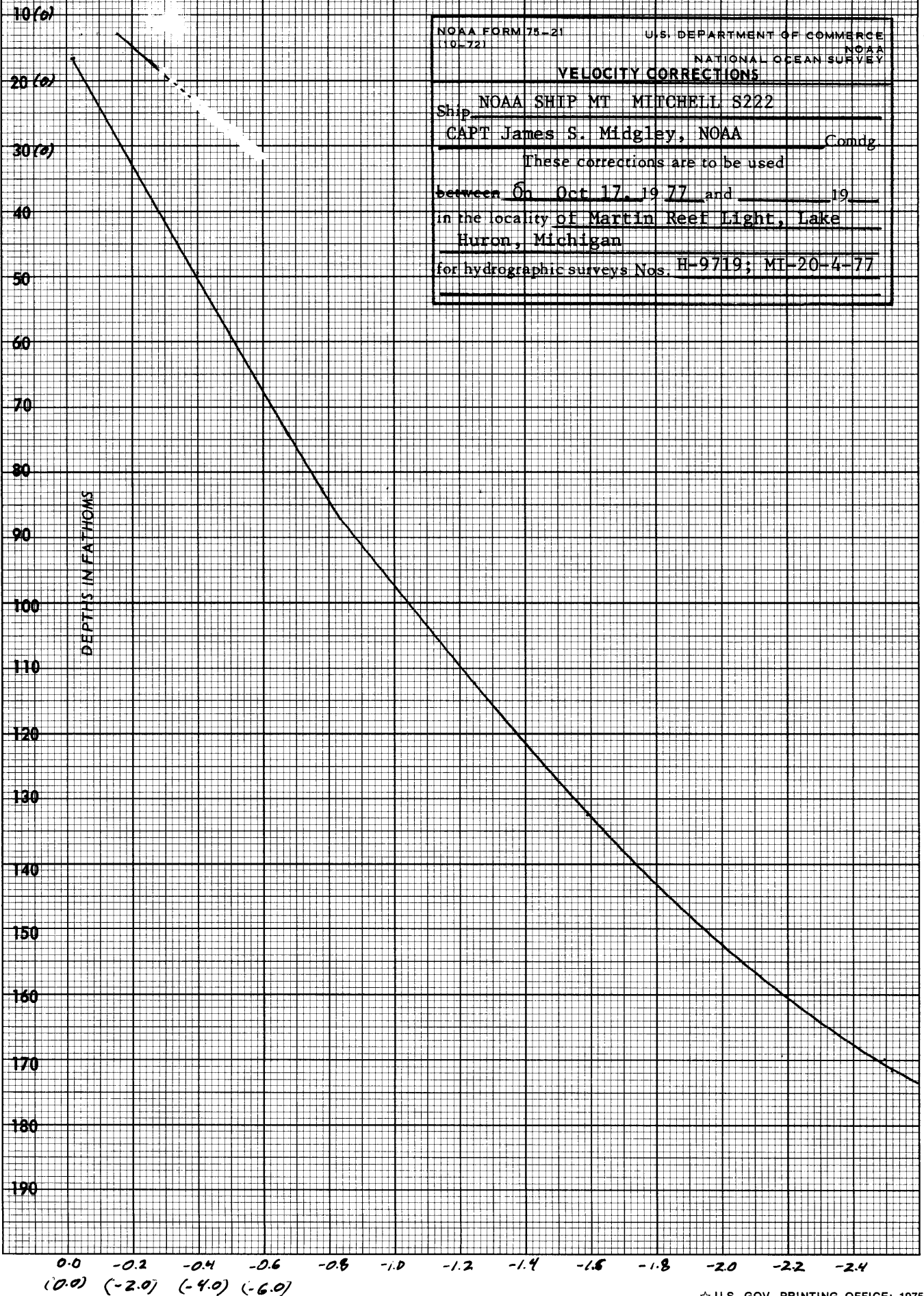
0016.43	-0000.02
0049.61	-0000.40
0082.80	-0000.78
0132.82	-0001.59
0171.49	-0002.52
0181.57	-0002.77

NOAA FORM 75-21
(10-72)U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA SHIP MT MITCHELL S222Comdg. CAPT James S. Midgley, NOAAThese corrections are to be used
between On Oct 17, 1977 and 19
in the locality of Martin Reef Light, Lake
Huron, Michiganfor hydrographic surveys Nos. H-9719; MT-20-4-77

(For deep water add a 0 to these figures)



DEPTHS IN FATHOMS

0.0 -0.2 -0.4 -0.6 -0.8 -1.0 -1.2 -1.4 -1.6 -1.8 -2.0 -2.2 -2.4
 (0.0) (-2.0) (-4.0) (-6.0)

46 1240

 K+E
 20 X 20 TO THE INCH • 7 X 10 INCHES
 KEUFFEL & ESSER CO. MADE IN U.S.A.

