

H10147

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic  
Field No. .... WH-05-01-84  
Registry No. .... H-10147

LOCALITY

State ..... Wisconsin  
General Locality ..... Lake Superior  
Sublocality ..... Ashland Harbor

19 84

CHIEF OF PARTY  
CDR D.R. Suloff

LIBRARY & ARCHIVES

DATE ..... February 9, 1987

**DIAGRAM LS-9**

***Charts***

14974

14973

14966

## HYDROGRAPHIC TITLE SHEET

H-10147

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 5-1-84

State WisconsinGeneral locality Lake SuperiorLocality Ashland HarborScale 1:5,000Date of survey July 18, 198<sup>4</sup> to Oct. 10, 1984Instructions dated April 23, 1984Project No. OPR-Z137-WH-84Vessel Launch 2931, Launch 2932, Monark 2933Chief of party CDR Donald L. SuloffSurveyed by PDW, DHM, LAR, DAH, KLMSoundings taken by echo sounder, hand lead, pole Raytheon DSF 6000N, Raytheon DE 719BGraphic record scaled by Ship PersonnelGraphic record checked by Ship PersonnelVerification by Leonardo DeodatoAutomated plot by PMC Xynetics PlotterEvaluation by Gordon E. KaySoundings in ~~fathoms~~ feet at ~~MLW~~ ~~MLLW~~ Low Water Datum (IGLD 1955:600 Feet)REMARKS: Comments in black are made by the evaluator. Separates have been removed and filed with the survey records.Notes in red in the Descriptive Report were added during the examination. SRB N/CG 242 11/9/88SH-21-97AWOIS and SURF ✓ RWD 4/87

PROJECT PROGRESS SKETCH

OPR-Z137-WH-84

LAKE SUPERIOR

WISCONSIN

BASIC HYDROGRAPHIC SURVEY

SEPTEMBER 1984

NOAA SHIP WHITING

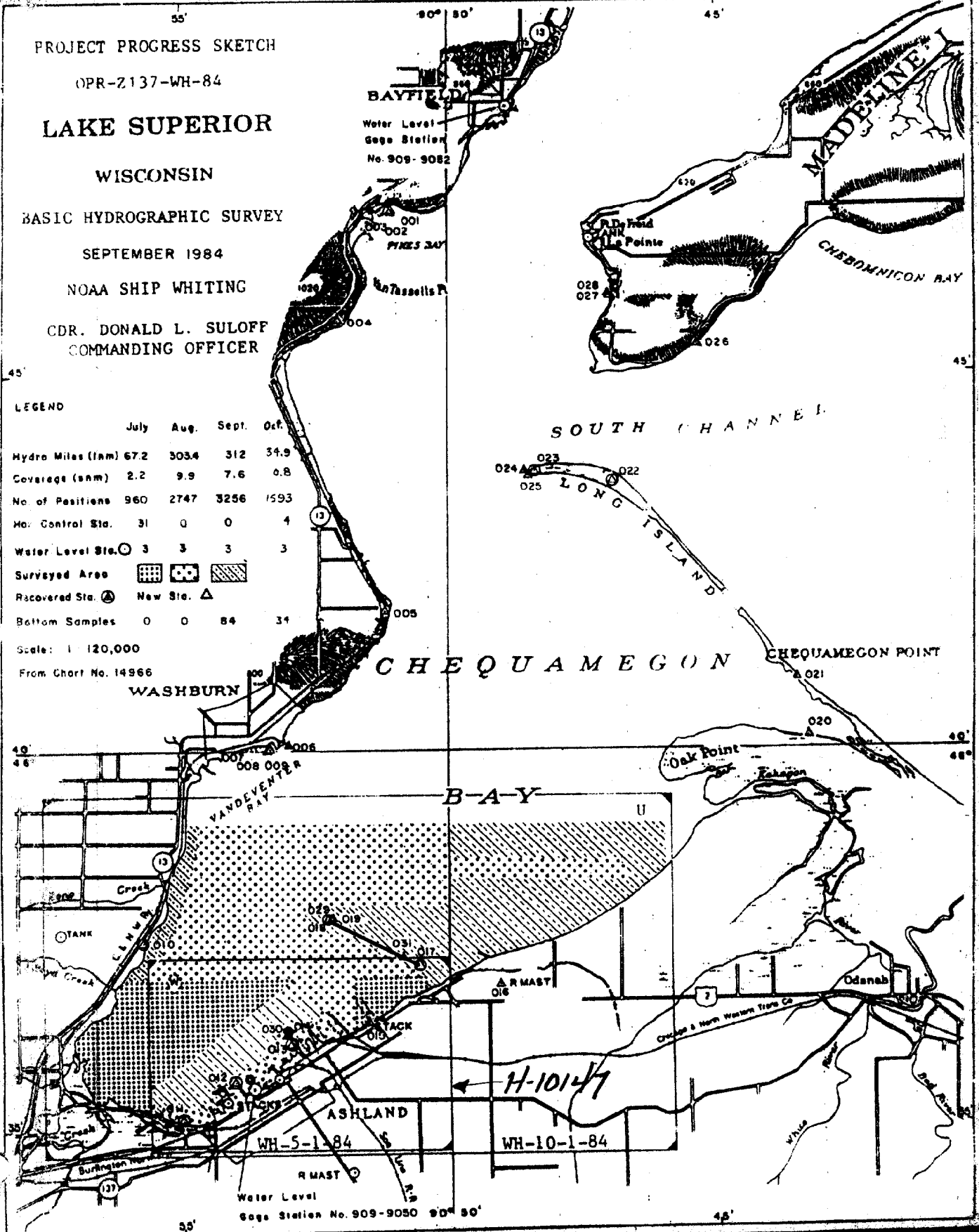
CDR. DONALD L. SULOFF  
COMMANDING OFFICER

LEGEND

	July	Aug.	Sept.	Oct.
Hydro Miles (nm)	67.2	303.4	312	34.9
Coverage (sqnm)	2.2	9.9	7.6	0.8
No. of Positions	960	2747	3256	1593
No. 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-10147 was performed in accordance with Project Instructions OPR-Z137-WH-84, Lake Superior, Wisconsin, dated April 23, 1984, supplemented by Change No. 1 (May 7, 1984), Change No. 2 (July 25, 1984) and Change No. 3 (August 23, 1984). This project is a continuation of contemporary basic hydrographic surveys begun in 1981. These surveys will contribute to a new data base for the maintenance of existing charts and constructions of new, reformatted, or reschemed nautical charts. This project exemplifies the cooperative charting effort between the National Ocean Service of NOAA and the Canadian Hydrographic Service.

B. AREA SURVEYED

The area covered by the survey is located in Chequamegon Bay, Western Lake Superior and specifically, the City of Ashland harbor vicinity. The area is bounded by the Ashland waterfront and the lines formed by the following points.

46°35'12" North	90°55'33" West	TO	46°35'41" North	90°55'30" West
46°35'41" North	90°55'30" West	TO	46°37'00" North	90°52'45" West
46°37'00" North	90°52'45" West	TO	46°37'00" North	90°50'30" West
46°37'00" North	90°50'30" West	TO	46°36'45" North	90°50'21" West

This survey was conducted by NOAA Ship WHITING personnel from 18 July to 10 October 1984 (JD 200 to 284).

