

10148

Diagram No. LS-9

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Basic Hydrographic
Field No. WH-10-1-84
Registry No. H-10148

LOCALITY

State Wisconsin
General Locality .. Lake Superior
Sublocality Chequamegon Bay

1984

CHIEF OF PARTY
CDR D.L. Suloff

LIBRARY & ARCHIVES

DATE July 14, 1987

10148

☆U.S. GOV. PRINTING OFFICE: 1985-508-054

Area 7
CHATS
14974 }
14973 } TO SIGN OFF SET
14966 } "RECORD OF APPLICATION"
14961 nc

HYDROGRAPHIC TITLE SHEET

H-10148

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

FIELD NO.

WH 10-1-84

State Wisconsin

General locality Lake Superior

Locality Chequamegon Bay

Scale 1:10,000 Date of survey 25 July - 11 October 1984

Instructions dated April 23, 1984 Project No. OPR-Z137-WH-84

Vessel 2931, 2932, 2933

Chief of party CDR D.L. Suloff

Surveyed by PDW, DHM, LAR, DAH, KLM

Soundings taken by echo sounder, hand lead, pole

Graphic record scaled by Ship WHITING Personnel

Graphic record checked by DHM, LAR, DAH, KLM, FRC, SK, MF, JRC, JB, JL, ALD, EH, RCB, BHB

Verification by P.M. Niland Automated plot by PMC Xynetics Plotter

Evaluation by C.R. Davies

Soundings in ~~fathoms~~ feet at ~~XXXXXXX~~ LWD

REMARKS: Marginal notes in black by evaluator. Separates are filed with
the hydrographic data.

84-21-97 AWOLS + SURF ✓ used 7/87

PROJECT PROGRESS SKETCH

OPR-2137-WH-84

LAKE SUPERIOR

WISCONSIN

BASIC HYDROGRAPHIC SURVEY

SEPTEMBER 1984

NOAA SHIP WHITING

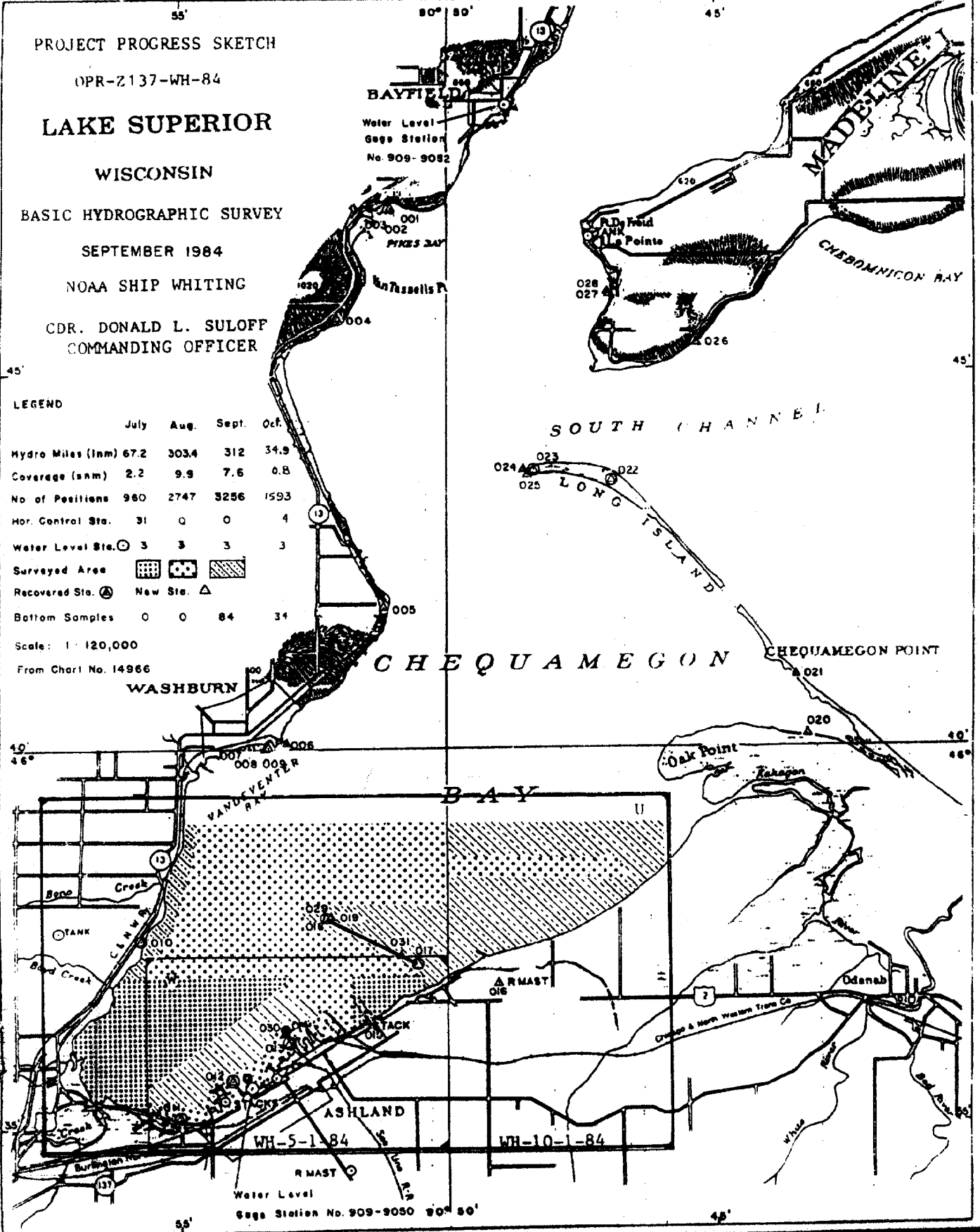
CDR. DONALD L. SULOFF
COMMANDING OFFICER

LEGEND

	July	Aug.	Sept.	Oct.
Hydro Miles (Inn)	67.2	303.4	312	34.9
Coverage (sqnm)	2.2	9.9	7.6	0.8
No of Positions	960	2747	3256	1593
Hor. Control Sta.	31	0	0	4
Water Level Sta.	3	3	3	3
Surveyed Area				
Recovered Sta.		New Sta.		
Bottom Samples	0	0	84	34

Scale: 1" = 120,000

From Chart No. 14966



A. PROJECT ✓

Hydrographic Survey H-10148 was performed in accordance with project instructions OPR-Z137-WH-84, Lake Superior, Wisconsin, dated 23 April 1984, as amended by Change No.1 (dated 7 May 1984), Change No.2 (dated 25 July 1984), and Change No.3 (dated 23 August 1984). The purpose of this project is to create a new data base for the maintenance of existing nautical charts of Chequamegon Bay, and for the construction of new, reformatted, or rescheded charts.

B. AREA SURVEYED ✓

The area surveyed is
from the south shoreline at 90°55'30" counterclockwise to

46°35'⁰⁶40"N to 46°37'00"N to 46°37'00"N
90°55'30"W to 90°52'45"W to 90°50'33"₈W

*See EVAL Report
Section 1*

to the south shoreline at 90°50'²⁷33"W

to the south shoreline at 90°46'⁰⁰15"W
46°38'17"N

to 46°39'00"N
90°46'⁰⁰15"W

to the west shoreline at 46°39'00"N

This survey was divided into two sections - north and south. Survey H-10148 was conducted from 25 July through 11 October 1984 (Julian days 207-285).

The area is characterized by a gently sloping mud or sand bottom with frequent patches of grass or weed.

The area north of the breakwater is characterized by extensive bottom rubble and dense patches of grass. The grass is thick enough in places to be indistinguishable from bottom rubble on the fathometer trace. Dives and lead-line comparisons were done in this area and in some cases, thick grass was found (see positions 5942-5944, 6092, 6093, and 6095). Although some of the features in this area are probably grass, some are definitely not grass and checking every feature with a diver would be impractical. Therefore only those features that could be interpreted as grass with reasonable confidence were disregarded. The limits of this area of extensive bottom rubble are shown on the smooth field sheet.

C. SOUNDING VESSEL ✓

The sounding vessels used for this survey were launches 1014 (EDP 2932) and 1015 (EDP 2931), and Monark WH-3 (EDP 2933). Each launch was equipped with a Raytheon DSF 6000N echo sounder, and the Monark was equipped with a Raytheon 719B echo sounder, a sounding pole, and a lead line. Horizontal positioning was obtained through the use of a Motorola Mini Ranger Falcon positioning system.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS ✓

Raytheon DSF 6000N and 719B echo sounders were the sounding equipment used for this survey. The following is a list of serial numbers:

<u>Vessel</u>	<u>EDP#</u>	<u>Type</u>	<u>S/N</u>	<u>JD</u>
Launch 1015	2931	DSF 6000N	A118N	207-258
			B037N	262-284
Launch 1014	2932	DSF 6000N	A112N	254-257
			A109N	272-278
Monark	2933	719B	5458	257-281

Depths recorded on the DSF 6000N on this survey varied from 4.0 feet to 37.9 feet. Depths recorded on the 719B on this survey varied from 2.3 feet to 26.0 feet. A sounding pole or a leadline was used when the depth was expected to be shallower than 2.5 ft. Depths taken by sounding pole and leadline along the shoreline, varied from 0.3 ft to 5.8 ft. Depths taken by leadline offshore (for DPs, least depths, and leadline comparisons) varied from 4.8 ft to 22.0 ft.

VELOCITY CORRECTION *See EVAL Report Sections 1 and 4*

While attempting to determine velocity correctors from the bar check data gathered on surveys H-10147 & H-10148, it was discovered that most of the bar checks were not usable. Neither velocity corrections nor instrument error could be reliably determined from the bar check data for launch 1015 (VesNo 2931).

The reason for the bad data is that the gain of the DSF-6000N was adjusted during the bar checks. The fathometers on the WHITING at this time had not been modified to limit the gain levels at the shallower ranges. Because of the extreme sensitivity of the gain in the "Auto" position in the shallower ranges, some survey personnel performed bar checks using manual gain settings. It was later discovered that varying the gain setting of the fathometer could vary the observed depth of a sounding even with the mid-season modification which had been made to rectify this problem. Unfortunately, much of the sounding data was gathered by personnel who performed bar checks in this manner. The quality of these bar checks is unknown since a constant gain was not used. If the minimum gain was used at each depth, the bar check would be measuring the true instrument error. Therefore, some of this bar check data could be usable.

To determine if in fact there was an observable instrument error on all of the echo sounders used, an independent method for determination of velocity corrections had to be used. Because the velocity problem was discovered in pre-^{processing} verification of the surveys, determination of the velocity correctors would have to be by a non-standard method.

Because these surveys were in fresh water, only temperature data were needed to determine the velocity of sound correctors. Temperature data were obtained from the Lake Superior District Power Company by telephone. Daily water temperature values were obtained from the generating facility located on the lake front in Ashland, WI. These data are the averages of the hourly water intake temperatures which are recorded to the nearest tenth of a degree (Fahrenheit). These data were used to compute velocity of sound correctors for all days of hydrography using RK 530. The intake is located offshore from the facility approximately 100 yds. It is at a depth of approximately 7 ft. *This data was not used see Supplemental Review and Discussion of H-10148 attached to this report.*

Because of the size and depth of Chequamegon Bay, and the narrow mouth of the bay, it is felt that the water column is well mixed by winds. Ship's divers were queried on this point. All divers stated that they had not observed any thermoclines in the bay while diving throughout the summer. Furthermore, the local dive shop in Washburn, WI, "The Self-Propelled Shop", was called and they also verified that the water in the bay is well mixed.

A further indication of mixing is the surface and sub-surface currents which are addressed in the currents report submitted with both surveys.

Rapid changes in the water temperature were compared to the ship's weather logs for the period of the survey. Sudden shifts of the wind from the west and southwest correlate well with rapid decreases in the lake temperature. This is due to the bay water being pushed out into the lake on the surface while being replaced with the much colder lake waters from below.

Because the bay is well mixed, it is felt that this single data point can be used to compute the sound velocity corrector. Comparison to the ship's sea chest intake temperatures was made when these temperature data were available. Agreement was as good as could be expected considering the resolution of the gauge on the sea chest intake.

Since velocity data were now available, it was decided a "smooth plot" of the data would be the most expeditious manner to determine if there were observable instrument correctors. Because the inshore work was done with a Raytheon 719-B in the MonArk (2933), which had no significant velocity or instrument errors, the junction between the launch and the MonArk should indicate an instrument error on the launch data. Daily leadline comparisons showed no significant instrument corrector for the 719-B. *CONCUR*

A smooth plot was performed using the velocities determined and smooth lake levels. The lake levels were computed using AM 501 and AM 504 with smooth hourly heights obtained from Water Levels Section. All main scheme sounding data for H-10147 & H-10148 were plotted and a comparison made. The plotted soundings from VesNo 2931 were consistently one foot shallower than the data

obtained with the 719-B. They were also shallower than sounding data obtained by launch 1014 (VesNo 2932), generally a foot shallower than 2932, but not nearly as consistent as the difference observed with 2933. This was taken to be an indication of an undetermined instrument corrector.

To determine the instrument corrector, all bar check data was reviewed and separated based on boat crews. Bar checks made with the units in the auto position were primarily used to determine the instrument correctors. This was done by applying the velocity correctors to the bar checks. The resultant values should be the observed instrument errors. Due to the sparse data available for 2931, bar check data which indicated a corrector in agreement with the AGC bar checks were also used to determine the instrument corrector.

It is felt that the instrument error determined in this manner is appropriate for application to all of the hydrography run by VesNo 2931. The manual gain setting used to run the hydrography is close to the gain setting of the auto position. Therefore, the difference in instrument error introduced by the use of the manual gain is minimal. The gain setting used to run the hydro can be estimated by the length of the initial on the fathogram, as this width varies directly with the gain selected. Additionally, survey personnel were questioned as to what manual gain setting was normally used to gather data, the gain setting used is approximately equivalent to the gain used in the AGC position. The instrument error determined in this manner was 0.2 ft for 2931 and -0.1 ft for 2932. These values are appropriate for all the echo sounders which were used in both launches. This value is the average of the error values and is applicable to all depths sounded. These values were computed with the measured drafts of 1.5 ft and 1.7 ft for 2931 and 2932, respectively.

To further test the validity of determining the velocity corrector and instrument error in this manner, a comparison was made to the attachments of the pre-processing examination report. The original of this report has been included with in the supplemental data file of H-10147, a copy is included with H-10148. Conclusions made by the examiner are in good agreement with temperature data and the resultant velocity and instrument correctors.

Specifically:

- 1) Attachment C indicates a velocity corrector; temperature data indicates a significant velocity corrector (0.4 ft at 27.3 ft) does exist. Bar checks on both of these days were performed without variation of the gain.
- 2) Attachment D indicates no velocity corrector is apparent; again, temperature data is in agreement with no corrector being needed until 40 ft. for days 243-244. Days 214-215 have a velocity corrector of 0.2 ft at 25 ft, but this may have been "hidden" since the gain was in manual.
- 3) Attachment E indicates no velocity corrector, but an instrument error does seem to exist. Temperature data also indicates no velocity corrector, and the average instrument corrector shown for JD 248-252 agrees with the corrector determined with velocity data.

4) Attachment F indicates an instrument corrector (2931) of 0.2 ft for JD 262 and no corrector for JD 263. The bar check data for JD 262 was performed in the AGC position, while the data on JD 263 was taken while the gain was varied. Temperature data indicates a negligible velocity corrector on both days.

Using the instrument errors and the smooth water level data, the main scheme hydro was re-plotted. The instrument errors were added to the velocity corrector tapes, and the new velocity tapes used to plot the data. Once again the junctions between different sounding vessels were closely examined for agreement. Agreement between the two launches (2931 & 2932) was very good. The plotted soundings agreed exactly approximately 85% of the time. The agreement between the launches and VesNo 2933 was good, agreeing to the exact depth approximately 60% of the time. The rest of the soundings all agree by 1 ft.

The launches are almost always shallower if there is disagreement. Based on comparison of the soundings it appears there is a small difference between the launches and the MonArk which is causing the differences in the plotted soundings. On gently sloping sections, the launches will show one foot shallower one to two soundings sooner than 2933. The trend of the bottom is always consistent among sounding vessels.