SETTLEMENT AND SQUAT

MT MITCHELL 1977 Field Season

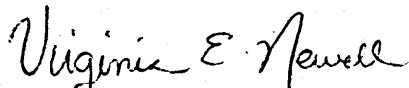
The settlement and squat test for the MT MITCHELL (S222) was conducted July 25, 1977 on Lake Huron, approximately one-half mile off the Coast Guard pier at St. Ignace, Michigan, using a Zeiss Ni-2 Level (S/N 142936), positioned at the end of the pier. Wave height was one foot and the wind was from 000° 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
LT(jg), NOAA

SETTLEMENT AND SQUAT CORRECTORS (SHIP WORK)

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

SETTLEMENT AND SQUAT
MT MITCHELL 1977 FIELD SEASON
JENSEN #1002 and 1004

Settlement and squat tests were run for MT MITCHELL launches 1002 and 1004 (vessel #2225, 2226 respectively) on September 1, 1977 off the St. Ignace Coast Guard pier. Corrections were determined with a Zeiss Ni2 Level (S/N 142936) positioned at the end of the pier and a Philadelphia leveling rod positioned directly above the transducer on the starboard side of each launch. The water level alongside the pier was measured before, during and after the level sightings - no change was observed. The seas were calm with no wind.

A buoy was placed in 50 feet of water approximately 50 meters off the pier. When the launches were laying to alongside this buoy variations of 0.1 to 0.5 feet were observed due to heave even though the seas were calm. Therefore, 2 sets of 20 measurements were made for each speed. This was done by running the launches from about one quarter mile east of the pier in to the buoy. High and low rod readings were recorded for each run. A "C" shot was done on the level before the tests were run to ensure small errors due to varying distances. C was found to be .01 mm/m or approximately 5 mm for distance differences of one quarter mile.

The leveling runs were made at 600, 1600, 2100 and 2600 rpm for each launch except launch 1002 idled at 500 rpm instead of 600 rpm. Measurements were made laying to beside the buoy both before and after the tests were run. Both launches carried a crew of two and all hydrographic survey equipment. Launch 1002 had full fuel tanks while launch 1004 was three quarters full. Attached is an abstract of the data obtained including a graph for each launch.

Respectfully Submitted:

William G. Pringle Jr.

William G. Pringle Jr.
Ensign, NOAA

SETTLEMENT AND SQUAT CORRECTORS
 MT MITCHELL 1977 FIELD SEASON

RPM	JENSEN #1002 VESNO 2225	JENSEN #1004 VESNO 2226
0	-----	-----
500	+ .01	-----
600	+ .05	+ .02
700	+ .08	+ .05
800	+ .11	+ .08
900	+ .14	+ .11
1000	+ .17	+ .13
1100	+ .19	+ .15
1200	+ .20	+ .17
1300	+ .22	+ .19
1400	+ .23	+ .20
1500	+ .24	+ .21
1600	+ .25	+ .21
1700	+ .24	+ .20
1800	+ .22	+ .19
1900	+ .18	+ .17
2000	+ .15	+ .14
2100	+ .08	+ .09
2200	0.0	+ .03
2300	- .10	- .04
2400	- .22	- .13
2500	- .38	- .23
2600	- .54	- .37

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: Cheboygan, Michigan (907-5076)

Period: September 17 - October 17, 1977

HYDROGRAPHIC SHEET: H-9719

OPR-520-MI-77

Locality: Lake Huron

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

Remarks:

DeTour Dock, Michigan gage (907-5098) was inoperative during most of the survey period.

Data from other gages on Lake Huron indicates no unusual water level movement during the survey period.