The area is characterized by a gently sloping mud or sand bottom with frequent patches of grass. Dive investigation proved the existence of these patches of grass in a number of instances. Checking each feature with a diver would have been impractical, hence, only those features that could be interpreted as grass with reasonable certainty were disregarded.

C. SOUNDING VESSEL

The sounding vessels used throughout this survey were launches 1014 (EDP 2932), 1015 (EDP 2931) and a 19-foot Monark WH-3 (EDP 2933), outfitted for nearshore survey work. The launches were equipped with Raytheon DSF 6000N Digital Survey Fathometers, along with the standard hydrographic equipment. The Monark operated with a Raytheon DE-719B echo sounder and also a leadline and sounding pole. Horizontal positioning was obtained through the use of a Motorola Falcon Miniranger III microwave positioning system and a Wild T-2 theodolite, operated together in a range-azimuth mode.

#### D. SOUNDING EQUIPMENT

Sounding equipment used throughout the survey on the launches was the Raytheon DSF 6000N Digital Survey Fathometer. The Monark (VESNO 2933) was equipped with a Raytheon DE-719B echo sounder. The following lists the serial numbers of each vessel's sounding instruments. ✓

<u>VESSEL #</u>	<u>S/N</u>	<u>JULIAN DAYS</u>
2931	B037N	235-284
2932	A122N	253-271
2932	A109N	272-282
2932	A118N	282
2933	5458	203-284

The Monark was equipped with leadline and sounding pole for inshore surveying and development. The launches were also equipped with leadlines for use when bottom sampling and obtaining least depths on developments.

The Monark worked in depths ranging from 1.0 feet to 32 feet.

The launches worked depths from 5 feet to 33 feet.

#### Bar Checks

Bar checks were performed twice daily on the launches--weather permitting. Several days were too rough for bar checks. These instances are annotated in the respective sounding volumes. Daily bar check abstracts are contained in the folder with each day's data. Bar check lines were measured against a steel tape every two weeks. No discrepancies were found. ✓

#### Velocity Corrections

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). *See Evaluation Report Action 4*

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-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 was needed to determine the velocity of sound correctors. Temperature data was 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. ✓

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. *see indication Report, Section 4*

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 headline comparisons showed no significant instrument corrector for the 719-B. ✓

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 were 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 indicate 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 indicate 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. ✓

#### 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 and 0.52 m (1.5 and 1.7 ft), respectively. All of the data assumes a launch TRA of 1.7 ft and a Monark TRA of 1.0 ft and all field sheets were plotted with these TRAs. TC/TI tapes are included with the data tapes to correct for the difference between actual and plotted launch and Monark TRAs. ✓

Due to the manner in which the analog record of the DSF 6000N is produced, there is no initial error. The chart graduations are generated at the time of sounding, therefore, the normal sources of initial error (such as belt stretch) do not affect the record. Therefore, no correction was applied. ✓

Two tests were conducted routinely on the DSF 6000N fathometer. In test one, the system generates a false bottom at 50% of the analog record depth and the digitizer is checked to see that it locks on this. Test two checks the chart recorder subsystem and aids in adjusting the print density and print density ratio. ✓

In a number of instances, the tide and draft setting on the Raytheon DE-719B fathometer, which was used in the Monark, was not calibrated correctly. This was due to the instrument being subjected to rough seas, as well as operator error. Concessions were made for this when scanning the echograms. When this was done, it is annotated as such on the echograms. The fathometer was routinely checked by comparing the depth shown on the echogram to that observed on a leadline or sounding pole simultaneously; taking into consideration the draft of the vessel. Comparisons were excellent, being within .1-.2 feet. ✓

#### 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 alongside 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. ✓

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

*Settlement and squat correctors applied to soundings are based upon speed of launch in R.P.M.s.*

#### Water Levels

The Field Water Level Note is included in separate B. As noted before, the replot sheet has smooth water levels applied to the plotted soundings. ✓

*of the Processing Critique concerning use of predicted water levels to plot field sheet.*

An abstract of correctors to echo soundings is included in separate D. Printouts of the TC/TT tapes are included in the supplemental data file.

#### E. HYDROGRAPHIC SHEETS

All field sheets were prepared by NOAA Ship WHITING personnel using a Houston Instrument DP-3 Roll Plotter (s/n 7842-1). The survey was divided into two 1:5,000 sheets; north and south, both with a skew of 0 degrees. As approved 10 May 1984, the sheet dimensions are 91 cm x 137 cm. Sheet origins and boundaries are as follows:

*The smooth sheet is oversized. See attached copy of letter from N/MOP 21 dated 2/4/86, also reference to Pre-Processing Critique for field deficiencies pertaining to plot.*

## 1:5,000, North Sheet

origin: 46°35'40" North 90°55'45" West

boundaries: 46°35'40" North 46°37'00" North  
90°55'45" West 90°55'45" West

46°37'00" North 46°35'40" North  
90°50'00" West 90°50'00" West

## 1:5,000, South Sheet

origin: 46°34'30" North 90°55'45" West

boundaries: 46°34'30" North 46°35'52" North  
90°55'45" West 90°55'45" West

46°35'52" North 46°34'30" North  
90°52'00" West 90°52'00" West

A total of <sup>2</sup> smooth field sheets, and 9 preliminary sheets are being submitted with this survey. The smooth field sheets are broken down as follows:

- 2 - 1:5,000 mainscheme
- 2 - 1:5,000 crosslines, shorelines, developments
- 2 - 1:5,000 bottom samples, detached positions

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

Some soundings have been manually edited from the smooth 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 is in black ink, indicating that it was verified against prior charts and topographic sheets TP-00439.

All plotted sheets and field records <sup>were sent to AMC, Hydrographic Survey Branch then subsequently</sup> will be sent to PMC, Nautical Chart Branch (N/MOP21) for verification and smooth plotting.  
*processing.*

F. CONTROL STATIONS

The following stations were used as Electronic Positioning Control or as Calibration Stations:

<u>Station Number</u>	<u>Name</u>	<u>Year Est.</u>	<u>Source</u>
007	MARINA 1984	1984	AMC
010	NASH 3 1984	1984	AMC
011	BODINS 1982	1982	AMC
012	REISS	1981	AMC
013	NO 60 USE	NA	ARMY
014	NO 80 USE 1939	1939	ARMY
015	ASHLAND JAMES RIVER CORP. STACK	1984	AMC
016	ASHLAND RADIO MAST	1984	AMC
017	ASHLAND BREAKWATER SOUTH LIGHT	1984	AMC
018	NO 81 USE	NA	ARMY
019	NO 81 USE RM 1	1984	AMC
023	CHEQUAMEGON POINT BEACON RED	1984	AMC
029	ASHLAND BREAKWATER LIGHTHOUSE	1982	NGS
030	BOLLARD	1984	WHITING
031	ASHLAND BREAKWATER SOUTH LIGHT ECC	1984	WHITING
032	GULL ROCK	1984	WHITING
033	WHY	1984	WHITING
034	NO 80 USE ECC	1984	WHITING
035	BURNOUT	1984	WHITING

These stations, with the exception of 013, 014, 018 and 030-035, were established over a number of years by horizontal control parties consisting of NOAA personnel. The control was established to third order specifications by use of conventional survey techniques. All positions used in this survey are on the NAD 1927.

Stations 013, 014 and 018 were established by the Army Corps of Engineers. The years of establishment could not be found for stations 013 and 018.