This difference in soundings is small, probably one or two tenths of a foot, and is not felt to be significant. Based on this final plot, it is felt that the difference is in the soundings of the MonArk. This is the level of agreement that was observed during leadline comparisons with the 719-B. A possible explanation is that the lead used to perform leadline comparisons sank into the bottom the small amount needed to cause the observed difference in the leadline comparisons. Based on the bottom structure, as observed by ship's divers, this is quite possible. The divers state in many dive reports that the bottom is very soft.

Bar check lines were checked every two weeks against a standard tape. No variations were observed. The bar check data are filed by day in the data cahiers.

DRAFT CORRECTION ✓

The TRA (freshwater) for the Monark (2933) was measured at 11 inches (0.9 ft). The TRA (freshwater) for the launches (2931 & 2932) was measured at 0.46 m (1.5 ft) and 0.52m (1.7 ft), respectively. All of the data assume a launch TRA of 1.7 ft and a Monark TRA of 1.0 ft. All field sheets were plotted with these TRAs. A TC/TI tape for each vessel, cut in the PMC format, is included with the data tapes.

A careful watch was kept on the Raytheon 719B to be certain that the initial remained at zero. The position of the initial was taken into account when the analog record was scanned. Therefore, no additional corrector was applied to this instrument.

SETTLEMENT AND SQUAT ✓

Settlement and squat trials were run for launch 1014 (2932), launch 1015 (2931) and the Monark (2933) on 8 July 1984. The trials were run in 25 feet of water along side the S00 Line Ore Pier in Ashland, WI. A level and rod were used to measure the effect of settlement and squat as the vessel in question was run at various speeds. All rod readings underway were compared to at rest readings to determine the correctors.

The Monark (2933) was observed at its operating speed of dead slow with both engines; no significant settlement or squat was detected. *CAW*

A copy of the raw settlement and squat data is included in the supplemental data file.

WATER LEVELS ✓

Water level correctors were not applied to data on the original field sheets, as no predicted levels were possible. The field sheets plotted after pre-verification have had smooth water levels applied. The Field Water Level Note is included in separate B. A copy of the smooth hourly heights is included in the supplemental data folder. *a copy of the water level note is included in this report.*

An abstract of corrections to echo soundings is included in separate D. Printouts of the velocity and TC/TI tapes are included in the supplemental data file.

E. HYDROGRAPHIC SHEETS ✓

As approved 10 May 1984, the sheet dimensions are 91cm x 137cm. All field sheets were prepared by WHITING personnel using Houston Instrument DP-3 Roll Plotters (S/N 7842-1, and 5848-22). The survey was divided into two sheets, with a skew of 0 degrees. The sheets were bounded by the following points:
See attached approval for an oversized sheet

	<u>North</u>		<u>South</u>	
origin =	46°37'00"	90°57'45"	46°34'30"	90°57'45"
	46°39'44"	90°57'45"	46°37'14"	90°57'45"
	46°39'44"	90°45'49"	46°37'14"	90°45'50"
	46°37'00"	90°45'49"	46°34'30"	90°45'50"

A total of 20 field sheets are submitted with this survey: 5 rough sheets, 5 boat sheets, and 10 smooth sheets. The smooth sheets are broken down as follows: 2 sheets with main scheme, 2 sheets with crosslines, and developments, 2 sheets with detached positions, and bottom samples, 1 sheet with wire drag, 1 sheet of the area around the breakwater enlarged to a scale of 1:5,000, and 2 "analysis" sheets which have had both velocities and water levels applied to the sounding data.

Contouring on the smooth sheets is at 6ft, 12ft, 18ft, 24ft, and 30ft.

Some soundings have been manually edited from the smooth ^{field} sheets for the sake of clarity (done by putting the pen in the UP position). The data are still on the tapes and were plotted on the rough sheets.

Shoreline taken from shoreline manuscript TP-00439 is drawn in black ink and shoreline taken from the photo revised U.S. Geological Survey quadrangles is drawn in brown ink.

F. CONTROL STATIONS ✓

The following stations, all based on North American Datum of 1927, were used as electronic positioning control stations:

<u>Signal #</u>	<u>Name</u>	<u>Year Established</u>	<u>Source</u>
007	MARINA 1984	1984	AMC
010	NASH 3 1984	1984	AMC
011	BODINS 1982	1982	AMC
012	REISS	1981	AMC
014	NO 80 USE 1939	1939	Army
018	NO 81 USE	NA	Army
029	ASHLAND BREAKWATER LIGHTHOUSE (not used)	1982	NGS
030	BOLLARD	1984	WHITING
031	ASHLAND BREAKWATER SOUTH LIGHT ECC	1984	WHITING
035	BURNOUT	1984	WHITING
023	Chequamegon Point Beacon Red (not used)		

Stations 014 and 018 were established by the Army Corps of Engineers. Stations 030 and 035 were established as supplemental hydrographic control and are exceptions to third-order specifications, per section 3.1.2.2 of the Hydrographic Manual. Horizontal directions were determined by the method specified in paragraph 3 of section 3.1.2.2 of the Hydrographic Manual and the distances were measured with a steel tape. These positions were not monumented (BOLLARD is recoverable). All other stations were established or located by WHITING or AMC personnel using Third-order, Class I methods. All field records were submitted to MOA2x1.

Stations 007, 010, 011, 012, 014, 018, 030, and 031 were used as electronic control stations. Station 029 was used for an initial and station 035 was used as the control station for a range-azimuth position (JD 284, #6105). An abstract of stations used for this survey is included in separate E.

The survey signal list is included in separate F. A copy of the Horizontal Control Report is included in the supplemental data file.

G. HYDROGRAPHIC POSITION CONTROL ✓

The electronic positioning system used for this survey was range-range MiniRanger Falcon. The HP 3810B (S/N 1929A00355) was used on JD 284 as range-azimuth control for position 6105 (vol 7, p43).

Motorola MiniRanger Falcon Equipment:

Launch Equipment:

<u>Vessel</u>	<u>JD</u>	<u>System</u>	<u>RP</u>	<u>R/T</u>
2931	207-284	B	D0018	D2128
2932	254-278	D	D0019	C2000
2933	257-281	A	D0004	D2123

Remotes:

code 1 S/N C2058	code 2 S/N C2059
code 3 S/N C2075	code 4 S/N C2065
code 6 S/N C2091	

The CDUs were display devices only and did not affect the data.

The intersection angles between ranges are greater than 30° and no more than 150° for all range-range data. Data with intersection angles outside this range have been rejected (see positions 4566-4570).

Launch range-range data for this survey was recorded in real time using RK112 and the launch computer/HYDROPLOT systems. All Monark range-range data was recorded real time by hand in sounding volumes and punched on paper tape later using RK602.

Fixed point calibration checks were performed daily before and after the periods of hydrography with the following exceptions:

JD 257 - The Monark (2933) had an apparent failure of the MiniRanger equipment and did not get a closing calibration check. It was later determined that the battery had run down. Freshly charged batteries were put in the Monark the next day and the check calibration was within acceptable limits.

Launch 1015 (2931) was unable to get a closing check calibration due to rough seas.

JD 263 - Code 6 was blown over, and code 4 was blown into the water near the end of the day. Launch 1015 and the Monark did not get closing check calibrations for codes 4 and 6. There was no closing check calibration for code 2 due to its erratic behavior. In the confusion of the rescue of code 4, no closing check calibration was done for code 3. All four codes calibrated correctly the following day. The erratic behavior of code 2 appeared to be caused by either interference or atmospheric conditions. It did not reoccur.

JD 267 - A fuse broke in the Monarks' MiniRanger system due to rough seas. No closing check calibration was done.

JD 269 - No check calibrations were done for launch 1015 due to rough seas.

JD 272 - No check calibrations were done for the Monark due to rough seas. A residual check was done to provide a rough check. A residual check consists of entering the X, Y, & Z coordinates of the stations, and the baseline correctors, in the MiniRanger CDU. The MiniRanger then computes a least squares position and the residuals (corrector to each range to get the least squares position).

Due to the large number of DPs, no check fixes were taken. Instead, the MiniRanger rates were closely observed while approaching and leaving the DP site to ascertain that the rates were consistent.

Baseline calibrations were performed on the following days: 194 & 195, 209, 223, 237, 261, and 284 & 285. The R/P, CDU, and R/T were set up on station BOLLARD (030) on JD's 194, 261, 284, and 285 and on a launch at BOAT CAL on JD's 195, 209, 223, 237, and 261. The remotes (or R/S's) were set up over station REISS (012). The systems were turned on and allowed to warm for at least 15 minutes and as much as 30 minutes on cold days. Readings were taken with no attenuation and then the attenuator was connected and readings were taken for the highest signal strength and down by fives to a minimum signal strength of 15. The baseline corrector was first taken to be the corrector at the highest signal strength, but on further consideration, it was decided to compute it as the average of all correctors from the highest signal strength down to the cut-off signal strength (the cut-off is where the correctors begin to change more rapidly with changing signal strength).

The remotes were blown over and into the water on JD 284 during the baseline calibration. The baseline calibration for system A with remotes 1, 2, 3, and 6 had been completed by that time. Codes 2, 3, and 4 did not get wet and so the baseline calibration for systems B and D with codes 2, 3, and 4 was completed that day. Codes 1 and 6 were dried over night. Code 6 was calibrated with systems B and D on JD 285. Code 1 did not work and was sent back to AMC for repair.

An abstract of the electronic correctors is included in separate E.

H. SHORELINE ✓

All shoreline shown in black on the smooth field sheets was taken from *See FVAC Report*
shoreline manuscript TP-00439. *Section 2*

All shoreline shown on the smooth field sheets in brown ink was taken from photo revised U.S. Geological Survey quadrangles. The shoreline does not agree very well with the shoreline manuscript in many places. When the survey was overlaid on the enlargement of the quadrangle, the soundings overlapped the shoreline by as much as 10m to 20m. As this much difference was observed between the quadrangle and the shoreline manuscript, the shoreline was adjusted to agree with the hydrography and should be used for orientation purposes only.

All shoreline features (such as groins, wharves, and rocks) were positioned to verify those shown on the shoreline manuscript (See the abstract of positions in separate G).

The following is a list of positions of DPs of shoreline features: 155-157 (AWOIS 3343), 268, 275, 279-292, 300, 308, 312, 323-324, 334-337, 347-349, 356-358, 377, 385, 392-409, 411-429, 447-453, 469-471, 473-480, 502, 513-523, 544-546, 564, 588-610, 637, 758-762, 876-880, 951-982, 983-1008 (AWOIS 3345) and 6056 & 6087 (AWOIS 3344).

The following are stations that plot lakeward of the shoreline: 012-REISS, 014-NO 80 USE 1939, 018-NO 81 USE, 029-ASHLAND BREAKWATER LIGHTHOUSE, 030-BOLLARD, 031-ASHLAND BREAKWATER SOUTH LIGHT ECC, 035-BURNOUT.

I. CROSSLINES ✓

There were 46.2 miles of crosslines run, which is 10.8% of the mainscheme. All crossline soundings agreed with the mainscheme soundings to within one foot or less. *CONCUR*

J. JUNCTIONS ✓

This survey junctions with the contemporary survey H-10147 (WH-5-1-84). Agreement was excellent with soundings differing by 1 foot or less. *CONCUR*

K. COMPARISON WITH PRIOR SURVEYS See EUNE Report Section 6

The soundings from prior survey LS 895, 1:10,000, November 1901, Map Of Portion Of Chequamegon Bay, (which are in the area south of the breakwater) are consistently three to four feet shallower than those determined by this survey. The application of water level correctors may account for part of this difference. The remaining difference may be due to geological processes in the Great Lakes area.

The soundings from prior survey ^{LS} 442, 1:16,000, 1869, Part Of Chequamegon Bay, appear to be 1 to 5 ft shallower than those determined by this survey. Comparison was difficult because of the difference in scale and the lack of grid lines on ^{LS} 442.

L. COMPARISON WITH THE CHART ✓

This survey was compared with chart 14974, 1:15,000, 21st edition, 2 June 1979, Ashland and Washburn Harbors, NA 1902 datum. The soundings on the chart are generally 2 to 4 feet shallower than those determined by this survey. This could be due to a higher lake level and to geological processes affecting the Great Lakes area. *CONCUR*

This survey was also compared with chart 14973, 1:60,000, 24th edition, 19 January 1980, Apostle Islands, NAD 1927. The soundings on the chart are generally 3 to 6 feet shallower than those determined by this survey. This could be due to a higher lake level and to geological processes affecting the Great Lakes. *CONCUR*

AWOIS

3343 - Visible Wreck - This item should be charted as a visible wreck at the average of the positions 155-157 ($46^{\circ}36'16.42''N$, $90^{\circ}56'49.00''W$). This feature is described in sounding volume 1. ✓ AWOIS
See EVAL Report Section 7

3344 - Trestle - This item was investigated by wire drag and diver search on JDs 277 and 278. The piles remain but are submerged. Positions 6056 and 6087 delineate the limits of the line of submerged piles. The investigation for this feature is described in sounding volumes 7 (p34-37) and 8 (p29-31), and diving reports 14-31. The limits of the submerged piles extend from latitude $46^{\circ}36'07.5''N$, longitude $90^{\circ}56'54.0''W$ and latitude $46^{\circ}36'19.5''N$, longitude $90^{\circ}56'27.0''W$. ✓ AWOIS
See EVAL Report Section 7

3345 - Submerged Crib - A visual search was conducted and no sign of the submerged crib was seen. The area is marshy and shallow with depths of about two feet. Visibility was around one foot. Positions 983-1008 (vol 5, p48-50) are detached soundings delineating the area searched. A crib in this area will not affect navigation and adds nothing to the chart. Thus, it is recommended that this submerged crib be deleted from the chart. AWOIS item 3345 located at latitude $46^{\circ}35'18.75''N$, longitude $90^{\circ}56'33.50''W$. deleted
Concur

3405 - 10 ft Depth - This item was verified (see JD 262, position 5714, vol 6, p58, depth = 7.2 ft + 1.3 ft TRA = 8.5 ft and the least depth from diver investigation #10, JD 266, position 5945, vol 7, p15, depth = 10.0 ft). Pos. 5714, 7.0 ft at latitude $46^{\circ}37'03.04''N$, longitude $90^{\circ}52'13.21''W$. ✓ 7.0
APPLS

3414 - Pile - On JD 266, the area was scanned with side scan sonar and then a diver search (dive #11) was performed in a circle of radius 50m around the reported position in accordance with the procedure described in the NOAA Dive Manual, section 7.1.1. Nothing was found. This pile should be removed from the chart. AWOIS 3414 located at latitude $46^{\circ}37'30.80''N$, longitude $90^{\circ}51'50.80''W$. Concur

The dumping ground north of the breakwater was last used, according to the Army Corps of Engineers, in 1959. A copy of the letter is included in the supplemental data file. As per project instructions, sounding lines were spaced at 50m over the area marked as a dumping ground. In addition, sounding lines in the vicinity were split to 50m to delineate an area of extensive bottom rubble (limits of this area are shown on the smooth field sheet). Chart according to Smooth Sheet. See letter attached to this report.

The following is a list of positions of the diving investigations on this survey: dive #3 - 5425, dive #4 - 9053, dive #5 - 5929 & 5930, dive #6 - 5941, dive #7 - 5942, dive #8 - 5943, dive #9 - 5944, dive #10 - (AWOIS #3405) 5945, dive #11 - (AWOIS #3414) dive #12 - 5962, dives #14-31 - (AWOIS #3344) 6056 & 6087, dive #36 - 6105.

M. ADEQUACY OF SURVEY ✓

This survey was conducted in accordance with the project instructions, Hydrographic Survey Guidelines, AMC OPORDERS, and the Hydrographic Manual.

This survey is adequate to supersede all prior surveys without qualification.

See EVAL Report Section 9

N. AIDS TO NAVIGATION ✓

Floating Aids:

	<u>Position</u>	<u>Latitude</u>	<u>Longitude</u>
Red Nun "2"	6089	46°36'53.97"N	90°53'17.55"W
Black Can "1"	6088	46°36'57.15"N	90°52'51.17"W

These floating aids to navigation adequately serve the apparent purpose for which they were established.