Philip C. Morris

Chief, Water Level Section

Don M. Spillman

Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

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				
ALBANY BAY ✓												1
ALBANY HARBOR ✓												2
ALBANY ISLAND ✓												3
ARNOLD ISLAND ✓												4
BARBED POINT ✓												5
BEAVER TAIL BAY ✓												6
BEAVER TAIL POINT ✓												7
BEAVER TAIL REEF ✓												8
BELLEVUE ISLAND ✓												9
CADOGAN POINT ✓												10
CARLTON BAY ✓												11
CRAB ISLAND SHOAL ✓												12
DE TOUR PASSAGE ✓												13
DE TOUR REEF ✓												14
DUDLEY BAY ✓												15
DUDLEY ISLAND ✓												16
HURON POINT ✓												17
LAKE HURON ✓												18
MARTIN REEF ✓												19
PETERS ISLAND ✓												20
POINT DE TOUR ✓												21
SADDLEBAG ISLAND ✓												22
ST. VITAL BAY ✓												22
ST VITAL POINT ✓												23
ST VITAL SHOAL ✓												24
SEYMOUR BAY ✓												24
STEVENSON BAY ✓												25
STEVENSON POINT ✓												25

APPROVED

Chas. E. Harrington - C3X5

CHIEF GEOGRAPHER-

23 JAN. 1979

APPROVAL SHEET
FOR
SURVEY H- 9719

- 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: 12/6/78

Signed: _____

Title: Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION			AMOUNT
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS			232
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS			3
DESCRIP- TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES	2					1- misc. data
CAHIERS	1-with Printouts		2			
VOLUMES	3					
BOXES			1- Smooth & Sawtooth rec.			

T-SHEET PRINTS (List)

SPECIAL REPORTS (List) 2- Chart mark-ups

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			2949
POSITIONS CHECKED	302	350	
POSITIONS REVISED		21	
SOUNDINGS REVISED		68	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	2		
VERIFICATION OF CONTROL		2	
VERIFICATION OF POSITIONS		20	
VERIFICATION OF SOUNDINGS		39	
COMPILATION OF SMOOTH SHEET		20	
APPLICATION OF TOPOGRAPHY		0	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		3	
COMPARISON WITH PRIOR SURVEYS & CHARTS		3	
VERIFIER'S REPORT		3	
OTHER		1	
TOTALS	2	91	93

Pre-Verification by K. R. Ainsley	Beginning Date 02/08/78	Ending Date 02/08/78
Verification by S. K. Kelley, J. S. Bradford	Beginning Date 10/07/78	Ending Date 11/27/78
Verification Check by Guy F. Trefethen	Time (Hours) 4	Date 12/01/78
Marine Center Inspection by Hydrographic Inspection Team	Time (Hours) 12	Date 12/06/78
Quality Control Inspection by R.W. Derkazarian	Time (Hours) 59	Date 1/17/79
Requirements Evaluation by DJ Hill	Time (Hours) 2	Date 2/27/79

Consistent 16 hr 2/15/79

Reg. No. 9719

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

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

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

Reg. No. _____

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

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

MAGNETIC TAPE CORRECTED

DATE _____ TIME REQ'D. _____ INITIALS _____

REMARKS:

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9719

FIELD NO. MI-20-4-77

Michigan, Lake Huron, De Tour Passage to Martin Reef Light

SURVEYED: September 17 through October 17, 1977

SCALE: 1:20,000

PROJECT NO.: OPR-520-
MI-77

SOUNDINGS: Ross Automated Hydrographic Survey System
CONTROL: Odum Hydrotrac
(Hyperbolic)
Del-Norte
(Range-Range)

Chief of Party James S. Midgely
Surveyed G. Mills
..... D. Waltz
..... D. Rice
..... M. Henderson
..... P. Daugherty
..... T. Rulon
..... M. Murphy
..... W. Pringle
..... T. Bainbridge
Automated Plot by CALCOMP-618 Plotter (AMC)
Verified and Inked by J. S. Bradford
November 27, 1978

1. Introduction

No unusual problems were encountered during verification. The red changes in the Descriptive Report were made by the verifier. The projection parameters have been revised and inserted in the Descriptive Report.

2. Control and Shoreline

a. The control is adequately described in Section F. and G. of the Descriptive Report.

b. There is no shoreline within the survey limits.
See Q.C. Report.