Stations 030-035 were located by WHITING personnel. These stations 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 and the distances were measured with a steel tape for stations 031, 034-035. The Hewlett-Packard 3810-B was used in determining the geographic locations for stations 032 and 033. Conventional monumentation was not used for these stations, due to the techniques used to determine the positions. The field data were forwarded to MOA2xl for verification of the positions.

Stations 007-014, 018 and 030-035 were used for electronic control during the survey. Stations 015-017, 023 and 029 were used as range-azimuth controls.

*These stations were used only as initial stations.*

A separate Geodetic Control Report will be submitted by MOA2xl in accordance with the Hydrographic Manual. An additional report was submitted by the WHITING to MOA2xl in regards to the positions established as supplemental control.

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

Range/azimuth control with the Motorola Falcon MiniRanger III system and a Wild T-2 theodolite was used throughout the survey for positioning of all vessels. On JD 284, the Hewlett Packard 3810B (s/n 1929A00355) was used as range/azimuth control for position 4849 (VESNO 2931, vol. 3, pg. 45). The following Falcon MiniRanger components (listed by serial numbers) were used on the vessels on the respective dates.

##### Equipment:

<u>Vessel</u>	<u>JD</u>	<u>System</u>	<u>RP</u>	<u>R/T</u>
2931	235-284	B	D0018	D2128
2932	253-282	D	D0019	C2000
2933	203-213	D	D0019	C2000
2933	219-222	C	D0017	C2096
2933	228-284	A	D0004	D2123

At the beginning of the survey, only two R/Ts were available (B & D). When additional R/Ts arrived and were calibrated, system D was moved into Launch 1014 and system C was used in the Monark. System C was switched out because its correctors were higher than the other system's correctors.

##### 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

##### Other Equipment:

Wild T-2 theodolite: s/n 57484 & 270193  
Hewlett Packard 3810B: s/n 1929A00355

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

All range/azimuth data gathered by the Monark (VESNO 2933) was recorded by hand. Master tapes were generated using RK 216 (Range/Azimuth Non-Real Time Plot) with the shipboard computer system. In the launches, range/azimuth data was recorded in real time, using RK 116 with launch board computer systems.

Daily systems checks were performed at the beginning and end of each day of hydrography (abstracts, supplemental data file) with the following exceptions:

JD 235- The AM calibration for launch 1015 was rejected due to erratic signal strengths. The PM calibration showed reasonable rates. These were used for the entire day. This situation did not reoccur. ✓

JD 243- No PM check calibrations were performed for launch 1015 or the Monark due to rough seas. ✓

JD 284- No PM check calibration was performed for launch 1015, as the MiniRanger underwent baseline calibration during the afternoon. ✓

Daily correctors used in processing each day's data are abstracted in section E., Abstract of Corrections to Electronic Position Control.

On JD 219, the daily corrector for VESNO 2933 was derived by averaging the daily systems check values. This was done because the values for that day (system C) were not within the allowable 3 meter range. ✓

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. *Refer to the Processing Airtel pertaining to this procedure*

Baseline calibrations were performed on the following days: 194 & 195, 209, 223, 237, 261, and 284 and 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. ✓

Average daily correctors were used for all rough and smooth plotted field sheets. Values used on corrector tapes are shown on the Electronic Corrector Abstract in separate E. All raw calibration data is included in the calibration folder and is also annotated in each vessel's respective sounding volume. ✓

H. SHORELINE

The primary source of the field sheet shoreline detail is shoreline manuscript TP-00439. On 8 September 1984 (JD 252), WHITING personnel conducted an intensive shoreline verification effort by whaler, simultaneously comparing shoreline map TP-00439, nautical chart 14974, and aerial photographs 7994, 7995, 7996, 8003, and 8004 with the actual shoreline. ✓

Shoreline map TP-00439 compares very favorably with the actual shoreline and was completely verified during this project. Those minor discrepancies noted, such as outfalls, inaccurately located piling, or new construction, were noted in red on both the manuscript and the field sheet, and referenced to the applicable detached position, AWOIS investigation, or blueprint. ✓

Nautical chart 14974 does not compare nearly as well. A major contributing factor to the discrepancies noted is undoubtedly the fact that it is compiled on the 1902 datum. Discrepancies were marked in red on the chart and referenced to the superseding data.

A special shoreline verification report has been compiled and is submitted in the supplemental data file. This report consists of page size copies of shoreline map TP-00439 and nautical chart 14974. These copies are annotated with verified material (shoreline with a solid line, features with a check (✓) mark and with cross-referenced change material). New shoreline is noted with a dashed line and annotated. } not included in survey records ✓

Shoreline on the final field sheet is shown in black ink when based on TP-00439 and in dashed red ink when changes are recommended. There was no shoreline delineated by the hydrographer. No red changes were noted on field sheet ✓

Areas where shoreline map TP-00439 was inaccurate and was corrected by this survey are listed below.

<u>Feature</u>	<u>Position</u>	<u>Action</u>	<u>Reference</u>
Outfall	46°35'26.82" North 90°53' <sup>3</sup> '27.60" West	Added	D.P. 1664 (Vol. 9, pg.11) <i>Shown as solid black line, extending seaward from the shoreline.</i>
Outfall	46°35'27.89" North 90°53'23.02" West	Added	D.P. 1665 (Vol. 9, pg.12) <i>Shown as a dashed black line, extending offshore.</i>
Marina	46°40'08.00" North 90°53'09.00" West	Added	Blueprint (supplemental data file) } located on H-10148 ✓

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: 173-245, 330-331, 344-346, 359, 919, 1206, 1334-1604, 1997-2007, 2015-2034, 2041, 2060-2062, 2064-2072 and 2091. ✓

The following is a list of stations that plot lakeward of the shoreline: 007-MARINA 1984, 012-REISS, 013-NO 60 USE, 014-NO 80 USE 1939, 017-ASHLAND BREAKWATER SOUTH LIGHT, 018-NO 81 USE, 019-NO 81 USE RM 1, 029-ASHLAND BREAKWATER LIGHTHOUSE, 030-BOLLARD, 031-ASHLAND BREAKWATER SOUTH LIGHT ECC, 032-GULL ROCK, 034-NO 80 USE ECC and 035-BURNOUT. *These stations plot on piers, breakwaters or on an island. There are no stations plotting off of the MHW line that fall on individual rocks or piles.*

I. CROSSLINES

There were 11.8 miles of crosslines run, which is 4.3% of the mainscheme. All crosslines agreed with the mainscheme soundings to within one foot or less. Since much of the mainscheme hydro could be more correctly considered to be development work and considering the many different orientations of the sounding lines, this percentage of crosslines is considered adequate.

J. JUNCTIONS

This survey junctions with the contemporary survey H-10148 (WH-10-1-84). Agreement was excellent with soundings differing by 1 foot or less.

K. COMPARISON WITH PRIOR SURVEYS

The soundings from the prior survey <sup>LS-442</sup> performed by the Corps of Engineers in 1869, Part of Chequamegon Bay, South Shore, Lake Superior, 1:16,000 was difficult to use as a <sup>PRIOR</sup> chart for comparison, as it had no <sup>PROJECTION</sup> grid with which to scale distance and also due to the difference in scale. It appeared that depths were generally 2 to 6 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 the building of numerous piers along the waterfront, dredging and geological processes in the Great Lakes area.

*See Evaluation Report Section 6, LS-895*

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 1 to 2 feet shallower than those determined by this survey. This could be due to a higher lake level and to geological processes affecting the lake.