Non-Floating Aids:

ASHLAND BREAKWATER LIGHTHOUSE	46°37'41.478"N	90°52'12.914"W
ASHLAND BREAKWATER SOUTH LIGHT	46°37'03.893"N	90°50'32.886"W

Landmarks Verified As Presently Charted:

ASHLAND JAMES RIVER CORPORATION STACK	46°36'17.230"N	90°51'26.558"W
ASHLAND RADIO MAST	46°36'50.135"N	90°49'24.946"W
RADIO MAST (offset)	46°34'18"N	90°51'48"W
LOUISIANA PACIFIC STACK *	46°36'10.61 "N	90°51'18.76 "W
GRAIN ELEVATOR (offset)	46°34'44.81 "N	90°54'27.42 "W
RADIO TOWER (with strobe) (offset)	46°41'30.45 "N	90°59'27.34 "W
WASHBURN CITY DOCK LIGHT (offset)	46°40'04.28 "N	90°53'01.36 "W
SOO LINE ORE DOCK (NE corner)	46°36'11.214"N	90°52'56.170"W
REISS COAL PIER (NW corner)	46°35'33.321"N	90°53'42.873"W
RELAY TOWER*	46°35'30"N	90°52'56"W
STACKS *	46°35'14"N	90°54'06"W
STACK *	46°34'54"N	90°54'12"W

* on H-10147

Included in separate I are 76-40 forms for landmarks that are to be added to the chart, or are to be modified.

The submerged cable shown on chart 14974 (46°37.2'N, 90°51.0'W, south of the breakwater) is used by the U.S. Coast Guard to power the navigation lights on each end of the breakwater. Although the Army Corps of Engineers indicated that it had been abandoned, the U.S. Coast Guard reports that it is still used to power the lights. A copy of the letter from the Army Corps of Engineers is included in the supplemental data file. This cable should remain on the chart. *CONC. WT*

There were no aids in the survey area with high intensity strobe lights.

O. STATISTICS ✓

	<u>2931</u>	<u>2932</u>	<u>2933</u>	<u>Total</u>
Number of positions	2170	732	1022	3924
Number of rejected positions	82	22	3	107
Lineal NM of sounding line	305.2	109.8	57.7	472.7
Square NM of hydrography	12.2	4.4	2.3	18.9
Bottom Samples	68	19	0	87
Detached Positions	24	3	183	210
Diver investigations	0	29	0	29

P. MISCELLANEOUS ✓

An abstract of the bottom samples collected and sent to the Smithsonian Institution is included in separate H.

The side scan sonar was not used to disprove any AWOIS items. It was used whenever possible to find objects which were then investigated by divers. In places where there was danger of losing the side scan fish, wire drag was conducted.

Geographic names were verified by WHITING personnel through the Ashland City Assessor, Ashland County Land Description Officer, and the Bayfield County Register of Deeds. All applicable names on the geographic names list (see separate C) are on the field sheets.

Interviews were conducted with local residents on the subject of currents in Chequamegon Bay. A copy of the Current Observations report is included in the supplemental data file. *Attached*

A user evaluation investigation was conducted in the Chequamegon Bay area by Ship WHITING personnel on 5 Aug and 21 Aug 1984. A copy of the User Evaluation is included in the supplemental data file. *Attached*

In the vicinity of $46^{\circ}36.2'N$, $90^{\circ}55.3'W$ there are two areas that appear to have been dredged. *Concur, depths range between 13 to 15 feet.*

The area north of the breakwater is characterized by extensive bottom rubble and dense patches of grass. The grass is thick enough in places to be indistinguishable from bottom rubble on the fathometer trace. Dives and lead-line comparisons were done in this area and in some cases, thick grass was found (see positions 5942-5944, 6092, 6093, and 6095). Although some of the features in this area are probably grass, some are definitely not grass and checking every feature with a diver would be impractical. Therefore only those features that could be interpreted as grass with reasonable confidence were disregarded. The limits of this area of extensive bottom rubble are shown on the smooth field sheet. *Area enclosed with limit line on smooth sheet.*

There were no harbor photographs taken, as there were no applicable harbors in the survey area.

There was no Loran-C chart verification during this survey since the survey vessels were not Loran-C equipped.

Q. RECOMMENDATIONS ✓

As was stated in section H, the shoreline from the photo revised USGS quadrangles does not compare well with the shoreline from the shoreline manuscript TP-00439 or with the soundings determined by this survey. The quadrangle shoreline should be used for orientation purposes only.

AWOIS items 3343, 3344, 3405, and 3414 should be charted as described (see *See EVAL* section L). AWOIS item 3345 should be removed from the chart. *Report Section 6+7*

Based on the WHITING's experience with the DSF-6000N fathometers in shallow water, it is recommended that the auto gain position be used whenever possible in shallow water. If the auto position can not be used, the gain should be kept at the minimum level that will yield digital information. Otherwise, an observable error in the data may occur. On commencing a survey in shallow water, an operating unit should determine the parameters within which they must apply "gain error" and what those correctors will be.

R. AUTOMATED DATA PROCESSING

<u>Program</u>	<u>Description</u>	<u>Version Date</u>
RK112	HYPERBOLIC, R/R HYDROPLOT	10-12-83
RK201	GRID, SIGNAL, AND LATTICE PLOT	09-16-81
RK211	RANGE-RANGE NON-REAL TIME PLOT	02-13-84
RK212	VISUAL STATION TABLE LOAD	04-01-74
RK216	RANGE-AZIMUTH NON-REAL TIME PLOT	02-09-81
RK300	UTILITY COMPUTATIONS	10-21-80
RK330	REFORMAT AND DATA CHECK	05-04-76
AM602	ELINORE--LINE ORIENTED EDITOR	12-08-82

S. REFERRAL TO REPORTS

* The User Evaluation Report was submitted to N/MOA2x1 on 2 September 1984.
 * The Geographic Names Report was submitted to N/MOA2x1 and N/CG243 via AMC on 21 September 1984. Copies of the Horizontal Control Report, Currents Report, Pre-verification Report, Lake temperature records, and ship's weather logs are included in the supplemental data folder.

* Copies attached

Respectfully submitted,

LeeAnne Roberts, LT, NOAA
 NOAA Ship WHITING S-329

Field Water Level Note

There were no predicted water levels applied to survey H-10147 or H-10148. Water level records were recorded in Central Standard Time (+6). Fisher Porter modified ADR gages were used at all sites.

<u>Site</u>		<u>Location</u>	<u>Period</u>
Saxon Harbor, WI	909-9048	46°34.0'N 90°26.5'W	2 July - 9 Oct
Ashland, WI	909-9050	46°34.5'N 90°54.0'W	3 July - 11 Oct
Bayfield, WI	909-9052	46°48.5'N 90°48.5'W	7 July - 11 Oct

Saxon Harbor

Gage R6604A5297M2 was installed on a pre-existing well on 2 July. The tape annotations were started in CDT (+5) and were changed to CST (+6) on 13 July. There were no interruptions in data. The gage zero was 10.01 ft above staff zero, which was at 590.825 ft above IGLD (1955) on 2 July 84. The staff was installed 2 July 84 and removed 8 Oct 84. Level run comparison showed movement of -.001ft. A gage/staff comparison was performed on 8 Oct wherein a staff reading was taken to compare with each punched value every six minutes for an hour. The stilling well was left in place.

Ashland

Gage R6511A632M14 was installed on a pre-existing well on 3 July 84. Data were annotated in CDT (+5) until 9 July and then in CST (+6). There were no interruptions in data. The only problems in operation were several 12-minute "jumps" caused by damp paper and excess drive tension. No data were lost because of these jumps. The gage zero was 10.00 ft above the staff zero. The staff zero was leveled at 598.234 ft above IGLD (1955) on 6 July. The staff was installed on 3 July and left in place after leveling on 11 October. Comparison of level runs indicated a change of +.013 ft between 6 July and 11 October. A staff/gage comparison was made every six minutes for one hour on 12 October. The stilling well was left in place.

Bayfield

Gage SN6804A4960M18 was installed on a pre-existing well on 7 July 84. A water level staff was installed on 6 July. Data were annotated in CDT (+5) until 9 July and then in CST (+6). There were numerous 12-minute "jumps" in the data tape due to over tension in the drive spring. There should be no data lost because of this. On 22 July, the original gage failed due to an electrical

short and was replaced by gage 6602A4447M4. Data was lost from 0606 CST to 1548 CST on 22 July (1206-2148 GMT, JD 204). The second gage performed continuously until its removal on 11 October 84. The comparison recorded readings every six minutes for an hour and indicated that the gage zero was 9.99 ft above the staff zero which is 599.225 ft above IGLD. It must be noted that the staff was reportedly hit by a small boat on 10 Oct with damage to the lower mounting. This probably has effected a change in the gage staff relationship. An opening level run was performed on 11 October. There was a difference of $-.022$ ft between these runs. The staff and well were left in place.

Zoning

Water level correctors from Ashland, WI (sta 909-9050) should be applied to surveys H-10147 and H-10148 for all work performed this season. Water levels from Saxon Harbor (909-9048) and Bayfield (909-9052) do not apply to these surveys.

											<u>YEAR EST</u>	<u>SOURCE</u>	
007	1	46	40	00776	090	53	17937	250	0001	000000	MARINA 1984	1984	AMC
010	1	46	37	06183	090	55	43104	250	0008	000000	NASH 3 1984	1984	AMC
011	1	46	34	57845	090	54	53444	250	0002	000000	BODINS 1982	1982	AMC
012	1	46	35	33321	090	53	42873	250	0001	000000	REISS	1981	AMC
014	1	46	36	11214	090	52	56170	250	0001	000000	NO. 80 USE 1939	1939	ARMY
018	1	46	37	41453	090	52	13215	250	0001	000000	NO. 81 USE	NA	ARMY
029	1	46	37	41478	090	52	12914	250	0000	000000	ASHLAND BREAKWATER LIGHTHOUSE, 1939	1982	NGS
030	1	46	36	11144	090	52	56396	250	0000	000000	BOLLARD	1984	WHITING
031	1	46	37	04064	090	50	33135	250	0000	000000	ASHLAND BREAKWATER SOUTH LT ECC	1984	WHITING
035	1	46	36	10770	090	52	56203	250	0000	000000	BURNOUT	1984	WHITING

NOAA FORM 76-40
(8-74)

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

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

Replaces C&GS Form 567.

ORIGINATING ACTIVITY

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

(See reverse for responsible personnel)

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
(Field Party, Ship or Office)
NOAA Ship WHITING S-329

STATE
WI

LOCALITY
Ashland Harbor

DATE
8/18/84

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

OPR PROJECT NO.		JOB NUMBER	SURVEY NUMBER		DATUM		METHOD AND DATE OF LOCATION <i>(See instructions on reverse side)</i>		CHARTS AFFECTED
CHARTING NAME		DESCRIPTION <i>(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)</i>			POSITION		OFFICE	FIELD	
		LATITUDE		LONGITUDE					
		° / ' "	° / ' "	° / ' "	° / ' "	D.M. Meters	D.P. Meters		
Z137-WH-84			H-10147/H-10148		NAD 1902				
Spire		There are too many spires to allow identification for navigation			46-35	42 /	90-52	38 /	14974
Spire		"			46-35	37 /	90-52	57 /	14974
Spire		"			46-34	53 /	90-53	39 /	14974
Spire		Not visible from the lake			46-35	14 /	90-53	32 /	14974
NWS sig sta		Not apparent from lake No longer in use as signal station			46-35	33 /	90-53	008 /	14973 14974
Note:		Positions scaled from Chart 14974							
		MC - L 1503 (84)							

S39

NOAA FORM 76-40
(8-74)

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

ORIGINATING ACTIVITY

Replaces C&GS Form 567.

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

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

<input checked="" type="checkbox"/> TO BE CHARTED	REPORTING UNIT <i>(Field Party, Ship or Office)</i>	STATE	LOCALITY	DATE
<input type="checkbox"/> TO BE REVISED	NOAA Ship WHITING	WI	Ashland Harbor	8/18/84
<input type="checkbox"/> TO BE DELETED				

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

(See reverse for responsible personnel)

CHARTING NAME	DESCRIPTION <i>(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)</i>	DATUM				METHOD AND DATE OF LOCATION <i>(See instructions on reverse side)</i>		CHARTS AFFECTED
		POSITION		OFFICE	FIELD			
		LATITUDE	LONGITUDE					
° / ' / "	D.M. Meters	° / ' / "	D.P. Meters					
Stack	Stack at Louisiana Pacific facility, 1.4 nm ENE of Ashland City Hall	46-36	10.61	90-51	18.76		F-L-3-6 8/18/84	14974
Grain Elevator	Grain elevator building 1.2 nm SW of Ashland City Hall	46-34	44.81	90-54	27.42		F-L-3-6 8-18-84	14974
Relay Tr	Microwave relay tower 2 nm S of Ashland City Hall	46-33	36	90-52	12		F-L-3-8 8-18-84	14973
Radio Mast	Strobe lighted radio mast 3.7 nm NW of Washburn City Hall.	46-41	30.45	90-59	27.34		F-L-3-6 9-14-84	14973
F. Lt. Pvt. Maint.	Washburn City Dock Light	46-40	04.28	90-53	01.36		F-L-3-6 9-14-84	14974 14973
	nc L-1503(84)							

540



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Current Observations

Interviews with local residents and observations made by WHITING personnel indicate that there are currents present in Chequamegon Bay. Ship's personnel observed surface currents while occupying horizontal control stations on both ends of the Ashland breakwater. The owner of the local dive shop, the Self-Propelled Shop (715-373-2990), and ship's divers have observed sub-surface currents running along the breakwater. Mr. Jack Wroblewski of Washburn Marine (715-373-2838), stated that there is a surface current along the bay front at the Washburn City Dock.

In the paper "Summer Thermal Structure and Circulation of Chequamegon Bay, Lake Superior - A Fluctuating System", the authors state that the current system found within the bay is a combination of directly wind-driven currents and horizontal seiche currents superimposed on the wind driven currents. Seiches with periods of 60 and 140 minutes were observed to generally show the greatest vertical displacement. The horizontal currents generated by the seiches vary sinusoidally and reverse every half period. Both ship's personnel and Mr. Wroblewski have observed the current reversal occurring approximately every half hour.

No quantitative measurements of magnitude or direction were attempted by the ship, nor would they be possible to predict. Observation indicates that the currents are weak and do not normally need to be considered by the mariner. The paper cited earlier indicates that currents with a magnitude greater than 0.6 knots (30 cm/sec) rarely occurred during the study. No noticeable set due to currents was noticed by conning officers of the WHITING while docking or undocking at either the SOO Line Ore Dock or Washburn Marina. If there was an effect, it was so slight that any wind would override the effect of the current. Additionally, ship's personnel have not observed any surface current while conducting operations at the end of the Soo Line Ore Dock or the C. Reiss Coal Pier.

Because of the small magnitude of these currents, minimal commercial traffic, and the complex nature of the currents; it is recommended that the Coast Pilot is not amended to make note of these currents.

The paper cited is:

Summer Thermal Structure and Circulation of Chequamegon Bay, Lake Superior - A Fluctuating System, R. A. Ragotzkie, W. F. Ahrnsbrak, and A. Synowiec, Proc. 12th Conf. Great Lakes Res. 1969: 686-704. Internat. Assoc. Great Lakes Res.



Copy to N/401A
7/87 RWD



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
NOAA Ship WHITING
439 West York Street
Norfolk, VA 23510

September 4, 1984

TO: N/CG243 -- George H. Mastrogianis

THROUGH: N/MOA2x1 -- Loyal Bouchard

FROM: *Donald K. Siloff*
Commanding Officer
NOAA Ship WHITING

SUBJECT: User Evaluation

A user evaluation investigation was conducted in the Chequamegon Bay area by Ship WHITING personnel on 5 August and 21 August 1984. Employees and customers at the Apostle Island Marina, Bayfield; Port Superior Marina, Bayfield; Washburn Marina, Washburn; and Bodins Marina, Ashland; were interviewed regarding the adequacy of NOAA charts. As specified in the project instructions, questions pertaining to chart layout, scale, format and color were entertained, as well as questions on availability of NOAA charts.