3. Hydrography

a. Depths at crossings are in good agreement.

b. The standard depth curves are adequately delineated. Brown curves were also used to delineate certain features. The 24-foot supplemental curve was added to H-9719 in order to conform with chart 14882.

c. The development of the bottom configuration and investigation of least depths is considered adequate with the following exceptions:

Reduced line spacing from the maximum 200 meter spacing, specified in Section 4.4 of the Project Instructions, where ~~shoals~~ ^{shoals are} was evident was not adhered to in several instances. For example, in the vicinity of latitude 45°56.6', longitude 83°57.0' depths to 42 feet rising from surrounding depths of 53 to 60 feet were found on the 200 meter maximum line spacing. A prior survey depth of 41 feet occurs in the area. Considering the echo sounder beam width; it is unlikely that the extent of the feature of least depth would be determined by 200 meter spacing.

4. Condition of Survey

The sounding records, field sheet and accompanying overlays, hydrographic records, and the Descriptive Report are adequate and conforms to the requirements of the Hydrographic Manual.

5. Junctions

An adequate junction was effected with the following contemporary surveys:

H-9721	(1977)	1:20,000	to the east ✓
H-9718	(1977)	1:50,000	to the south ✓
H-9726	(1977)	1:20,000	to the west ✓
I-2256A	(1965)	1:15,000	to the north ✓
1-2257	(1965)	1:15,000	to the north ✓
1-2258	(1965)	1:15,000	to the north ✓

Adjustments to junctional curves as indicated on a junctional strip provided of H-9718 (1977) are recommended to be made to H-9718 by Quality Control Branch (C352).

6. Comparison with Prior Surveys See Q.C. Report

a.	1-1373 ✓	(1916)	1:20,000
	1-1374 ✓	(1917)	1:20,000
	1-1838 ✓	(1945)	1:120,000

These most recent prior surveys taken together cover the common area of the present survey. A comparison with these surveys and the present survey reveals the prior surveys to have variable differences from 12 feet shoaler to 8 feet deeper with the prior surveys being generally deeper. Features found on the present survey were generally located by the prior surveys with the present survey being more definitive. With the exception of several depths and bottom characteristics being brought for-

ward to supplement the present survey, the present survey is adequate to supersede the prior surveys in the common area.

b. Swept Areas

1-1373	(1916)	1:20,000
1-1374	(1917)	1:20,000

There are no conflicts with the swept areas and depths indicated on the above prior surveys and present survey depths.

7. Comparison with Charts 14880 (24th Edition, February 5, 1977)
14882 (25th Edition, April 17, 1977)

a. Hydrography

Comparison with the chart shows good agreement. Depths vary from (1) to (10) feet. Most of the charted hydrography originates with the previously mentioned prior and junctional surveys.

The greatest difference between the chart and present survey is located at latitude 45°56.5' longitude 83°54.2'. This unidentified, charted 44 foot sounding, was not investigated by the field, however its existence is unlikely. The origin of this sounding should be researched before considering retention on chart 14880.
Delete from chart.

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

b. There were no aids to navigation within the actual survey area; however, two buoys in close proximity were located and were inserted into the survey data.

8. Compliance with Project Instructions

This survey adequately complies with the Project Instructions, except as indicated in Section 3. Hydrography of this report.

9. Additional Field Work

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

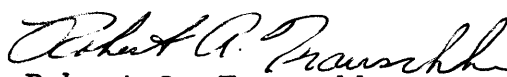
10. Addendum

The formal water level approval note has not been received; however, water levels applied were those provided by the water levels Section, C3314. It is requested that Quality Control Branch, C352 obtain this note. *Appended.*


Inspection Report
H-9719

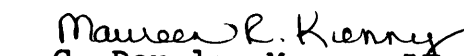
Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the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


Examined and Approved:
Hydrographic Inspection Team
Date:


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

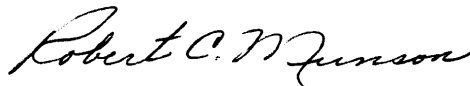
^{ABSENT}
Charles H. Nixon, CAPT, NOAA
Chief, Operations Division


R. D. Sanocki
Technical Assistant
Processing Division


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


Harry R. Smith
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

OA/C352:RWD

January 17, 1979

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

THRU: Chief, Quality Control Branch

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

SUBJECT: Quality Control Report for H-9719 (1977), De Tour Passage to
Martin Reef, Lake Huron, Michigan

A quality control inspection of H-9719 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, shoreline transfer, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, the survey 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. Section 2-a of the Verifier's Report is supplemented by the following:

The status of the control stations (triangulation stations) could not be substantiated by the National Geodetic Survey (NGS). It is assumed, however, that the necessary records and computations will eventually be submitted to the NGS. Ultimately, therefore, it is expected that the triangulation station status of the control stations will be validated. Accordingly, the control stations are symbolized as triangulation stations pending formal processing and acceptance as such by the NGS and described as "(Field pos.)" on the smooth sheet.