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 appear to be approximately 1 foot shallower than those determined by the survey. Comparison was difficult due to the lack of soundings with which to compare, as well as the difference in scale.

AWOIS

*See Evaluation Report section 7, for a comparison with Chart 14974, 22nd Edition and Chart 14973 25th Edition*

- ✓ 3346 - Row of Piles - It is recommended by the hydrographer that this item be *Concave* charted at the surveyed positions (Vol. 8, pos. 1597-1601) as visible and *Chart area as* submerged piles. The average position for the area was 46°35'06.76" North, *shown on* *Smooth Sheet*



90°55'32.49" West.

3347 - 9 Charted Rocks/Groins - It is recommended by the hydrographer that the items which were located and positioned be charted as submerged and awash rocks at the surveyed positions (Vol. 8, pos. 1578-1579). Those that were not located or were not fully developed should be corrected to NAD 1927 and continue to be charted as on Chart 14974. *See Evaluation Report, section 7 and Exam. Rpt., Item 1*

*lat. 46°35'03.4"N, long. 90°55'00"W.*

3348 - Pier/Groin Awash - It is recommended by the hydrographer that these items be charted at the surveyed positions (Vol. 8, pos. 1581-1582, 1586-1588) as ramp and groin. *See Evaluation Report, section 7 chart present survey information and retain charted piles and ruins.*

3349 - Rock Awash - It is recommended by the hydrographer that this item be charted at the surveyed position, 46°34'57.93" North, 90°54'36.26" West as submerged rocks. The description can be found in Vol. 8, pos. 1576. *Do not concern as charted at latitude 46°34'59.0 N, longitude 90°54'41.2 W. insufficient investigation retain*

3350 - Dangerous Submerged Wreck - This item was investigated by making a fathometer search followed by a diver investigation. The area was discovered to be foul with timbers. A position was obtained (46°35'15.64" North, 90°54'14.50" West) and it is recommended that at this position, the area be designated as foul with timbers. *concur*

3351 - Visible Piles/Rock Awash - It is recommended by the hydrographer that a bare rock be charted at the surveyed position of 46°35'45.66" North, 90°53'04.26" West. A further explanation can be found in Vol. 8, pos. 1492-1493. These piles were not located. Hence, their positions should be corrected to NAD 1927 and they should be charted as submerged piles. *Chart area as shown on sheet, as foul with racks and piles.*

3352 - Dangerous Submerged Wreck - This item was investigated by diver sweep of the area with a searchline. The wreck was located and a leadline least depth of *3.0* ~~5.1~~ ft was obtained. (VESNO 2931, Vol. 3, pos. 4849). It is recommended that the item be charted at the surveyed position of 46°35'55.93" North, 90°52'36.82" West as a submerged wreck. *Wreckage is wooden hull vessel, hand against shore*

*6925*

~~3353~~ - Dangerous Submerged Wreck - This item was investigated by diver investigation and bottom sweep of the area. The wreckage was located and a leadline least depth of *3.4* ~~3.4~~ ft was obtained. (Vol. 11, pos. 2091). It is recommended that the item be charted at the surveyed position of 46°36'03.20" North, 90°52'40.22" West as submerged wreckage. *Wreckage consists of ribs of vessel flush with bottom.*

*(Charted in lat. 46°36'20.4"N, long. 90°52'31.2"W)*

3354 - Submerged Crib Covered 19 ft - A diver investigation was begun on this item, but was not completed, as there was a possibility that this was a suction point for the Ashland Water Works. It is recommended that the position of this item be corrected to NAD 1927 and continue to be charted as on Chart 14974. *See Evaluation Report section 7. includes charted pipeline.*

3355, 3356 - Railroad Pier/Groin - It is recommended by the hydrographer that these items be combined and charted as an area foul with pier ruins. The average position for the area is 46°35.2' North, 90°54.4' West. The description of the investigation can be found in Vol. 8, pos. 1556, 1558, 1560-1561, 1570-1574. *See Evaluation Report, section 6*

Retain the piles and ruins charted within a 250 m. radius centered on lat. 46°35'23", long. 90°54'11" as submerged unless shown otherwise on the present survey.

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- 3357-3361 - Lumber Pier (ruins) - It is recommended that these AWOIS items be combined and charted as an area foul with ruins. The average position for the area is 46°35.4' North, 90°54.2' West. The description of the investigation can be found in Vol. 8, pos. 1532, 1534-1543. *See Evaluation Report, section 6. Do not concur see above*
- 3362 - Lumber Pier (submerged ruins)<sub>A</sub> - This item was investigated via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item to NAD 1927 and continue as charted on Chart 14974. *See Evaluation Report section 6 concur*
- 3363 - Lumber Pier (submerged ruins)<sub>A</sub> - It is recommended by the hydrographer that this item be <sup>revised as</sup> charted as foul with piles. The average position for the area is 46°35'15.94" North, 90°54'12.47" West. The description for the investigation can be found in Vol. 8, pos. 1544-1545, 1547-1548. *See Evaluation Report, section 6 concur*
- 3364 - 4 Visible Piles<sub>A</sub> - Due to the fact that AWOIS 3364 was not accessible, it is recommended that the item's position be corrected to NAD 1927 and continue to chart as on 14974. Explanation can be found in Vol. 8, pg. 41. *concur*
- 3365 - 6 Piles<sub>A</sub> - This item was investigated via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item's position to NAD 1927 and chart as submerged <sup>piles</sup> ruins. *concur*
- 3366 - Lumber Pier (submerged <sup>slab fill</sup> ruins)<sub>A</sub> - This item was investigated via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item's position to NAD 1927 and continue as charted on Chart 14974. *concur*
- 3367 - City Wharf Pier - This item was located and determined to be a ~~submerged crib~~ <sup>ruins</sup> consisting of piles with a least depth of ~~7~~<sup>3</sup> ft. It is recommended that the item be charted as such at the surveyed positions (Vol. 8, pos. 1522-1525). The approximate center of the feature is 46°35.6' North, 90°53.5' West. *See Evaluation Report section 7*
- 3368 - Pier/Piling (bare)<sub>A</sub> - It is recommended that this item be charted as continuous ruins from its offshore limits to the shoreline. Although sounding lines may be shown within the area, it is a hazard to navigation and should be approached only with the aid of local knowledge. The description of the investigation can be found in Vol. 8, pos. 1495-1512. The average position for the area is 46°35.7' North, 90°53.2' West. *See Evaluation Report, section 6*
- 3369 - 8 Piles/4 Dolphins (bare) - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 8, pos. 1515-1517), as 4 dolphins bare. The 8 piles were not discovered. Hence, their positions should be corrected to NAD 1927 and they should be charted as submerged piles. *concur*
- 3370 - City Dock Pier/ Dolphin (bare) - This item was investigated via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item's position to NAD 1927 and chart as submerged <sup>visible piles</sup> ruins. *concur*
- 3371 - 2 Piles (bare) - This item was investigated via surface search in a small boat. Due to the fact that only one pile was discovered; it is recommended that *concur*

the located item be charted at the surveyed position ( $46^{\circ}35'29.11''$  North,  $90^{\circ}53'19.11''$  West) as a bare pile and the other should have its position adjusted to NAD 1927 and should be charted as a submerged pile. The description of the investigation can be found in Vol. 8, pos. 1520. *Concur*