The major requests of area chart users were to have Loran C overprint on Chart 14973 (Apostle Islands) and Chart 14976 (Isle Royale). Users also expressed their desires for a chart of the Apostle region with a scale in between that of 14973 (1:60,000) and 14966 (1:120,000). The proposal for a 1:100,000 edition of 14973 was described in Section 1.7 of the project instructions and may fulfill the users' needs. Many also mentioned the large size of Chart 14973, indicating they would prefer a smaller, more manageable version.

The major complaint of chart suppliers was the lack of availability. Those interviewed explained that orders took up to two months to receive and, if charts were sold out, it could be the following boating season before more could be obtained.

Those interviewed had no comments on either chart format or color.





DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231-1027

225
F00

IN REPLY REFER TO

13 SEP 1984

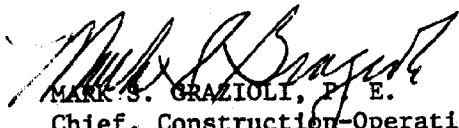
Construction-Operations Division
Operations and Maintenance Branch

Commanding Officer
NOAA Ship WHITING S-329
P. O. Box 777
Ashland, Wisconsin 54806

1. I am writing in response to your letter of 9 August 1984 requesting information about Ashland Harbor, Wisconsin.
2. The last use of the open water dumping grounds at Ashland was completed by the U. S. Hopper Dredge HAINS, which deposited 244,000 cubic yards of dredged material in 1959.
3. Wisconsin Statute 30 titled "Navigable Waters, Harbors and Navigation" regulates dredged material dumping in navigable waters. This statute is implemented by the Wisconsin Department of Natural Resources in their regulations Chapter NR 347 "Regulation of Dredging Projects".
4. I have inclosed a copy of the documents for your information.
5. In reference to the submerged cable it was previously used by the U. S. Coast Guard to power the navigation lights on each end of the breakwall. The power cable is now abandoned and the lights are presently battery powered. The most likely location is as shown on NOAA Chart 14974. The Ninth Coast Guard District Headquarters in Cleveland may have more exact information.
6. If you have any further questions please call Mr. Donald L. Billmaier, Chief, Operations and Maintenance Branch at (313) 226-6796.

FOR THE COMMANDER:

Incl
as


MARK S. GRAZIOLI, P. E.
Chief, Construction-Operations
Division

RECEIVED

SEP 19 1984

NOAA SHIP WHITING



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Ocean Service
Pacific Marine Center
Nautical Chart Branch
7600 Sand Point Way NE
Seattle, Washington 98115-0070

February 4, 1986 N/MOP21/TWR

TO: N/CG24 - Roy Matsushige

FROM: N/MOP21 
Thomas W. Richards

SUBJECT: Oversized Hydrographic Survey Smooth Sheet

In order to complete cartographic processing on surveys H-10147 and H-10148 it will be necessary to plot the data onto oversized smooth sheets.

The limits of the hydrographic data are as follows:

	Length (cm)	Width (cm)
H-10147	132	85
H-10148	143	72

Allowing 14 cm additional length and width for margins the minimum required sheet size is as follows:

H-10147	146	99
H-10148	157	86

However, because of the physical limitations of the PMC Xynetics, plotter data cannot be plotted beyond 139 cm. This requires that the data for H-10148 be skewed 353 degrees. The effect of this on the sheet dimensions is as follows:

H-10147 (unskewed)		
Data limits	132	85
Sheet limits	139	99
H-10148 (skewed)		
Data limits	139	86
Sheet limits	153	100

The resulting dimensions of both survey smooth sheets exceed those specified in section 1.2.4 of the Hydrographic Manual. While the limits of H-10147 are acceptable as maximum sheet size the data limits of H-10148 exceed maximum specifications by one centimeter. It is proposed that the requirement for a 7-cm margin be relaxed to permit plotting these data. In both cases it is requested that approval be granted for plotting the data onto oversized sheets.



Should this proposal for overwidth sheets be unacceptable it will become necessary to return the surveys to AMC where a larger Xynetics plotter would be capable of handling the excessive length of H-10148. Since these surveys are junctional and the data is inter-related on the paper data tapes H-10147 would also have to be returned.

cc: N/MOP211



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

N/CG24x1:DEW

FEB 24 1986

TO: N/MOP21 - Thomas W. Richards *TWR*
FROM: N/CG24 - Roy K. Matsushige *Roy K. Matsushige*
SUBJECT: Oversized Hydrographic Survey Smooth Sheets
REF: N/MOP21/TWR Memorandum, February 4, 1986

Your request to process oversized smooth sheets for hydrographic surveys H-10147 and H-10148, as described in the referenced memorandum, is approved.

CC:
N/MOA23 - MacFarland w/copy of reference





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Pacific Marine Center
7600 Sand Point Way NE, BIN C15700
Seattle, Washington 98133-0070

N/MOP211/KS

TO: N/MOP - Robert L. Sandquist *RS*
FROM: N/MOP21 - David W. Yeager *David W. Yeager*
SUBJECT: Preprocessing Examination for H-10148

I. SURVEY INFORMATION

A. Field No. WH-10-1-84 Registry No. H-10148

B. State Wisconsin

General Locality Lake Superior

Sublocality Chequamegon Bay

C. Project Instructions: OPR-Z137-WH-84

Original dated April 23, 1984

Change No. 1 dated May 7, 1984

Change No. 2 dated July 25, 1984

D. Date:

Field Work Commenced July 25, 1984

Field Work Completed October 11, 1984

plus 6 weeks = November 22, 1984

Data Received at Atlantic Marine Center December 7, 1984

Data Received at Pacific Marine Center March 27, 1985

plus 1 month = April 27, 1985

Examination critique transmitted to field _____

Target for completion of Marine Center processing _____ *

* Date to be assigned when survey is returned from the WHITING.



II. PREPROCESSING EXAMINATION CRITIQUE

Hydrographic survey H-10148 was accomplished by the personnel of NOAA Ship WHITING, Cdr. D. L. Suloff commanding. The following personnel supervised portions of the data acquisition: Lt. Minkel, Lt. Roberts, Ens. Hodges and Ens. Miller.

A. Danger to Navigation Report

No dangers to navigation were reported by the WHITING. No dangers were identified during preprocessing.

B. Compliance with Instructions

AWOIS items were adequately investigated; however, the hydrographer's recommendations should reflect NOAA's conservative aspect of charting; i.e., rather than deleting a submerged crib in a marshy area when a complete investigation is not accomplished, the recommendation would probably be better to continue charting as a submerged crib.

C. Final Field Sheet

The final field sheet exceeds the allowable limits of hydrography. The hydrography covers an area 77 x 147 cm. Standard limits are 76 x 122 cm. Upon request, the limits can be increased to 76 x 137 cm. See the Hydrographic Manual, section 1.2.4 for requirements.

Least depths were not transferred to the main field sheet as directed in the AMC OORDER 76 II.

Depth curves were initially inked in black, then gone over with color, thereby making it difficult to readily discern depth curve values.

D. Descriptive Report

The title sheet entry "Surveyed by" should list by name those people who were actually in charge during survey operations (see Hydrographic Manual 5.3.2).

All control stations were listed as triangulation. No data was submitted with hydro record to resolve the following discrepancies:

1. NO. 81 USE has N/A for the year established. Is this triangulation?
2. What established control was used for the basis of new control?

It would appear that these stations do not fit the 250 carto code.

F. Sounding Volumes and/or Raw Data Printouts

Data for AWOIS items 03350, 03352, and 03353 as well as positions 6029, 6030, 9613-9650, and 4849 are found in volume 7/8. They should have been copied and submitted with H-10147.

G. Sounding Correctors

The hydrographer stated there were no consistent or significant velocity correctors. Upon review of the direct comparison sheets, it appears there are correctors applicable to most data. That problem will be addressed in a separate memo, Condition of Surveys H-10147 and H-10148.

K. Automated Data Check

There were no tapes included for bottom sample data.

N. Survey Acceptance

The preprocessing examination of H-10148 was conducted under the time constraints of Hydrographic Survey Guideline No. 15. All comments contained herein are based on a spot check of the data, and it is possible that some problem areas have not been addressed.

Based on the data examined, it is recommended that this Chequamegon Bay survey not be accepted for Nautical Chart Branch processing until completion of additional field processing. (See memo, Condition of Surveys H-10147 and H-10148.)

Prepared by:



Karol Scott



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Pacific Marine Center
Nautical Chart Branch

June 18, 1985

N/MOP21x2/MRK

TO: N/MOP - Robert L. Sandquist *RLS*

FROM: N/MOP21 - David W. Yeager *David W. Yeager*

SUBJECT: Condition of Surveys H-10147 and H-10148

During the preprocessing examination of surveys H-10147 and H-10148, two items were noted which required thorough review. Seventeen hours were spent investigating the following concerns:

1. Separation of Data Between Surveys

Data were not separated adequately by survey. The following specifics were noted:

The majority of bottom samples for both surveys were contained with H-10147 data. The paper tapes had been punched without regard to survey; however, the raw data tapes had been separated and the Abstract of Positions prepared correctly. Some bottom samples rejected in the raw data records still appear on the paper tapes.

Three AWOIS investigations falling within H-10147 limits were forwarded with H-10148 data. One AWOIS investigation for H-10148 was forwarded with H-10147 data.

One line of shoreline hydrography and two detached positions were mistakenly included with H-10147.

2. Velocity Corrections

Velocity corrections were not applied to either survey. The following statements were included in both Descriptive Reports.

"Numerous bar checks and leadline comparisons indicated no consistent or significant velocity correctors. Any corrections observed on a particular day were well within the variation attributable to changes in gain."

To verify the ship's findings, samples of nine days of bar check data from H-10147 and ten days from H-10148 were reviewed. Total corrections for velocity variations and residual instrument errors were determined following the method in the Hydrographic Manual, section 4.9.5.1.3, using the measured value of 1.5 ft as the actual draft. The results can be seen on Attachments A and B.



Table 4-4 of the Hydrographic Manual states that corrections should be applied to the nearest 0.2 ft in 0 - 20 ft of water over regular bottom. Comparing the bar check results to this criteria shows the corrections for velocity variations and instrument error to be in excess of 0.2 ft in many cases.

It is difficult to address the statements made in the Descriptive Reports that any corrections observed on a particular day were well within the variation attributable to changes in gain. This comment can be interpreted two ways:

1. The statement could be interpreted to mean that velocity corrections are of a smaller magnitude than "gain error". In this case, the statement is not an acceptable argument supporting non-application of velocity corrections. Errors are additive and any that can be determined and meet the criteria set in Table 4-4 should be applied.
2. The second interpretation is that any difference in depth readings during bar checks normally attributed to sound velocity effects in the water column is actually due to changes depending on gain setting. If this is a true statement, and given that the errors exceed 0.2 ft, bar check data obtained using the DSF-6000N echo sounder should not be used to determine velocity corrections unless corrected for gain as the accuracy requirements for applying corrections found in Table 4-4 of the Hydrographic Manual are not met for these surveys.

Bar check data were graphed, grouping successive days, with averages plotted in orange (Attachments C through F). Not knowing the gain setting during bar checks makes it impossible to accurately discuss its effects. Assuming the same gain setting was used throughout an entire bar check as it appears from the raw data records (unless the system was on "auto"), certain conclusions can be drawn. If for a specific gain setting there is a constant error, then another factor is involved on JD207-208 (Attachment C), namely velocity, since the error is not constant at the different bar depths. In this case, velocity tables would be required. If gain setting accounts for the total error found during bar checks, then the error is not constant and would be very difficult, if not impossible, to determine.

Using the curves determined from the average groupings of bar check data, velocity does not appear to be a factor for the days shown on Attachments D and E. However, all data is shifted 0.2 to 0.4 ft. This shift could be due to instrument error caused by incorrect electronic calibration and/or "gain error". If it is due to incorrect electronic calibration, then this error should have been corrected via the TRA field of the TC/TI tape. If the error is due to gain setting, then, because of the significant size of the error, recommendations should have been offered in the Descriptive Reports as to determination, application, and affect of these errors.

It would have been extremely useful if the hydrographer had performed a velocity cast of some type, especially on days that large variation was found during bar checks. "Gain error" then would not have been a factor. When there is a potential problem with equipment the initiative should be taken to identify and quantify the problem.

RECOMMENDATIONS:

I recommend that H-10147 and H-10148 not be accepted for marine center processing pending additional field processing. If the theory can be supported with data that the bar check differences are attributable to changes in gain, this data should be forwarded and fully documented. All questions raised in this memo concerning survey accuracy requirements and gain error determination should be addressed in the Descriptive Reports.

If it cannot be shown sufficiently that the bar check results are due totally to gain settings instead of instrument error (other than gain problems) or sound velocity differences in the water column, velocity tables must be prepared where necessary and TRA values must be revised for instrument error. The hydrographer should re-abstract all bar check and leadline comparison data using the measured draft of 1.5 ft for the launches rather than the previously used 1.7 ft. The results should be analyzed. The data should be submitted to PMC as a part of the surveys, not as a separate addendum. The Descriptive Reports should be revised to show the above changes. All required information concerning the velocity tables should be inserted in the appendix and paper tapes of velocity tables cut. New TC/TI tables and tapes must be made. To facilitate the merging of the new TC/TI tapes into the already computer spooled surveys, the TC/TI tapes must be submitted in PMC format (Attachment G). The TRA correction field must contain the sum of the draft, instrument error, initial, and settlement and squat corrections. PMC software will ignore all TRA values on the corrector tapes and will use the value on the TC/TI tape as the final TRA correction.

The problems addressed under section 1, Separation of Data Between Surveys, will be corrected during office processing. Although the data identification, computer file manipulation, and raw data transfers will be time-consuming, it is felt that it would be considerably more difficult for the hydrographer to accomplish this task.