2. The shoreline was added to the smooth sheet in brown for orientation purposes only from surveys 1-2256a (1965-69), 1-2257 (1965), and 1-2258 (1965). The shoreline on these surveys originates with aerial photographs of 1964.

3. The junction with surveys 1-2256a (1965-69), 1-2257 (1965), 1-2258 (1965), and the present was adequate. However, soundings carried forward to 1-2258 from prior surveys 1-1373 (1916) and 1-1374 (1917) were not adjusted to the 1927 N.A. Datum and consequently when transferred to the



present survey were out of position. These have been corrected on the present survey after applying a graphical horizontal datum adjustment to the earlier surveys.

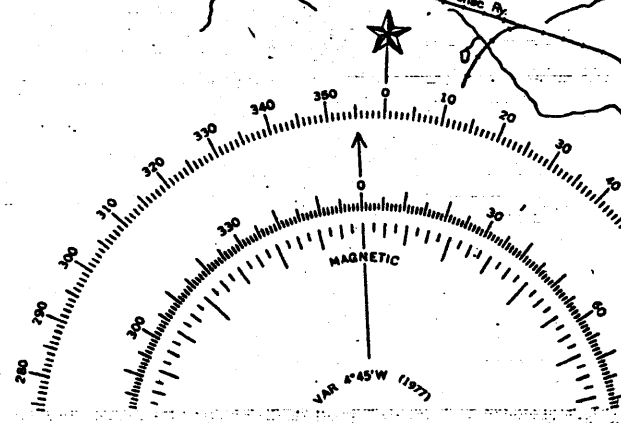
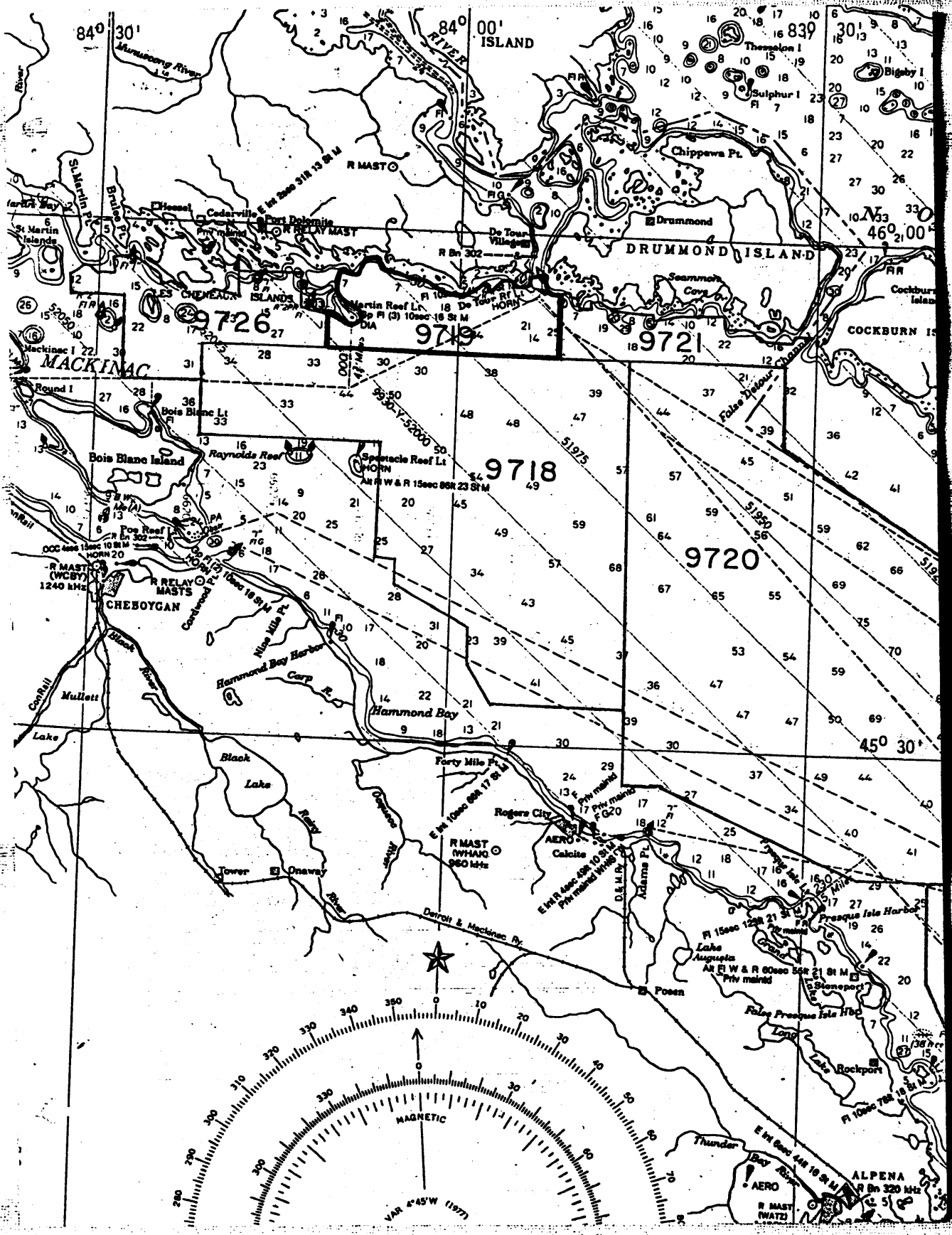
Several isolated areas on the 1965 surveys were in conflict with the present survey by as much as 12 feet which could possibly be attributed to poor control or faulty soundings. These soundings have been rejected on the 1965 work. Soundings general vary + or - 1 to 2 feet throughout the remainder of the junction.