3372 - Pile (bare) - It is recommended that this item be charted at the surveyed position,  $46^{\circ}35'33.93''$  North,  $90^{\circ}53'12.53''$  West, as 2 bare piles. The description of the investigation can be found in Vol. 8, pos. 1518. *Concur See Exam. Rpt. Sec. 7*

*charted in vicinity of lat.  $46^{\circ}35'37''$ , long.  $90^{\circ}53'09''$*   
3373 - 3 Piles (bare) - This item was investigated via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item's position to NAD 1927 and chart as submerged piles. *Concur*

3374 - Row of Piles (bare) - It is recommended by the hydrographer that this item be charted as continuous ruins from its offshore limits to the shoreline. The average position for the area is  $46^{\circ}35.4'$  North,  $90^{\circ}53.6'$  West. The description of the investigation can be found in Vol. 8, pos. 1562-1569. *See L.R. Section 7*

3375 - Visible Piles - It is recommended by the hydrographer that this item be charted as continuous ruins from its offshore limits to the shoreline. The average position for the area is  $46^{\circ}35.7'$  North,  $90^{\circ}53.1'$  West. The description of the investigation can be found in Vol. 8, pos. 1489-1491. *See L.R. Sect 7*

*charted in lat.  $46^{\circ}35'52''$ , long.  $90^{\circ}53'04''$*   
3378 - Lumber Pier (submerged ruins) - It is recommended by the hydrographer that this item be charted as continuous ruins from its offshore surveyed limits to the shoreline. The average position for the area is  $46^{\circ}35.8'$  North,  $90^{\circ}53.0'$  West. The description of the investigation can be found in Vol. 8, pos. 1480-1488. *See L.R. Sect 6 See Exam. Rpt. item 3*

*charted in lat.  $46^{\circ}35'56''$ , long.  $90^{\circ}53'05''$*   
3379 - Lumber Pier/Piling (bare) - It is recommended by the hydrographer that this item be charted as pier ruins as delineated by the detached positions (Vol. 8, pos. 1473-1479). The average position for the area is  $46^{\circ}35.9'$  North,  $90^{\circ}53.0'$  West. *See L.R. Sect 6 See Exam. Rpt. item 3*

3380 - Pier (submerged ruins) - It is recommended by the hydrographer that this feature be charted as visible and submerged piles at the surveyed positions (Vol. 8, pos. 1462-1466). The average position for the area is  $46^{\circ}35.8'$  North,  $90^{\circ}52.9'$  West. *See L.R. Sect 6*

*charted in lat.  $46^{\circ}36'00''$ , long.  $90^{\circ}52'55''$*   
3381 - Lumber Pier/4 Piles - It is recommended by the hydrographer that this item be charted as continuous ruins from its offshore surveyed limits to the shoreline. The average position for the area is  $46^{\circ}35.9'$  North,  $90^{\circ}52.8'$  West. The surveyed positions can be found in Vol. 8, pos. 1453-1459. *See L.R. Sect 6 See Exam. Rpt. item 3*

*charted in lat.  $46^{\circ}36'03''$ , long.  $90^{\circ}52'53''$*   
3382 - Lumber Pier/2 Rows of Visible Piles - It is recommended by the hydrographer that this item be charted as continuous ruins from its offshore surveyed limits to the shoreline. The average position for the area is  $46^{\circ}36.0'$  North,  $90^{\circ}52.9'$  West. The surveyed positions can be found in Vol. 8, pos. 1419-1425 and 1447-1452. *See L.R. Sect 6*

charted in lat.  $46^{\circ}35'47''$ ; long.  $90^{\circ}53'37.8''$

3383 - Pile (bare)<sub>A</sub> - This item was not investigated, due to time constraints. Therefore, correct the item's position to NAD 1927. As the pile was not visible, it should be charted as submerged. *Concur*

lat.  $46^{\circ}35'46.6''$ ; long.  $90^{\circ}53'08.0''$

3384 - Submerged Crib, Covered 6 ft/ Outfall<sub>A</sub> - This item was investigated via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item's position to NAD 1927 and continue as charted on Chart 14974. *Concur*

charted in lat.  $46^{\circ}35'57.8''$ ; long.  $90^{\circ}52'35.0''$

3385 - Pier<sub>A</sub> - This item was investigated and located via surface search in a small boat. Although, no position was acquired for this pier, due to its location being out of sight of the theodolite and operator; it is recommended that the item's position be corrected to NAD 1927 and continue as charted on Chart 14974. *Revise position in accord- one with present survey*

charted in lat.  $46^{\circ}36'09.0''$ ; long.  $90^{\circ}52'48.4''$

3386 - Visible Pile<sub>A</sub> - This item was investigated via side scan sonar search and diver investigation, neither of which showed any remains of the pile. It is recommended that this item be removed from the chart, as it has been disproved by acceptable methods. The investigation can be found in Vol. 3, (VESNO 2931), pos. 4552-4560. *These positions were omitted by the field. did see records were not submitted - see section P of this report.* *Retain as charted. Subm pile*

3387 - 3 Visible Piles - It is recommended that this item be charted at the surveyed positions (Vol. 8, pos. 1416-1417 and 1429-1430), as three visible dolphins. center dolphin - lat.  $46^{\circ}36'07.4''$ ; long.  $90^{\circ}52'45.7''$  *Concur*

3388 - Pier (RR Ore)/Submerged Crib, Visible and Submerged Piles - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 7, pos. 1393-1399 and Vol. 8, pos. 1400-1411), as visible and submerged pier ruins. The average position for the area is  $46^{\circ}36.1'$  North,  $90^{\circ}52.0'$  West. *see R. sect. 6 and Exam Rpt. item 3*

3389 - Pier (RR Ore)/Submerged Crib, Visible and Submerged Piles - It is recommended by the hydrographer that these items be charted at the surveyed positions (Vol. 7, pos. 1372-1392), as submerged and bare pier ruins. The average position for the area is  $46^{\circ}36.4'$  North,  $90^{\circ}51.5'$  West. *see E.P. sect 6 and Exam Rpt. item 3*

3390 - Pier (RR Ore)/Platform and Pier in Ruins - It is recommended by the hydrographer that this item be charted as continuous ruins from the offshore surveyed limits to the shoreline. Surveyed positions can be found in Vol. 1, pos. 235-245 and Vol. 7, pos. 1357-1369. The average position for the area is  $46^{\circ}36.5'$  North,  $90^{\circ}52.2'$  West. *Concur*

3391 - Visible Piles (9), Pulpwood Storage - This item was investigated via surface search in a small boat. As only  $\frac{1}{9}$  of the piles were discovered, it is recommended by the hydrographer that these be charted at their surveyed positions (~~Vol. 1, pos. 234~~, Vol. 7, pos. 1350-1354), as <sup>1/9</sup> visible piles and <sup>8/9</sup> piles since, it cannot be recommended with reasonable certainty that the others no longer exist, their positions should be corrected to NAD 1927 and they should be charted as submerged piles. *Concur*

3392 - Visible Piles (10)<sub>A</sub>, Pulpwood Storage - This item was investigated via surface search in a small boat. Although piles were discovered, it was *Concur*

difficult to determine whether they were a part of AWOIS 3392. It is recommended by the hydrographer that these piles be charted at their surveyed positions (Vol. 7, pos. 1349, 1355) and since, it cannot be recommended with reasonable certainty that the <sup>charted piles</sup> others no longer exist, their positions should be corrected to NAD 1927 and they should be <sup>retained</sup> charted, as submerged piles. *Concur*

✓ 3393 - Lumber Pier/Submerged Ruins - This item was investigated by surface *See L.R. Sect 6* search via small boat, as well as side scan sonar and diver sweep in order to determine the limits of the feature. It is recommended by the hydrographer that the item be charted at the surveyed positions (Vol. 1, 221-233), as visible and submerged ruins. <sup>Do not</sup> *Concur* The <sup>ruins are</sup> average position for the area is 46°36'37.99" North, 90°51'41.34" West. <sup>surveyed offshore</sup> A corrected lead line depth of 7 ft. was obtained at this position, but was not processed.