Prepared by:

Maureen R. Kenny

Maureen R. Kenny

Attachments (7)

ATTACHMENT A

"Velocity and Instrument" Corrections for H-10147

BAR DEPTH	JD235		JD236	
	AM	PM		
5	0.2	0.2	0.1	
10	0.3	0.1	0.3	
15	0.2	-0.1	0.1	
20	0.3	-0.1	0.1	
25	0.2	0.1	-0.1	

	JD243		JD244	
	AM	PM	AM	PM
5	0.3		0.4	0.4
10	0.5		0.3	0.3
15	0.7		0.5	0.3
20	0.5		0.5	0.5
25			0.4	0.4

	JD248	
	AM	PM
5	0.3	0.3
10	0.7	0.4
15	0.5	0.2
20	0.7	0.4
25	0.6	0.4

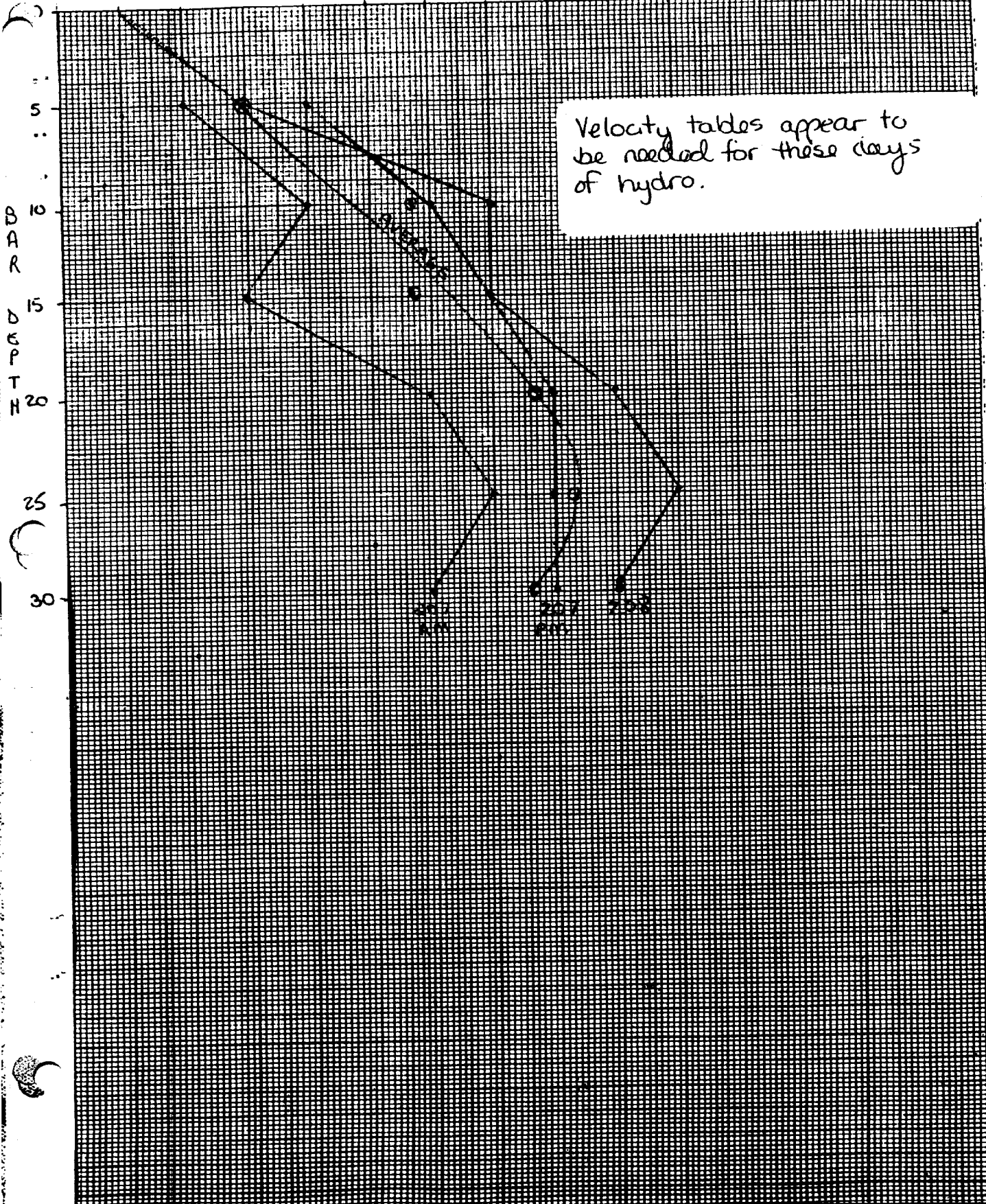
	JD249		JD250		JD251	JD252	
	AM	PM	AM	PM		AM	PM
5	0.2	0.1	0.2	0.3	0.2	0.2	0.3
10	0.2	0.1	0.2	0.2	0.2	0.2	0.2
15	0.3	0.2	0.2	0.3	0.2	0.2	0.2
20	0.3	0.2	0.2	0.2	0.2	0.2	0.3
25	0.3	0.2	0.2	0.4	0.2	0.2	

MILWAUKEE

JD 207-208

VELOCITY + INSTRUMENT ERROR

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9



ATTACHMENT D

Instrument Error
gain or calibration

JD 243-244

VELOCITY + INSTRUMENT ERROR

0 0.1 0.2 0.3 0.4

0.5 0.6 0.7

DEPTH DIVIDED

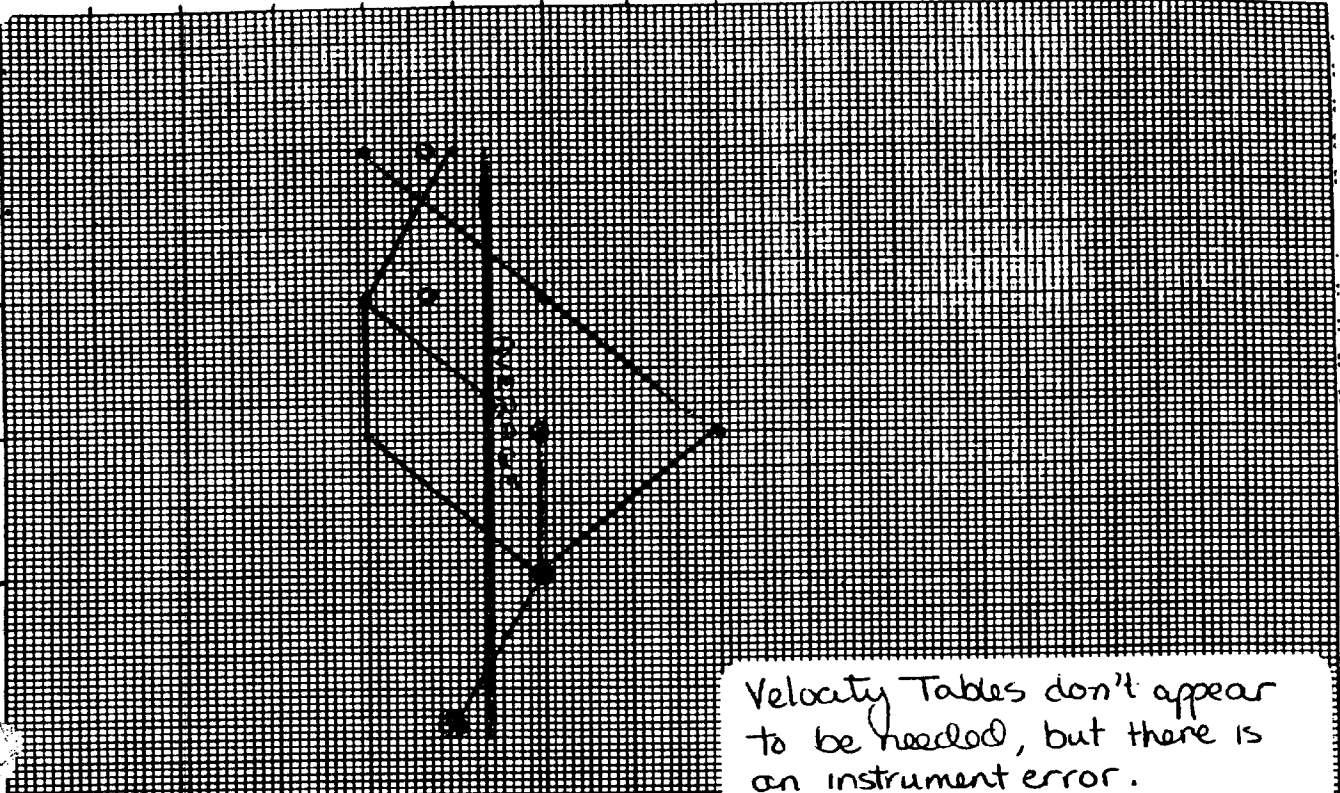
5

10

15

20

25



Velocity Tables don't appear to be needed, but there is an instrument error.

JD 214-215

0 0.1 0.2 0.3 0.4 0.5

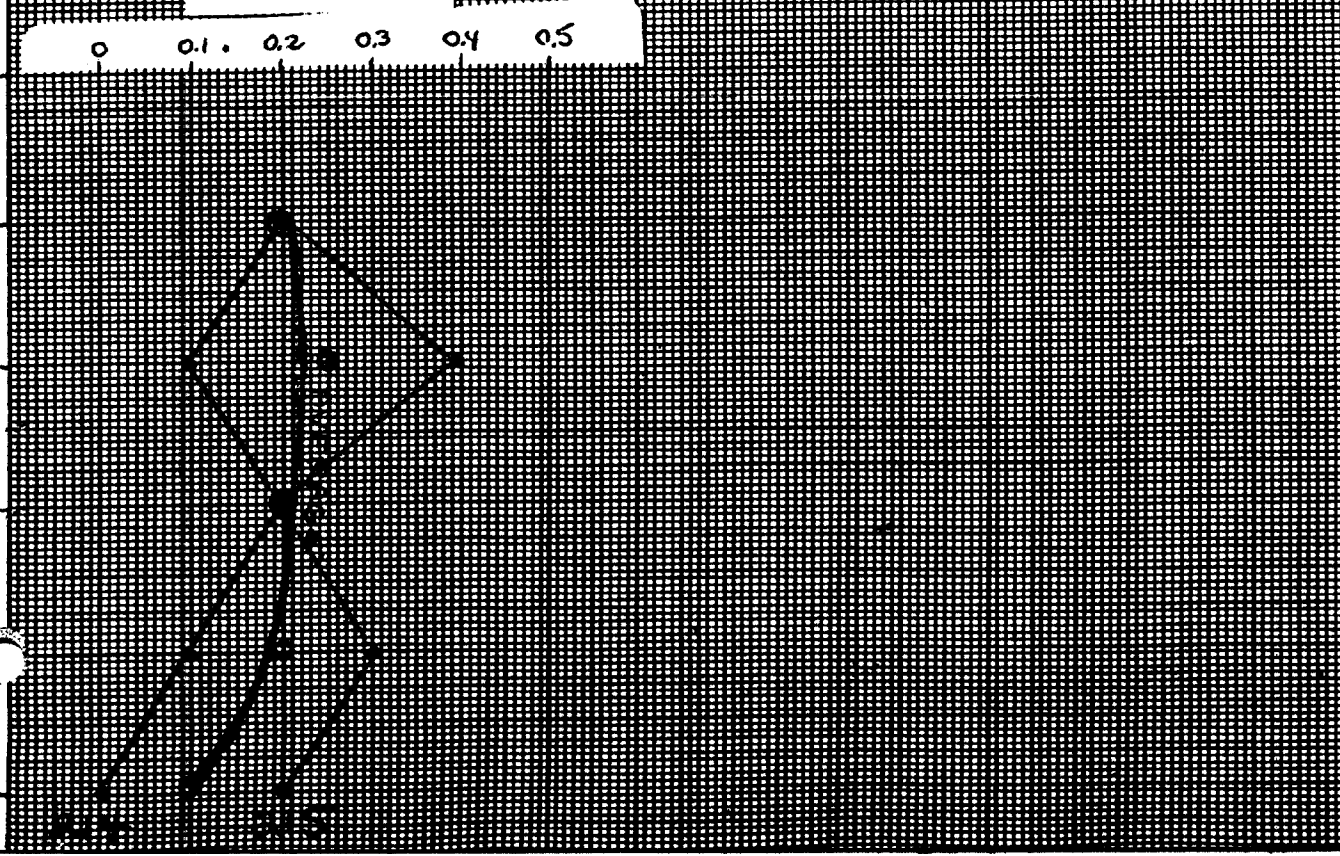
5

10

15

20

25



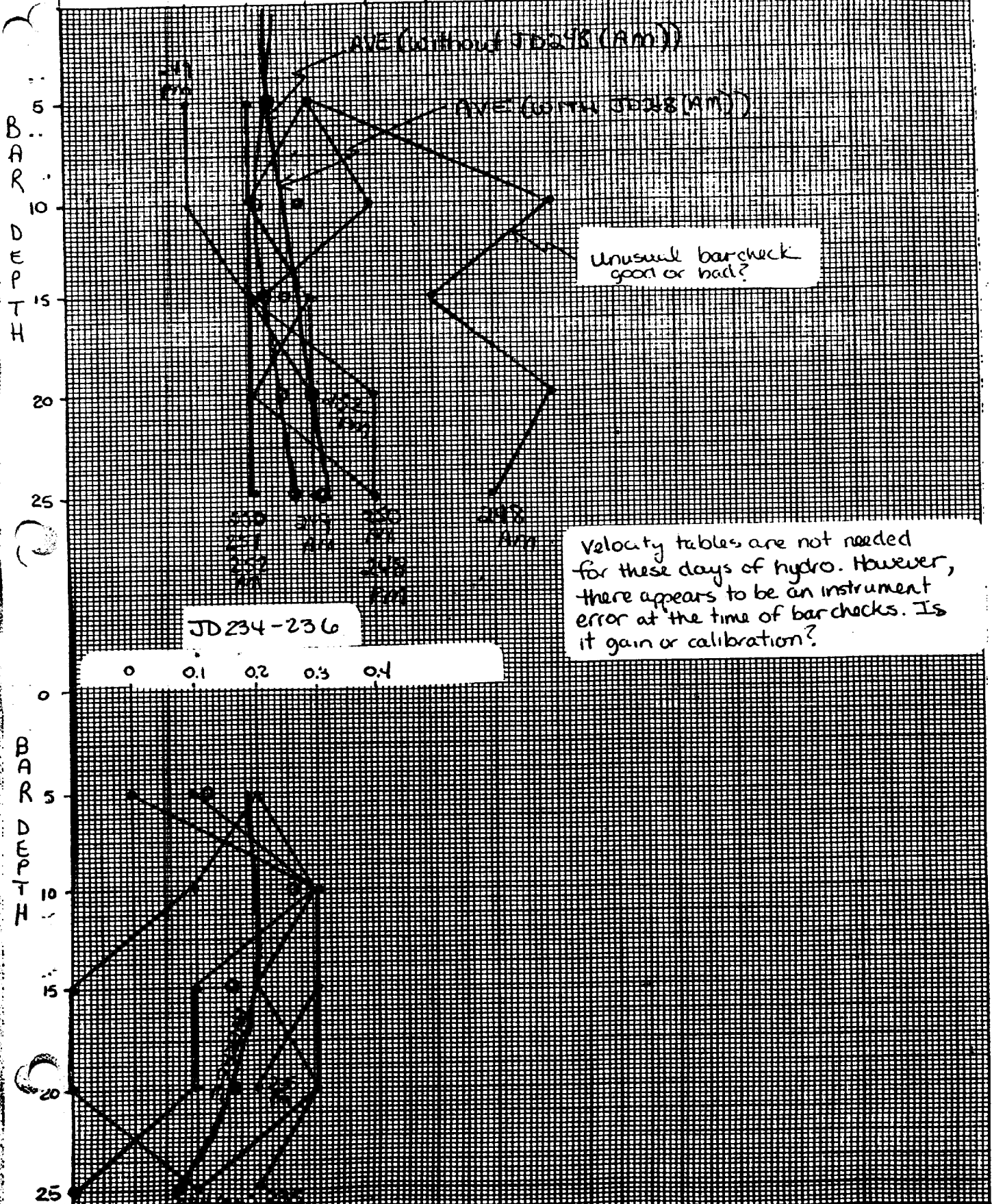
Instrument error?
gain or calibration

HIHCHHINI E

JD 248-252

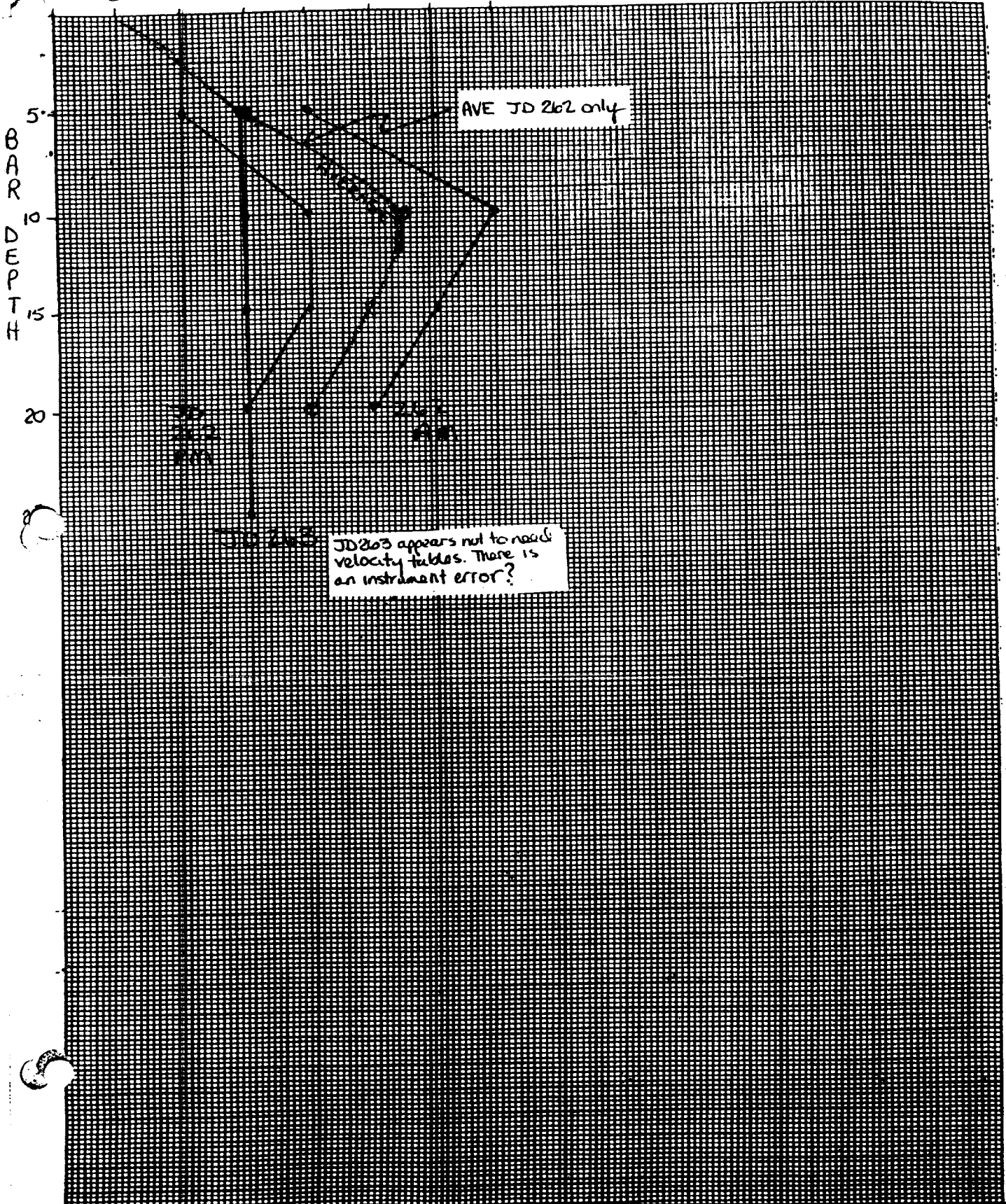
0 0.1 0.2 0.3 0.4 0.5 0.6

VELOCITY + INSTRUMENT ERROR



ATTACHMENT F C

JD 262-263
VELOCITY + INSTRUMENT ERROR
0 0.1 0.2 0.3 0.4 0.5 0.6



JD 263 appears not to need velocity tables. There is an instrument error?