In the vicinity of latitude $45^{\circ}57.05'$, longitude $83^{\circ}52.6'$, the present survey indicates 55- to 60-foot depths; however, the previous surveys indicate shoaler water with least depths of 12 to 15 feet. The present fathograms indicate a similar rise in the bottom before the sounding line began; a slight control error might exist on the present survey, the shoaler depths have been shown.

4. Two prior soundings, a 39- and 42-foot, in the vicinity of latitude $45^{\circ}56.75'$, longitude $84^{\circ}02.15'$, originate with prior survey 1-1077 (1905). These soundings are in disagreement with surveys 1-1374 (1917), 1-2257 (1965), and the present by approximately 30 feet; several other shoaler soundings of these prior surveys are also in disagreement. It is considered that the prior survey control was in error and the soundings have been rejected.

5. The scanning and check scanning by the hydrographer and the verification of the scanning were deficient in that least depths from shoal intermediates 2 to 3 feet shoaler than depths on regular interval scanning were generally disregarded. It was also noticed that least depths from side echoes or boulders lying on top of features were generally disregarded. The quality of the survey is considered to be impaired by these deficiencies.

cc:
C35
C351



RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. 9719

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
14882	8/10/79	Russell P. Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3
14881	2-21-80	Ralph B. Rase	Full Part Before After Verification Review Inspection Signed Via Drawing No. 2 <i>app'd in full thru 14882</i>
14880	5-5-81	P. Steward	Full Part Before After Verification Review Inspection Signed Via Drawing No. 2 <i>critical charts only</i>
14860	10-8-81	Eli Bodwinac	Full Part Before After Verification Review Inspection Signed Via Drawing No. 5 <i>Part applied thru 14860</i>
14880	5-29-85	Ralph B. Rase	Full Part Before After Verification Review Inspection Signed Via Drawing No. 4 <i>thru 14882 & 14881 app'd in full.</i>
14860	5-5-87	Joseph P. Moore	Full Part Before After Verification Review Inspection Signed Via Drawing No. 7 <i>Applied in full thru 14881</i>
14880	3-1-93	Charles James	Full Part Before After Verification Review Inspection Signed Via Drawing No. 6 <i>App'd thru CHTS 14881, 14882, 14860 and Hydro chart.</i>
			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.