<sup>charted in lat. 46°36'23", long. 90°51'22"</sup>  
3394 - Pier Ruins<sub>A</sub> - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 1, pos. 215-219), as pier ruins. The average position for the area is 46°36.4' North, 90°51.4' West. *Concur*

<sup>charted in lat. 46°36'28", long. 90°51'07"</sup>  
3395 - Bulkhead<sub>A</sub> - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 1, pos. 209-211), as a ~~rock~~ <sup>rock</sup> crib. The average position for the area is 46°36.5' North, 90°51.1' West. *Obstruction (Rocks and Piles)* *Concur*

<sup>charted in lat. 46°36'30", long. 90°51'02"</sup>  
3396 - Bulkhead<sub>A</sub> - It is recommended by the hydrographer that this item be charted at the surveyed position, 46°36.3' North, 90°51.0' West, as a boat ramp (private). The item description can be found in Vol. 1, pos. 208. *Concur*

<sup>charted in lat. 46°36'30", long. 90°50'56"</sup>  
3397 - Submerged Ruins<sub>1</sub> - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 1, pos. 196-201 and Vol. 7, pos. 1342-1346), as visible and submerged pier ruins. The average position for the area is 46°36.6' North, 90°50.9' West. *Do not concur* *See L.R. Sect 6* *See Exam. Rpt. item 3*

<sup>charted in lat. 46°36'42", long. 90°50'49"</sup>  
3398 - Submerged Ruins<sub>A</sub> - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 1, pos. 190-192), as visible and submerged pier ruins. The average position for the area is 46°36.6' North, 90°50.8' West. *Do not concur* *See L.R. Sect 6* *See Exam. Rpt. item 3*

<sup>charted in lat. 46°36'41.2", long. 90°50'38.4"</sup>  
3399 - Pile<sub>A</sub> - This investigation was conducted via surface search in a small boat. Despite an attempted disproval, the hydrographer cannot recommend with reasonable certainty that the item no longer exists. Therefore, correct the item's position to NAD 1927 and chart as a submerged pile. Investigation description can be found in Vol. 7, pg. 58. *Concur*

<sup>charted in lat. 46°36'42", long. 90°50'29" are considered disproved, chart present survey info.</sup>  
~~3400 - Pile and Ruins/Groin and Boathouse - It is recommended by the hydrographer that these items be charted at the surveyed positions (Vol. 1, pos. 182-188), as visible and submerged pier ruins. The average position for the area is 46°36.7' North, 90°50.4' West. The positions for the groin and boathouse should be corrected to NAD 1927 and they should continue to be charted as on Chart 14974.~~ *Concur*

3401 - Ruins/Groin - It is recommended by the hydrographer that this item be charted at the surveyed positions (Vol. 7, pos. 1334-1336), as a rock jetty. The average position for the area is 46°36.9' North, 90°50.0' West. *This feature is located on H-10148*

- 3402 - Rock Awash - It is recommended by the hydrographer that this item be charted at the surveyed position,  $46^{\circ}36'45.48''$  North,  $90^{\circ}50'18.66''$  West, as a visible rock awash. A description of the investigation can be found in Vol. 1, pos. 180 and Vol. 7, pos. 1337-1338. *Post 1338 was excised [\*(2)] Post 1337, \*(3) Another (lat.  $46^{\circ}36'46.4''$ ; long.  $90^{\circ}50'18.8''$ ) - rock is located on the shoreline, manuscript TP-00439 has been referred to the*
- 3403 - Rock Awash - This item was not investigated. Therefore, ~~correct the position to NAD 1927 and continue as charted on Chart 14974.~~ *smooth sheet.*
- 3404 - 3 Foot Shoal - Hydrography was run extensively over this area and should be referred to in determining the least depth. A least depth of  $7^5$  feet was obtained on the shoal area. *This rock is on H-10140, and was transferred to H-10147 - originates with TP-00439 in lat.  $46^{\circ}36'46.6''$ ; long.  $90^{\circ}50'16.9''$  Chart area as shown on smooth sheet. Longitude  $90^{\circ}52'21.2''$*

The following is a list of position of the diving investigations on this survey : dive #1- 4552-4560 (AWOIS 3386), dive #2- 4531-4545 (AWOIS 3393), dive #13- 6029, dive #32- 6030 (AWOIS 3350), dive #33- 2091 (AWOIS 3353), dive #34- 4849 (AWOIS 3352), dive #35- (AWOIS 3354-dive aborted) and dive #36- 6105. *✓*

Dive #2 (AWOIS 3393) - position 4561

#### M. ADEQUACY OF SURVEY

This survey was conducted in accordance with the Project Instructions, Hydrographic Survey Guidelines, AMC OPORDERS, and the Hydrographic Manual. The survey is complete and adequate to supersede all prior surveys, with the exception of the AWOIS items in the area, which are discussed in Section Q., Recommendations.

#### N. AIDS TO NAVIGATION

Seventeen  
Fifteen buoys within the survey area were located during this project, eight of which were channel buoys in the Ashland Harbor Channel. Surveyed positions are compared to those charted on NOS Chart 14974, 21st Edition.

Description	Surveyed Position (1927 NAD)	Charted Position (1902 NAD)	Diff.
Red Nun "2" (Pos 4047)	$46^{\circ}36'23.5^2''$ North $90^{\circ}52'26.09''$ West	$46^{\circ}36'23.0''$ North $90^{\circ}52'27.0''$ West	25.3 M
Black Can "1" (Pos 4049)	$46^{\circ}36'42.3^6''$ North $90^{\circ}52'31.80''$ West	$46^{\circ}36'42.0''$ North $90^{\circ}52'31.5''$ West	13.4 M
Black Can "5" (Pos 4052)	$46^{\circ}36'18.5^5''$ North $90^{\circ}52'41.16''$ West	$46^{\circ}36'18.0''$ North $90^{\circ}52'42.0''$ West	25.1 M
Red Nun "6" (Pos 4053)	$46^{\circ}36'10.4^5''$ North $90^{\circ}53'00.55''$ West	$46^{\circ}36'10.5''$ North $90^{\circ}53'01.0''$ West	9.6 M
Red Nun "4" (Pos 4054)	$46^{\circ}36'17.7^4''$ North $90^{\circ}53'13.73''$ West	$46^{\circ}36'17.9''$ North $90^{\circ}53'14.0''$ West	7.4 M
Red Nun "2"	$46^{\circ}36'53.87''$ N $90^{\circ}53'17.62''$ W	$46^{\circ}36'53.2''$ N $90^{\circ}52'51.5''$ W	
Black Can "1"	$46^{\circ}36'56.94''$ N $90^{\circ}52'51.24''$ W	$46^{\circ}36'56.3''$ N $90^{\circ}53'18.0''$ W	