ATTACHMENT G

TRA CORRECTION/VELOCITY TABLE INDICATOR (TC/TI) TAPE FORMAT

EXAMPLE:

103845 0 0003 0001 150 202300 000000
122401 0 0004
144206 0 0000 0000 151 000000 000000

103845 = Time in hours, minutes and seconds

0 = Not used, Log 0

- 0003 = TRA Correction (sum of draft, instrument error, initial, and settlement and squat corrections); signed, always recorded to the nearest tenth and in the same units as logged soundings. PMC software ignores the TRA value on the corrector tape (i.e., considers it equal to 0.0) and uses the value on the TC/TI tape as the final TRA correction.

First Digit = 0, Correction Positive

First Digit = 1, Correction Negative

0001 = Velocity Table Number, 01 to 99. (Table 1 = 0001). If no table applies (leadline, pole sounding), Log 0000.

150 = Day of the Year

202300 = Vessel Identifier. Required on the first record, optional thereafter. Last two columns not used, Log 00.

000000 = Not used, Log 000000..

This tape applies plus or minus TRA corrections and indicates the applicable velocity correction table. A long word is logged at the beginning of the initial day or whenever the TRA correction changes on a subsequent day and/or whenever the velocity table changes. A short word is only logged to change the TRA correction within the same day. The last record on the TC/TI tape must be greater in time than the last record on the master tape.

The TRA correction and velocity table number are applied from the indicated time up to but not including the next applicable tabulated time of change.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Pacific Marine Center
1801 Fairview Ave. East
Seattle WA 98102-3767

DATA
XO
2

June 21, 1985

N/MOP21:DWY

TO: N/MOA - Wesley V. Hull
Robert L. Sandquist
FROM: N/MOP - Robert L. Sandquist
SUBJECT: Pre-Processing Examination and Condition of
Surveys H-10147 and H-10148

The preprocessing examinations for the subject surveys have been completed. The results of these examinations indicate that additional field processing and/or information will be required in order to complete verification for these surveys. Specifically, the determination and tabulation of correctors for sound speed variation and/or instrument (gain?) error requires additional field processing.

Accordingly, it is our opinion that these surveys should be returned to the field unit for the necessary additional work.

It should be recognized that the type of problem noted is neither unique to one field unit, nor is it of large magnitude. Further, the surveys are themselves particularly complex and detailed. It is also understood that the field units conducting such surveys are under considerable pressure to meet schedules for data submission. Therefore, the concerns noted may be mitigated somewhat by these factors. It is not inherent in the critique/acceptance process to pass judgement on the overall quality of the survey, but rather to identify those areas of concern which may impact processing completion, or require additional explanation. I believe that these two surveys fit this category and that they do not possess systematic deficiencies of the magnitude which would require rejection.

It is noted that the WHITING will not require all survey records to complete this task, however, with your concurrence the complete package will be forwarded to the vessel under separate cover to keep all the records together. Please furnish the WHITING copies of the attachments to this memorandum for their use in completing the required processing.

Attachments (3)



JUN 25 1985

Supplemental Review and Discussion
of Hydrographic Surveys H-10147 and H-10148
(Resubmitted to PMC Nautical Chart Branch on November 20, 1985)

I. Discussion:

Bar checks were intended to provide velocity corrections for the surveys. Because of manual manipulation of the gain on the DSF 6000 echo sounder during the acquisition of bar checks, the corrections varied to the point that the bar check data could not be used for velocity corrections.

The hydrographer obtained temperature data from the Lake Superior District Power Company in Ashland, Wisconsin. These data were acquired from a water intake temperature gage at a depth of approximately 7 feet, about 100 yards offshore from the facility. Attachment A shows the approximate location of the facility in respect to areas surveyed. Using the single-point temperature observations the hydrographer determined velocity corrections for both of the surveys. This procedure can be acceptable only if there is no significant variation in temperature with depth or horizontal position.

Examination of the temperature data reveals significant fluctuations with time (attachment B). Based on information given in the Descriptive Reports and conversations with scientists at the Great Lakes Environmental Research Laboratory (GLERL) in Ann Arbor, Michigan, strong upwellings of cold water can occur in the survey area when winds from the south or southwest push the surface water away from shore. The scientists from GLERL also indicate that using a single-point temperature observation from the southern limit of the bay for velocity corrections can cause significant error in computing depths. David Schwab of GLERL indicates that a worst-case scenario is possible when using the single-point data to correct soundings for the entire survey area, i.e., while minimum temperatures are being recorded at the intake, maximum temperatures may exist at the northern limits of the survey area and vice versa.

Based on the temperature data, there appear to have been five periods of significant upwelling during July-October 1985. The most dramatic temperature change occurred during the August 20-29 period when the temperature dropped more than 10 degrees (Celsius) in four days and increased more than 6 degrees during the following five days. The amount of possible error from a 10-degree worst-case scenario can be computed using attachment C.

The hydrographer feels the surveys should be accepted and processed using the single-point temperature readings from velocity corrections, but there are two questions raised by the justification presented in the Descriptive Reports. First, the theory of instantaneous temperature change for the entire bay was substantiated only by the opinion of nonscientific interests such as local recreational divers. Scientists contacted by the Nautical Chart Branch indicate that with the magnitude and rate of

temperature change recorded at the intake, there will be significant horizontal and vertical temperature gradients throughout the survey area. Second, the examination of junction soundings between vessels is a crude method for verifying velocity corrections. At the 35-foot depth level, attachment C shows the maximum difference between velocity tables to be 1.0 feet. This indicates that differences in soundings caused by incorrect velocity determination may not always be evident when examining junction soundings. This method also does not account for the possibility that the velocity determinations for both vessels may be incorrect. It is possible that sounding junctions are in close agreement, but the velocity corrections may still be incorrect.

The inherent non-conforming depth correction data potentially compromises the quality of all soundings on the two surveys. As a result it will not be possible to process the field data into standard cartographic and digital products which meet Charting and Geodetic Services specifications.

II. Recommendations:

As an alternative to a complete rejection of the survey data thereby eliminating it as a revision source for nautical charts it is proposed that the data be subjected to limited processing.

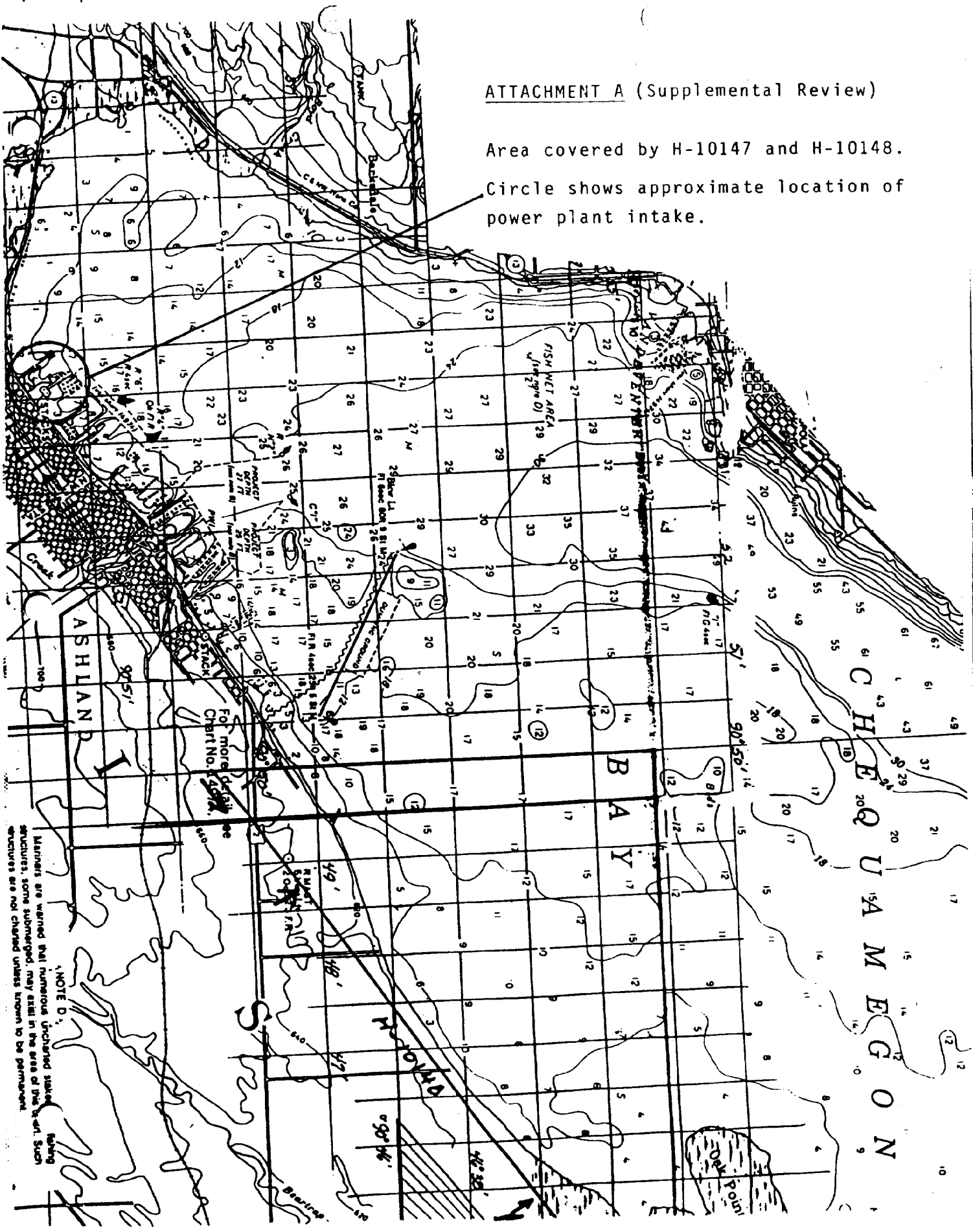
Such processing would involve the following steps: 1) horizontal position information would be utilized to locate new features or verify existing ones 2) soundings would be reduced utilizing best available information but qualified as not conforming to specifications for a basic hydrographic survey 3) appropriate digital data would be plotted on a new map at the scale of the original survey 4) the processed and plotted data would then be evaluated for use in revising appropriate nautical charts and the results would be compiled into an Evaluation Report. In order to properly identify the surveys as other than basic, the H-registry numbers should be rescinded and replaced by appropriate D-registry numbers.

This limited processing would serve to ensure that much good quality information is made available for chart revision purposes and would also assist the nautical chart compiler by identifying specific data which did not conform to C&GS specifications.

ATTACHMENT A (Supplemental Review)

Area covered by H-10147 and H-10148.

Circle shows approximate location of power plant intake.



NOTE D:
Manners are warned that numerous uncharted stakes, markers, and structures, some submerged, may exist in the area of the chart. Such structures are not charted unless known to be permanent.

For more details see
Chart No. 1550A

ATTACHMENT B (Supplemental Review)

Temperature data as submitted by the WHITING

LAKE TEMPS

		AUG		SEP		OCT	
2	17.1	1	14.2	1	16.9	1	11.7
3	16.1	2	16.4	4	17.5	2	11.5
4	17.8	3	18.3	5	17.7	3	12.5
5	17.9	4	19.3	6	17.4	4	12.2
6	17.3	5	19.9	7	17.8	5	12.4
9	17.8	6	21.9	8	18.3	6	12.8
10	18.7	7	23.2	10	12.2	8	12.6
11	21.1	8	22.3	11	12.2	9	12.8
12	20.9	9	23.6	12	11.6	10	13.2
13	20.4	10	22.9	13	12.7	11	12.9
14	21.9	11	22.6	14	14.1	12	13.1
16	20.7	13	21.2	15	12.8	13	14.1
17	19.7	14	22.9	17	13.8	14	13.8
18	19.6	15	24.3	18	14.9	15	13.8
19	20.6	16	23.5	19	15.8	16	13.3
20	20.2	17	23.1	20	15.6	17	11.9
21	20.8	18	22.3	21	15.1	18	8.7
22	19.4	19	23.3	22	11.4	19	11.6
23	19.6	20	23.7	24	10.6	20	9.9
24	19.9	21	18.4	25	10.7	22	9.1
25	21.3	22	16.3	26	11.2	23	8.1
26	22.1	23	13.6	27	11.7	24	8.9
27	22.1	24	17.1	28	11.1		
28	22.6	25	18.4	29	10.0		
30	20.9	27	19.1				
31	16.2	28	18.1				
		29	20				
		30	19.4				
		31	16.9				

ATTACHMENT C (Supplemental Review)

H-10147 and H-10148

VELOCITY CORRECTIONS

DEPTH	Temperature (Celsius)		
	11*	14**	24*
5	0.0	0.0	+0.2
10	0.0	0.0	+0.2
15	-0.2	0.0	+0.4
20	-0.2	0.0	+0.4
25	-0.2	0.0	+0.6
30	-0.2	0.0	+0.6
35	-0.2	0.0	+0.8
40	-0.4	0.0	+0.8
45	-0.4	0.0	+1.0

* 11 = Minimum temperature for velocity casts
24 = Maximum temperature for velocity casts

** A reading of 23.7 was recorded on Aug 20 and a reading 13.6 was recorded on Aug 23. The temperature rebounded back to 20.0 by Aug 29.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES

Great Lakes Environmental
Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

December 10, 1985

John Wilder
NOAA/Nautical Chart Branch
ATTN: MOP/21X2
7600 Sand Point Way, NE
Seattle, Washington 98115

Dear John,

In response to your telephone call regarding the thermal structure of Lake Superior, I enclose a copy of an article by E.B. Bennett on this subject. I hope it is of some help in resolving the question you had about the effect of upwelling on the calibration accuracy of hydrographic surveys near Ashland, Wisconsin. If I can be of any further assistance, please write or call.

Sincerely,

David J. Schwab

David J. Schwab
Oceanographer

cc: D. Reid

GENUIS.
THE PAPER SENT BY SCHWAB ADDS
MORE FUEL TO THE FIRE, ALTHOUGH SPECIFIC
INFO. REGARDING TO LOCAL SURVEY REGION
IS LACKING.