Channel Buoys

Black Can "1" (Pos 4055)	46°36'06. <sup>08</sup> <del>98</del> " North 90°53'26.37" West	46°36'07.1" North 90°53'26.4" West	6.2 M
<u>Description</u>	<u>Surveyed Position</u>	<u>Charted Position</u>	<u>Diff.</u>
Red Nun "2" (Pos 4056)	46°36'06.5 <sup>3</sup> " North 90°53'31.37" West	46°36'06.9" North 90°53'32.0" West	17.2 M
Red Structure Buoy "4" Qk Fl R (Pos 4057)	46°35'56.9 <sup>0</sup> <del>7</del> " North 90°53'34.35" West	46°35'56.8" North 90°53'35.2" West	18.5 M
Black Can "3" (Pos 4058)	46°35'56.8 <sup>5</sup> <del>7</del> " North 90°53'26. <sup>98</sup> <del>88</del> " West	46°35'57.3" North 90°53'26.3" West	14.8 M
Black Can "5" (Pos 4059)	46°35'50.6 <sup>5</sup> <del>6</del> " North 90°53'34.42" West	46°35'50.8" North 90°53'34.2" West	6.4 M
<del>Black</del> Green Spar "1" (Pos 4060) (Priv Mtnd.)	46°35'41. <sup>17</sup> <del>20</del> " North 90°53'46.91" West	46°35'41.8" North 90°53'47.8" West	26.5 M
Red Spar "2" (Pos 4061) (Priv Mtnd.)	46°35'39.9 <sup>2</sup> <del>8</del> " North 90°53'51.28" West	46°35'39.2" North 90°53'49.9" West	37.0 M
Red Structure Buoy "6" Fl R 4 sec (Pos 4062)	46°35'46.7 <sup>7</sup> <del>8</del> " North 90°53'57.32" West	46°35'47.2" North 90°53'57.5" West	13.2 M
Red Nun "8" (Pos 4063)	46°35'42.7 <sup>6</sup> <del>7</del> " North 90°53'57.4 <sup>3</sup> <del>4</del> " West	46°35'43.4" North 90°53'56.8" West	23.7 M
Red Nun "10" (Pos 4064)	46°35'29.18 <sup>6</sup> <del>7</del> " North 90°54'19.2 <sup>8</sup> <del>7</del> " West	46°35'30.0" North 90°54'20.0" West	29.7 M

These floating aids to navigation adequately serve the apparent purpose for which they were established. Each was compared with the Light List (US Coast Guard, 1984) and all were found to be listed. All positions were obtained via range/azimuth techniques. The launch or Monark would pull up alongside the buoy, take down a range, while the T-2 operator would shoot an angle to the buoy. MiniRanger ranges were watched closely while approaching and departing the buoys to insure the ranges were proper; T-2 initials were checked frequently to insure no disturbance to the instrument.

There were no non-floating aids to navigation within the survey area.

*refer to Evaluation Report section 7.*

## 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	46°34'18"N	90°51'48"W
ASHLAND LOUISIANA PACIFIC STACK	46°36'10.61"N	90°51'18.76"W
ASHLAND GRAIN ELEVATOR	46°34'44.81"N	90°54'27.42"W
RADIO TOWER (with strobe)	46°41'30.45"N	90°59'27.34"W
WASHBURN CITY DOCK LIGHT	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

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. *Concur*

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	177 <del>4</del> <sup>3/</sup>	129 <del>8</del>	105 <del>4</del>	311 <del>2</del> <sup>65</sup>
Number of Rejected Positions	159	58	202	419
Lineal NM of Sounding Lines	146.6	51.1	78.2	275.9
Square NM of Hydrography	2.6	1.1	1.6	5.3
Bottom Samples	23	7	0	30
Detached Positions	49	0	414	463
Diver Investigations	0	8	0	8

P. MISCELLANEOUS

Side scan sonar was used to investigate a number of AWOIS items. Due to the fact that 100% coverage was not attained (since depths were so shallow), the side scan's use was only beneficial in attempting to locate the items, not in fully developing the features. Side scan sonar records are not submitted with this survey. ✓



There were 8 dives in support of this survey. These dives are documented on the dive investigation forms, included in the supplemental data file.

Deficiency item reports were completed on each AWOIS item and are also included in the supplemental data file.

An evaluation of NOAA chart users was conducted by Ship WHITING personnel on 5 August and 21 August 1984 within the Chequamegon Bay area. A report of this evaluation was sent to N/CG243 on September 4, 1984 and a copy is included in the supplemental data file. *see Attached report.*

The Coast Pilot pertaining to this area was reviewed and all verified information and recommendations were sent to Chief of Data Control Section, N/CG243 via a report dated 19 October 1984. A copy of the report is included in the supplemental data file.

Bottom samples were submitted to the Smithsonian Institution in accordance with the Project Instructions. A bottom sample abstract is included in separate H.

No Loran-C data was collected during this survey, as the launches and Monark are not equipped for this type of data acquisition.

Geographic names were verified by WHITING personnel through the Ashland Land Description Officer, Ashland City Assessor and the Bayfield County Register of Deeds. All applicable names on the geographic names list (separate C) are on the field sheets. A copy of the report is included in the supplemental data file. *see Attached*

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. *see Attached*

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

Q. RECOMMENDATIONS

This was not considered a complete survey when the vessel departed the area, since a number of the AWOIS investigations had not yet been completed. Since it is now apparent that the area may not be again visited for many years, and after discussion with the Director, Atlantic Marine Center, it has been determined that the survey should be submitted as a complete survey. However, not all of the waterfront investigation can be considered complete. All AWOIS items which were completed in 1984 should be charted as described (see section L). For any investigations which must be considered incomplete or which were not addressed, the hydrographer recommends using the previously charted extent of the items (after conversion to NAD 1927), but showing them as submerged since all visible features were surveyed. This can be justified on two counts.

First, the limits of all ruins and features verified by the 1984 survey compared well with previously charted positions when considering datum shifts, so it is reasonable to believe that unverified limits would also be acceptable. Second, there has been no expressed or apparent move on the part of the City of Ashland to remove any of the pier ruins or associated debris along the waterfront.

*See Evaluation Report, section 7.*

R. AUTOMATED DATA PROCESSING

<u>Program</u>	<u>Description</u>	<u>Version Date</u>
RK 112	HYPERBOLIC, R/R HYDROPLOT	10/12/83
RK 116	RANGE/AZIMUTH REAL TIME PLOT	04/28/84
RK 201	GRID, SIGNAL AND LATTICE PLOT	09/16/81
RK 212	VISUAL STATION TABLE LOAD	04/01/74
RK 216	RANGE/AZIMUTH NON-REAL TIME PLOT	02/09/81
RK 300	UTILITY COMPUTATIONS	10/21/80
RK 330	REFORMAT AND DATA CHECK	05/04/76
AM 602	ELINORE--LINE ORIENTED EDITOR	12/08/82
RK 610	BINARY TAPE DUPLICATOR	12/01/82

On JD 280, 281 and 283, survey launches 2931 and 2932 performed data acquisitions using RK 112, HYPERBOLIC, R/R HYDROPLOT, simultaneously collecting data in such a manner (i.e., azimuth from T-2 shore party every minute), as to be sufficient as Range/Azimuth hydrographic data. This was done such that the launches would know their position more fully, as the "hydro" being performed was development of a dredged channel and in a specific location. RK 116 was not sufficient for this purpose. During shipboard processing, azimuths were edited in to the data and the data was processed using RK 216.