John





**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Ocean Service
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

December 18, 1985 N/MOP21x2/JDW

TO: N/CG2 - J. Austin Yeager
Robert L. Sandquist
FROM: N/MOP - Robert L. Sandquist
SUBJECT: Adequacy of Hydrographic Surveys H-10147 and H-10148

Hydrographic surveys H-10147, Wisconsin, Lake Superior, Ashland, and H-10148, Wisconsin, Lake Superior, Chequamegon Bay, were submitted to the Pacific Marine Center for processing during March 1985. Preprocessing examinations of the surveys revealed problems with the velocity corrections which required returning the surveys to the WHITING for additional field processing. These surveys have now been returned to PMC for further action.

However, the original concerns regarding the adequacy of corrections to echo soundings which were cited in the Preprocessing Examination Critique (attachment A) have not been resolved. Specifically, it is not possible to derive conclusive information necessary to determine corrections to echo soundings with sufficient accuracy to state that the sounding data meets C&GS specifications for a basic survey. The maximum possible error introduced by such uncertainties may range to 1.4 feet in depths of 40 feet. This possible error exceeds the basic requirement for depth determination (.25 percent of the depth) and will thus preclude final certification of the data. More detailed information regarding this problem and possible alternative action is contained in attachment B.

Accordingly, it is recommended that these surveys be subjected to limited processing as described in attachment B and that the H-registry numbers be rescinded and replaced by appropriate D-registry numbers. Such action will ensure that much good quality information is made available for chart revision and data which does not meet standards is appropriately qualified.

These surveys will be retained by the Nautical Chart Branch (N/MOP21) pending your approval of the recommended course of action or alternative reply. Further information regarding this matter may be obtained from Lt. Cdr. David W. Yeager at FTS 392-6835.

Attachments

cc: N/MOP21
N/MOP211





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

RECORDED

MAR 10 1986

MAR 6 1986

N/CG24x1:DEW

PACIFIC MARINE CENTER

*LOW 3/10
MOP 21*

TO: N/MOP - Robert L. Sandquist *RLS*
FROM: N/CG2 - *J. Austin Yeager*
SUBJECT: Adequacy of Hydrographic Surveys H-10147 and H-10148
REF: N/MOP21x1/JDW Memorandum, December 18, 1985

Information provided in the referenced memorandum and in subsequent conversations among Mr. Dale E. Westbrook (N/CG24x1) of my staff and Mr. Dennis Hill and Lt. John Wilder, NOAA, of the Pacific Marine Center reveals the following:

1. Inadequate field observations were made on hydrographic surveys H-10147 and H-10148 to provide appropriate and accurate velocity corrections.
2. Additional field observations (bar checks or velocity casts) for these surveys are not available on WHITING.
3. Further attempts by Pacific Marine Center personnel to analyze and manipulate the existing velocity correction data would be extremely time consuming and would not yield definitive corrections that could be logically justified.
4. An analysis of known water temperatures in the area of these surveys at that time of the year indicates that, although the temperatures in the water column can vary significantly from day to day, most velocity corrections, if applied, would be additive (tending to make corrected depths deeper than those originally observed).

In view of the above findings, I have decided that these two surveys shall be fully processed as registered hydrographic surveys without velocity corrections applied to the observed depths. All other necessary corrections shall be applied as appropriate. As a result, the depths shown on the smooth sheets will generally be "on the safe side" (by a maximum of about 1 foot in 40-foot depths).



Because of this nonstandard action, the smooth sheets shall be conspicuously annotated as follows:

NOTE: Velocity corrections have not been applied to the depths on this survey. The echo sounder(s) used was (were) calibrated for a velocity of sound of 800 fm/sec.

Also, the Evaluation Reports for these surveys shall reiterate this statement, supplemented by the reasons why this nonstandard action was taken. The surveys shall be classified as inadequate basic surveys but usable for application to nautical charts.

I recommend that you inform the Director, Atlantic Marine Center, of the nonstandard actions required to process and utilize the results of these surveys so he can take appropriate steps to prevent reoccurrence.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Pacific Marine Center
 1801 Fairview Avenue East
 Seattle, Washington 98102-3767

FEB 23 1987 N/MOP21x2/DJH

Commander (CAN)
 Ninth Coast Guard District
 1240 East 9th Street
 Cleveland, Ohio 44199

Dear Sir:

During office review of hydrographic survey H-10148, Chequamegon Bay, Lake Superior, Wisconsin, the following change affecting charts 14973 and 14974 was noted. Questions concerning the survey may be directed to Cdr. Thomas W. Richards, Chief, Nautical Chart Branch, telephone (206) 526-6835.

The following statement is recommended for inclusion in the Local Notice to Mariners:

"Submerged debris has been detected in the area immediately north of the Ashland Breakwater. This debris is submerged at Low Water Datum and is scattered throughout an area extending at least 1500 meters off the breakwater. The center of the area containing the highest concentration is located at latitude 46 degrees, 37 minutes, 55 seconds north longitude 90 degrees, 51 minutes, 38 seconds west (chart 14974, North American 1902 Datum); latitude 46 degrees, 37 minutes, 54 seconds north, longitude 90 degrees 51 minutes, 39 seconds west (chart 14973, North American 1927 Datum); 850 meters, bearing 61 degrees true from the Ashland Breakwater Light located on the northwest end of the breakwater. This debris has not been determined to be a hazard to surface navigation; however, mariners are cautioned against anchoring in this area".

Sincerely,

Original Signed By

Robert L. Sandquist
 Rear Admiral, NOAA
 Director, Pacific Marine Center

bc:N/CG222

FILE COPY


CODE	SURNAME	DATE	CODE	SURNAME	DATE
N/MOP21	Richards <i>TRW</i>	4/20	N/MOP	Sandquist <i>RS</i>	4/23
N/MOP2	Mordock <i>MM</i>	4/23			
N/MOPx1	Petersen <i>P</i>	2/23			

APPROVAL SHEET

This basic hydrographic survey was conducted in accordance with the Project Instructions, as supplemented by Changes 1, 2, and 3, the Hydrographic Manual, the AMC OPORDERS, PMC OPORDER and the Hydrographic Survey Guidelines. During the survey period, I met daily with the Field Operations Officer and took an active part in determining day-to-day activities and in assessing the work remaining for completion. All boat sheets were examined daily. The finally transmitted sheets were reviewed in their entirety; all supporting records were spot checked.

Difficulties we experienced with velocity corrections are thoroughly discussed in Section D. Although the correctors applied were derived from non-standard techniques, we believe them to be accurate and adequate for application to this survey.

This survey is complete and adequate for charting purposes. All previous surveys of the common area should be considered superseded.


Donald L. Suloff, CDR, NOAA
Commanding Officer
NOAA Ship WHITING S-329

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

WATER LEVEL NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center: MOA231

Hourly heights are approved for

Water Level Station Used: Ashland, Wisconsin (909-9050)

Period: July 25, 1984 through October 10, 1984

HYDROGRAPHIC SHEET: H-10148

OPR- Z137-WH-84

Locality: Lake Superior

Plane of reference: Low Water Datum (IGLD 1955 : 600.0 Feet)

Remarks:

Zoning not required, data from other gages on Lake Superior indicates no unusual water level movement during the survey period.

for Harry A. Hipsley
Chief, Water Levels Section



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
NOAA Ship WHITING S-329
439 West York Street
Norfolk, VA 23510

September 21, 1984

TO : George H. Mastrogianis
N/CG243

THRU : Loyal Bouchard
N/MOA2x1

FROM : *Donald L. Suloff*
CDR Donald L. Suloff
Commanding Officer
NOAA Ship WHITING S-329

SUBJECT: Geographic Names

On 21 August 1984, a geographic names investigation was conducted by the NOAA Ship WHITING personnel within both Ashland and Bayfield counties. A number of places were visited, which included the Ashland County Court House, Ashland City Hall and Bayfield County Court House. The Ashland Land Description Officer, Ashland City Assessor and Bayfield County Register of Deeds were interviewed. A number of the geographic names which are found on the charts were in dispute and are listed in the following text. A list of names and addresses of those interviewed also follows.

Mr. Bill Metzinger
Land Description Officer
Ashland County Court House
Ashland, WI 54806
715/682-9775

Mrs. Vivian Hansen
Ashland City Assessor
Ashland City Hall
Ashland, WI 54806
715/682-9333

Mr. Otto Korpela
Bayfield Co. Register of Deeds
Bayfield Co. Court House
Washburn, WI
715/373-5315





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

ASHLAND COUNTY

UNDISPUTED NAMES

Bay City Creek
Burlington Northern RR.
City Dock
C.G. Bretting Inc. Mfg. Co.
Kakagon River
Lake Park
Lake Superior District Power Co.
Long Island
Oak Point
Soo Line Ore Dock
Soo Line RR.
The C. Reiss Coal Co.

NEW UNDISPUTED NAME

2nd Landing (geographic position) 46°38'00" N, 90°46'42.0" W

DISPUTED GEOGRAPHIC POSITION

Chequamegon Point (new position) 46°41'54.0" N, 90°44'36.0" W

DISPUTED NAMES

As Charted

Local Usage

American Can Co. -----	James River Corporation
Chicago & North Western Trans. Co.--	City and Soo Line Owned
City Waterworks -----	Ashland Water Utility
Clarkson Coal Co. -----	The C. Reiss Coal Co.
Commercial Dock -----	Pulp Hoist (owned by Northland College)

The American Can Company is now owned and operated by the James River Corporation. Chicago and North Western Trans. Co. Railroad is owned jointly by the City of Ashland and the Soo Line Railroad. City Waterworks is locally known as Ashland Water Utility and the Clarkson Coal Co. dock is owned by The C. Reiss Coal Co. The Commercial Dock located west of the Wastewater Treatment Plant is now owned by Northland College, Ashland, and is known locally as the Pulp Hoist.





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

BAYFIELD COUNTY

UNDISPUTED NAMES

Barksdale
Bono Creek
Boyd Creek
City Dock
Fish Creek
Houghton Point
Little Sioux River
North Fish Creek
Sioux River
South Fish Creek
Thompson Creek
Vandeventer Bay
Van Tassells Point
Whittlesey Creek
Wyman Point

NEW UNDISPUTED NAME

Mill Slips (geographic position) 46°39'42.0" N, 90°54'03.0" W

The Mill Slips is an area within Vandeventer Bay, which previously was a mill site and is now foul with ruins.

DISPUTED NAMES

As Charted

Local Usage

Chicago & North Western Trans Co. -- Abandoned
The C. Reiss Coal Co. ----- Washburn Marina

The new Washburn Marina is located at the site of The C. Reiss Coal Co. and the Chicago and North Western Trans. Co. railroad is now abandoned.

cc:
N/CG2x5- Charles E. Harrington
N/CG221- Richard H. Davis



GEOGRAPHIC NAMES

WH-10-1-84

Name on Survey	A 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997 B ON PREVIOUS SURVEY C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G GRAND McNALLY ATLAS H U.S. LIGHT LIST K									
	A	B	C	D	E	F	G	H	K	
Ashland	X									1
Barksdale	X									2
Bono Creek	X									3
Boyd Creek	X									4
Chequamegon Bay	X									5
Fish Creek	X									6
Whittlesey Creek	X									7
Wyman Point	X									8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20
										21
										22
										23
										24
										25

HYDROGRAPHIC SURVEY STATISTICS

H-10148

RECORDS ACCOMPANYING SURVEY To be completed when survey is processed

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS POS., ARC, EXCESS	9
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	8

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS SOURCE DOCUMENTS
ACCORDION FILES	4				
ENVELOPES					
VOLUMES	8				
CAHIERS					
BOXES					

SHORELINE DATA

SHORELINE MAPS (List) TP-00439, TBGS quadrangles

PHOTOBATHYMETRIC MAPS (List)

NOTES TO THE HYDROGRAPHER (List)

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List): 14973, 14974

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			3924
POSITIONS REVISED	—	—	
SOUNDINGS REVISED	—	—	
CONTROL STATIONS REVISED	—	—	

TIME-HOURS

PROCESSING ACTIVITY	VERIFICATION	EVALUATION	TOTALS
	PRE-PROCESSING EXAMINATION	—	—
VERIFICATION OF CONTROL	—	—	—
VERIFICATION OF POSITIONS	214	—	214
VERIFICATION OF SOUNDINGS	230.5	—	230.5
VERIFICATION OF JUNCTIONS	—	—	—
APPLICATION OF PHOTOBATHYMETRY	—	—	—
SHORELINE APPLICATION VERIFICATION	—	—	—
COMPILATION OF SMOOTH SHEET	70.5	—	70.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS	—	13.0	13.0
EVALUATION OF SIDE-SCAN SONAR RECORDS	—	—	—
EVALUATION OF WIRE GRABS AND SWEEPS	—	—	—
EVALUATION REPORT	—	35	35
GEOGRAPHIC NAMES	—	—	—
OTHER DIGITIZING	—	—	36
TOTALS	515	48	

USE OTHER SIDE OF FORM FOR IN MARKS

Pre-processing Examination by

K. Scott, M. Kenny, J. Wilder

Beginning Date

Ending Date

3-21-86

Verification of Field Data by

J. Stringham, T. Jones, P. Niland

Time (Hours)

Ending Date

1-13-87

Evaluation Check by

S. Otsubo, B. Olmstead, J. Green

Time (Hours)

Ending Date

2-19-87

Evaluation and Analysis by

C.R. Davies

Time (Hours)

Ending Date

1-28-87

Inspection by

D. Hill

Time (Hours)

Ending Date

2-23-87

PACIFIC MARINE CENTER
EVALUATION REPORT
H-10148

1. INTRODUCTION

H-10148 was accomplished by the NOAA Ship WHITING in accordance with the following project instructions:

OPR-Z137-WH-84, dated April 23, 1984
Change Number 1, dated May 7, 1984
Change Number 2, dated July 25, 1984
Change Number 3, dated August 23, 1984

This is a basic hydrographic survey of Chequamegon Bay, Lake Superior, Wisconsin. The survey extends from the head of the bay, excluding Ashland Harbor, north to Vandeventer Bay in the west and Oak Point in the east. The shoreline is characterized by numerous marsh and grass areas near the head of the bay and cultural features throughout the survey area. The survey extends offshore and the bottom gradually slopes to depths of 36 feet. A discontinued dumping ground is located directly northeast of the Ashland breakwater. The bottom throughout the area is composed of mud and sand.

H-10148 was originally submitted for processing in March, 1985. The preprocessing examination noted deficiencies, the most important of which were the lack of sound velocity and instrument error correctors. The survey was returned to the ship for additional field processing. This additional processing did not resolve the problem. Upon instructions from Nautical Charting Division, N/CG2, the survey was accepted for office processing despite its inherent problems. Copies of pertinent correspondence are attached to this report.

Because of the significant deviation from standard procedure the smooth sheet has been annotated with the following note:

NOTE: Velocity corrections have not been applied to the depths on this survey. The echosounders used were calibrated for a velocity of sound of 800 fm/sec.

Consequently, depths may be up to 1 foot deeper than depicted on the smooth sheet.

The survey exceeds the maximum allowable sheet size as specified in section 1.2.4 of the Hydrographic Manual. A copy of the correspondence granting approval for an oversize smooth sheet is appended.

Predicted water levels were not applied to the field sheet. Water levels used for the final reduction of soundings reflect approved heights from Ashland, Wisconsin (909-9050), based on the Low Water Datum (IGLD 1955: 600.0 feet). The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. The revised data is listed in the smooth position/sounding printout.

A digital file for this survey has been generated and includes categories of information required to comply with N/CG2 Hydrographic Survey Guideline No. 23, Completion of Digital Hydrographic Surveys, September 7, 1983. Certain descriptive information, however, may not be included in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Horizontal control and hydrographic positioning are adequately discussed in sections F and G of the hydrographer's report. Positions of horizontal control stations used during hydrography are either published or field values based on the North American Datum of 1927.

The applicable shoreline manuscript is TP-00439. This is a registered Class I map, and originates from photography dated April, 1978 and was field edited in July, 1980. The shoreline manuscript only covers the area west of longitude 90°49'49.7"W. Beyond this point the shoreline was inked in brown from USGS topographic maps and is intended to be used for orientation purposes only. The cause of the shoreline displacement problem referred to by the hydrographer was not identified. The brown shoreline on the smooth sheet has been adjusted to agree with the hydrography. There is no indication in the field records that attached cultural features e.g., piers shown on the topographic map were verified or disproven. Since there is some obvious conflict between the present survey and this map, these cultural features have not been displayed on the smooth sheet.

In addition, the rocky islet appearing on the map at latitude 46°38'45"N, longitude 90°54'53"W, bearing 21 feet at LWD, was not adequately investigated by the hydrographer. Present survey records only report a rock uncovering 4 feet at LWD. To determine if the original map compilation was correct Mr. Frank Wright, Photogrammetric Quality Control Unit, N/CG2311 was contacted. He confirmed that the compilation was accurate as published. The islet has been added to the smooth sheet directly from the shoreline map.

3. HYDROGRAPHY

Except for the areas listed in Section 7, hydrography within the limits of the sheet is adequate to:

- a. Delineate the bottom configuration, determine least depths, and to draw the standard depth curves.
- b. Reveal that there are no significant discrepancies or anomalies requiring further investigation.
- c. Show that the survey has been properly controlled and soundings are plotted correctly.

4. CONDITION OF SURVEY

The hydrographic records and reports are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change

No.3, the Hydrographic Survey Guidelines, and the AMC OPORDERS except as noted in the Preprocessing Examination Report and as follows:

a. The smooth sheet for H-10148 is oversized. The length exceeds by 14 centimeters the maximum length requirements specified in the Hydrographic Manual 1.2.4.

b. Sound velocity and instrument error correctors were not adequately determined during the course of this survey, which resulted in a degradation of sounding accuracy. Computed survey depths may be in error by at least 1 foot. Section 6.7.3. of the project instructions specifically stated that frequent determination of velocity correctors was imperative due to rapid and unpredictable changes in Great Lakes water temperatures. A detailed analysis of this deficiency is contained in N/MOP letter, Condition of Surveys H-10147 and H-10148, dated June 18, 1985 (copy attached).

In addition, instrument error correction was not applied because of the manner in which it had been determined. The hydrographer indicates that instrument error correction was derived by first accounting for the velocity component in the total set of echo sounding corrections then assuming that the difference remaining between echo sounder and bar depths during standard bar checks was the instrument error. This procedure, while generally considered valid, is in this case, invalid. Accurate sound velocity is indeterminable. Without correct sound velocity values it is not possible to determine accurate instrument errors using the hydrographer's technique. Assuming that the velocity correctors were valid it would have been necessary for the bar checks to have been conducted in the same location as the temperature observations, since a single location was used for all velocity determinations. It is not possible to make this determination. In addition, there is considerable doubt associated with the tuning status of the echo sounders used during the bar checks. It is now known that manually adjusting the gain setting causes noticeable variation in recorded depths. The hydrographer indicated that the status of the instrument was determined by interviewing the operators. This occurred months after the survey was completed. There are no written annotations on the echograms to authenticate the statement that instruments were operated in the auto tuning mode. As a result, there is considerable doubt concerning the accuracy of the instrument corrections determined by the hydrographer. The elimination of this corrector produces shallower sounding values.

c. The shoreline manuscript discrepancies discussed in Section H of the hydrographer's report were not resolved. Additional information, such as detached positions along the shoreline and representation of this information on the field sheet, would possibly provide resolution for immediate charting.

d. Several charted soundings warrant further development to verify or disprove their existence (See Section 7, Comparison with Chart). The investigation of these areas was incomplete (Hydrographic Manual, 4.5.15).

e. The location of numerous minor piers by the hydrographer was not adequately documented. There was no information provided which described the orientation to the shoreline.

5. JUNCTIONS

H-10148 junctions with H-10147 (1984) to the south. Soundings were transferred from H-10147 to justify depth curves. The junction has been adequately effected.

There are no contemporary surveys to the north, however, a comparison with charted depths reveals good agreement with the present survey.

6. COMPARISON WITH PRIOR SURVEYS

LS-895 (1901) 1:10,000

LS-442 (1869) 1:16,000

The present survey soundings compare within 1 to 4 feet of the prior soundings. This can be attributed to the relative accuracy of the data acquisition techniques, a change in the vertical datum, the absence of velocity and instrument correctors, and the natural changes throughout the area.

Depths offshore are generally similar to present depths indicating a stable bottom. Alongshore areas have changed significantly due to cultural development. Changes have affected both depths and shoreline.

A significant cultural change since LS-442 is the construction of the Ashland Breakwater. A comparison to prior depths indicates relatively little change in the area with the exception of the area on the north side of the breakwater where spoil dumping has apparently occurred.

AWOIS item 03344 submerged piles charted between latitude 46°36'07.5"N, longitude 90°56'54.0"W and latitude 46°36'19.5"N, longitude 90°56'27.0"W originating from LS-895 (1901) was verified during this survey. The review of the survey records indicates bottom drag hangs in a greater area than that referenced in the hydrographer's report. The limit line defining the area which is foul with submerged piles has been extended to include these hangs. Depths were obtained only on those features which were hung. This area should be charted as shown on the smooth sheet.

AWOIS item 03401, pier ruins at latitude 46°36'53.70"N, longitude 90°50'04.70"W (NAD 1902) was investigated on H-10147 (1984). However, the hydrographer did not investigate the offshore limit of the pier shown on LS-895; therefore, the pier as shown on LS-895 was transferred to this survey as submerged ruins.

With the transfer of the previously mentioned feature, H-10148 is adequate to supersede the prior surveys within their common areas.

7. COMPARISON WITH CHART

Chart 14974, 21st Edition, dated June 2, 1979; scale 1:15,000

Chart 14974, 22nd Edition, dated Dec. 7, 1985; scale 1:15,000

Chart 14973, 24th Edition, dated Jan. 19, 1980; scale 1:60,000

Chart 14973, 25th Edition, dated Jan. 25, 1986; scale 1:60,000

a. Hydrography - Charted information originates from the before mentioned prior surveys and miscellaneous sources. Comparison with chart 14973, 25th Edition and chart 14974, 22nd Edition was accomplished since these were the latest editions at the time of the survey processing.

Most of the changes appearing on the later editions of these charts originate with TP-00439. This Class I map was registered in 1980, prior to the date of the survey, therefore a valid comparison could be accomplished. There are, however, some scattered soundings on the 22nd edition of 14974 and the 25th Edition of 14973 for which the source was not identified. It is not appropriate to supersede these soundings unless it can be determined that they originate from a source prior to the date of this survey. These soundings appear on accompanying copies of the chart.

The following charted depths were not verified or disproven by the hydrography on this survey. These soundings should be retained as charted. The positions for these soundings on NAD 1927 are:

SOUNDING	LATITUDE NORTH	LONGITUDE WEST
12 feet	46°38'40"	90°50'21"
11 feet	46°38'00"	90°51'42"
11 feet	46°37'58.5"	90°51'35.5"

RETAINED
BAS

AWOIS items originating from miscellaneous sources are adequately discussed in section L of the hydrographer's report supplemented as follows:

AWOIS item 03343 a visible wreck, charted at latitude 46°36'14.50"N, longitude 90°56'47.80"W, on the 21st Edition of chart 14974 was investigated by the hydrographer. The wreck was located at latitude 46°36'16.26"N, longitude 90°56'48.96"W, and was described by the hydrographer as the remains of an old sailing vessel oriented in a NW-SE direction, 30 feet in length, consisting of a wooden hull sheathed with steel. This visible wreck bares 6 feet at LWD. It is recommended that the position of the charted visible wreck be revised to the above location.

APP'D

Numerous piers located by the hydrographer have been added to the smooth sheet as dashed lines. This was necessary since no information was provided to describe the orientation of the piers to the shoreline from the offshore detached positions. As a result, these piers are displayed in their approximate locations; however, the quality of the positioning is considered adequate for charting without the use of a qualifying note, e.g., position approximate.

There is no indication that the status of the Fish Net Area charted in the vicinity of latitude 46°38'45"N, longitude 90°54'00"W was investigated. It is recommended that this note be retained as charted.

NOTE located
@ 46° 39' 18" N
90° 54' 35" W

The status of the Dumping Ground charted in the vicinity of latitude 46°37'30"N, longitude 90°52'00"W, was thoroughly investigated and determined to be inactive. Attached correspondence from the Army Corps of Engineers (COE), indicates that this inactive status has been in effect since 1959.

Although dumping activity has apparently ceased, the hydrographer has determined that the bottom is littered with debris. The nature of this debris is not described; however, to inform the mariner of potential problems when anchoring in this area it is recommended that the area be retained as charted or otherwise denoted as containing hazards. The entire area containing debris has been delimited on the smooth sheet.

Revised

Geographic names appearing on the smooth sheet originate with these charts.

Except as noted, H-10148 is adequate to supersede charted hydrography within the common area.

A danger to navigation report was submitted to the Coast Guard and DMA regarding the debris littering the bottom north of the breakwater.

b. Controlling Depths - There are no channels with controlling depths within the limits of this survey.

c. Aids to Navigation - There are two fixed and two floating aids within the limits of this survey. The location and description of these charted aids to navigation have been verified. They adequately serve their intended purpose.

8. COMPLIANCE WITH INSTRUCTIONS

H-10148 adequately complies with the project instructions except where noted in section 4 of this report.

9. ADDITIONAL FIELD WORK

This is an inadequate basic survey but usable for application to nautical charts (see attached N/CG2 letter, Adequacy of Hydrographic Surveys H-10147 and H-10148, March 6, 1986). Additional field work to result in an adequate basic survey is recommended on a low priority basis.

Respectfully submitted,

Charles R. Davis

Cartographer

This survey has been examined and it partially meets Charting and Geodetic Services standards and requirements for use in nautical charting. Significant deviation from standard procedures and specifications are inherent. Users are advised to carefully review the hydrographer's report and the Evaluation Report prior to utilizing either graphic or digital data. Under these terms the survey is recommended for approval.

Dennis Hill

Dennis Hill

Chief, Hydrographic Section

ATTACHMENT TO DESCRIPTIVE REPORT FOR H-10148

I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. As noted in the Evaluation Report, this hydrographic survey deviated significantly from standard procedures and specifications. With the caveat that the survey only be used in conjunction with careful review of the hydrographer's report and the Evaluation Report, these survey data are acceptable for use in nautical charting.

Thomas W. Richards 2/24/87
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWMordock

Raymond Mordock 2/24/87

After review of the smooth sheet and accompanying reports, I hereby certify this survey is adequate and meets appropriate standards with the exceptions as noted above. The above recommendations are forwarded with my concurrence.

Robert L. Sanborn 2/24/87
Director, Pacific Marine Center (Date)

ADDENDUM TO EVALUATION REPORT FOR H-10148

The Evaluation Report, Section 2, Control and Shoreline is supplemented as follows:

In accordance with N/CG2 memorandum, dated December 12, 1986, an NAD 83 datum adjustment tick has been added to the smooth sheet, and accompanying overlays. The adjustment value was determined by N/CG121 and amounts to -0.195 seconds of latitude and +0.684 seconds of longitude for the geographic area common to this survey. Computed geographic positions contained in the survey digital file remain on NAD 27.

Frank W. Picard 4/9/87
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWWordock

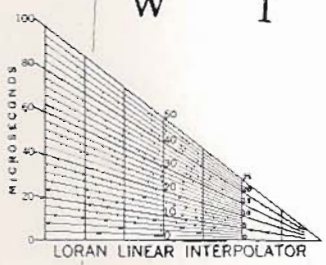
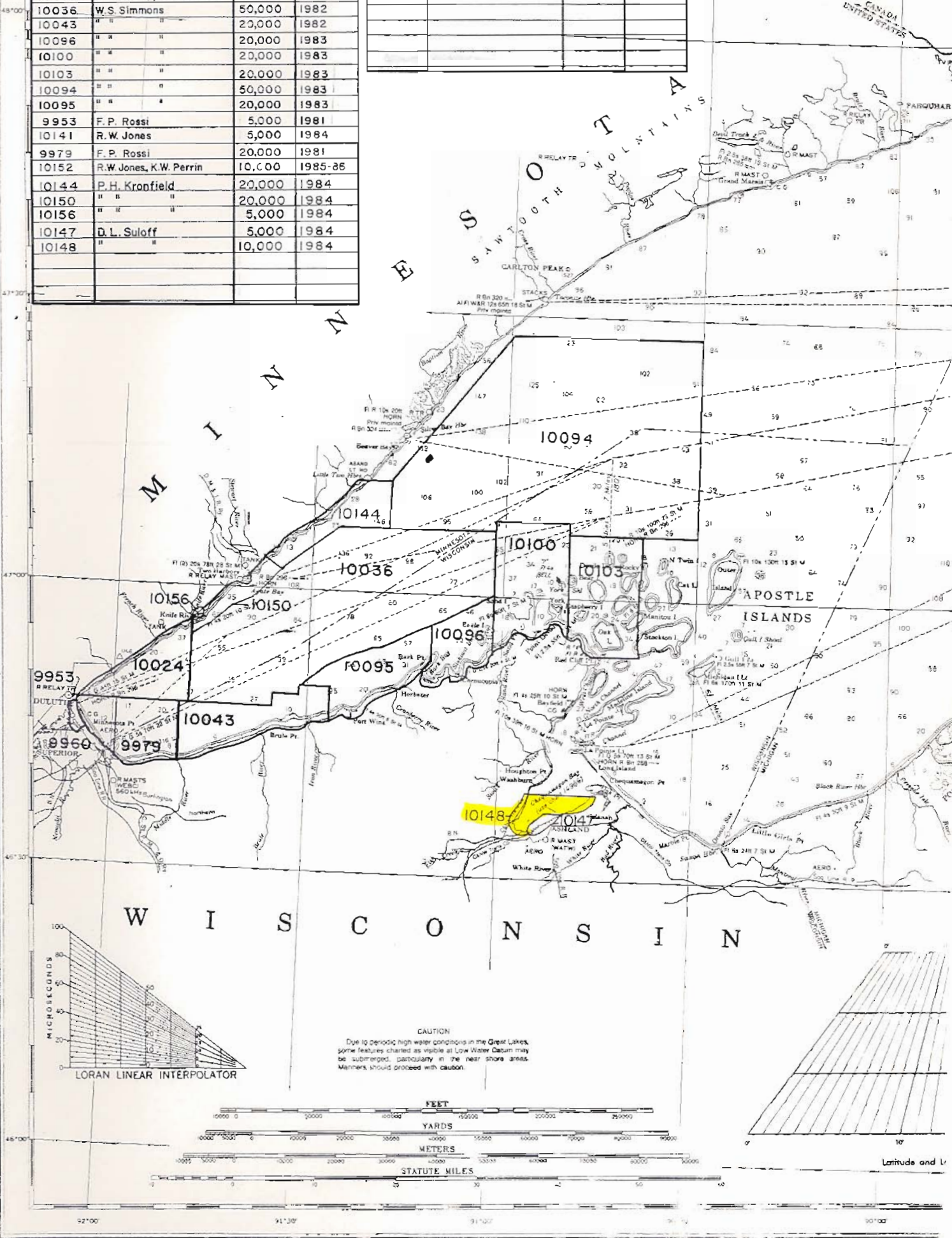
SIGNATURE AND DATE:

L. Wordock 4/10/87

Approved:

Robert P. Saundt 4-13-87
Director, Pacific Marine Center (Date)

9960	F.P. Rossi	10,000	1981
10024	D.E. Nortrup, W.S. Simmons	20,000	1982
10036	W.S. Simmons	50,000	1982
10043	" " "	20,000	1982
10096	" " "	20,000	1983
10100	" " "	20,000	1983
10103	" " "	20,000	1983
10094	" " "	50,000	1983
10095	" " "	20,000	1983
9953	F.P. Rossi	5,000	1981
10141	R.W. Jones	5,000	1984
9979	F.P. Rossi	20,000	1981
10152	R.W. Jones, K.W. Perrin	10,000	1985-86
10144	P.H. Kronfield	20,000	1984
10150	" " "	20,000	1984
10156	" " "	5,000	1984
10147	D.L. Suloff	5,000	1984
10148	" " "	10,000	1984



CAUTION
 Due to periodic high water conditions in the Great Lakes, some features charted as visible at Low Water Datum may be submerged, particularly in the near shore areas. Mariners should proceed with caution.