S. REFERRAL TO REPORTS

A User Evaluation Report was submitted to N/MOA2x1 on 2 September 1984. The Geographic Names Report was submitted to N/CG243 via AMC on 21 September 1984. The Coast Pilot Report pertaining to this area was submitted to N/CG243 on 19 October 1984. The Electronic Control Report was submitted to MOA23. A copy of the Horizontal Control Report, Geographic Names Report and Current Report is included in the supplemental data file.

Respectfully Submitted,



Kay Miller, Ensign, NOAA



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

**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.



## 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.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 21, 1984 through October 10, 1984

HYDROGRAPHIC SHEET: H-10147

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 G. Hippin  
Chief, Water Levels Section

													YEAREST	SOURCE
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
013	1	46	36	04232	090	52	50515	250	0001	000000	NO 60 USE			ARMY
014	1	46	36	11214	090	52	56170	250	0001	000000	NO 80 USE 1939		1939	ARMY
015	1	46	36	17230	090	51	26558	250	0000	000000	ASHLAND JAMES RIVER CORP. STACK	1984	1984	AMC
016	1	46	36	50135	090	49	24946	250	0000	000000	ASHLAND RADIO MAST		1984	AMC
017	1	46	37	03893	090	50	32886	250	0008	000000	ASHLAND BREAKWATER SOUTH LIGHT		1984	AMC
018	1	46	37	41453	090	52	13215	250	0001	000000	NO 81 USE		NA	ARMY
019	1	46	37	41704	090	52	13102	250	0001	000000	NO 81 USE RM 1 1984		1984	AMC
023	1	46	43	42550	090	48	33380	250	0000	000000	CHEQUAMEGON POINT BEACON RED		1984	AMC
029	1	46	37	41478	090	52	12914	250	0000	000000	ASHLAND BREAKWATER LIGHTHOUSE		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 LIGHT ECC	1984	1984	WHITING
032	1	46	35	45467	090	53	14014	254	0000	000000	WHY		1984	WHITING
033	1	46	35	23966	090	54	11327	254	0000	000000	GULL ROCK		1984	WHITING
034	1	46	36	11284	090	52	55915	254	0000	000000	NO 80 USE ECC		1984	WHITING
035	1	46	36	10770	090	52	56203	254	0000	000000	BURNOUT		1984	WHITING

NOAA FORM 76-40  
(8-74)

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

ORIGINATING ACTIVITY

**NONFLOATING AIDS OR LANDMARKS FOR CHARTS**

Replaces C&GS Form 567.

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

<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.

CHARTING NAME	DESCRIPTION <i>(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)</i>	POSITION				METHOD AND DATE OF LOCATION <i>(See instructions on reverse side)</i>		CHARTS AFFECTED
		LATITUDE		LONGITUDE		OFFICE	FIELD	
		° / ' "	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
	MC L1503(84)							

fall outside limits of H-10147

SLS



NOAA FORM 76-40  
(8-74)

Replaces C&GS Form 567.

**NONFLOATING AIDS OR LANDMARKS FOR CHARTS**

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

**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)*

<input 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 S-329	WI	Ashland Harbor	8/18/84
<input checked="" type="checkbox"/> TO BE DELETED				

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

CHARTING NAME	DESCRIPTION <i>(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)</i>	POSITION				METHOD AND DATE OF LOCATION <i>(See instructions on reverse side)</i>		CHARTS AFFECTED
		LATITUDE		LONGITUDE		OFFICE	FIELD	
		° / ' "	D.M. Meters	° / ' "	D.P. Meters			
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	08 /	<i>/ D.H.M.</i>		14973 14974
Note:	Positions scaled from Chart 14974							
	<i>nc L-1503(84)</i>							

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## 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, 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.

This survey is not complete as assigned by the project instructions; however, in consideration of the future surveying plans for Lake Superior, and subject to the recommendations contained in section Q, the data should be processed and applied to the applicable charts. The sounding data is complete and should supersede all previous surveys of the common area; the shoreline and offshore manmade features should be treated in accordance with the recommendations contained in this report.



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



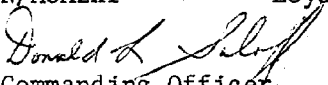
**UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration**

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:   
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.





**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



Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name
	<input checked="" type="checkbox"/> Name change	State
	<input type="checkbox"/> Changed application	County
	<input type="checkbox"/> Other	

Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " N, Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " W, Mouth N/A End Center (Circle one)  
 Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " N, Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " W, Heading N/A End (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

The CHICAGO & NORTH WESTERN TRANS. CO. RAILROAD,  
 WHICH RUNS PARALLEL TO THE WEST SHORE OF  
 CHEQUAMEGON Bay IS NOW ABANDONED.

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MR. OTTO KORPELA	BAYFIELD COUNTY COURT HOUSE WASHBURN, WI	BAYFIELD COUNTY REGISTER OF DEEDS

Submitted by: Name CDR. DONALD L. SKLOFF Title CDR. /NOAA Date 9-13-84  
 Agency NATIONAL OCEAN SERVICE of NOAA Address 439 W. YORK ST. NORFOLK, VA  
 Person who prepared this copy if other than above: Date 9-13-84  
 Name ENS. KAY L. MILLER Title ENSIGN /NOAA

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name <i>Mill Slips</i>
	Name change	State <i>WISCONSIN</i>
	Changed application	County <i>BAYFIELD</i>
	<input checked="" type="checkbox"/> Other New Name	

Lat. *46° 39' 42.0" N.* Long. *90° 54' 03.0" W.* (NOAA CHART 14974) Mouth End Center (Circle one)  
 Lat. " " " " N, Long. " " " " W, Heading End (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

*The "MILL SLIPS" IS AN INSHORE AREA, LOCATED TO THE WEST OF THE WASHBURN MARINA FACILITY. THE AREA ENCOMPASSED IS FULL WITH PIER RUINS.*

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

*"Mill Slips" is the NAME that is USED locally to refer to this AREA.*

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
<i>MR. OTTO KORPELA</i>	<i>BAYFIELD COUNTY COURT HOUSE WASHBURN, WI</i>	<i>BAYFIELD COUNTY REGISTER OF DEEDS</i>

Submitted Name: *CDR. DONALD L. SULLOFF* Title: *CDR. / NOAA* Date: *9-13-84*  
 Agency: *NATIONAL OCEAN SERVICE OF NOAA* Address: *439 W. YORK ST. NORFOLK, VA.*  
 Person who prepared this copy if other than above: \_\_\_\_\_ Date: *9-13-84*  
 Name: *ENS. KAY L. MILLER* Title: *ENSIGN / NOAA*



Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name
	<input checked="" type="checkbox"/> Name change	WASHBURN MARINA
	Changed application	State: WISCONSIN
	Other	County: BAYFIELD

Lat. 46° 40.08.0" N, Long. 90° 53.09.0" W (NOAA CHART 14974) Mouth End  Center (Circle one)  
 Lat. \_\_\_\_\_ " N, Long. \_\_\_\_\_ " W, Heading End  A (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

The NEW WASHBURN MARINA facility occupies the site of The C. REISS Coal Co. dock in the City of Washburn. It is ADJACENT TO THE Washburn City Dock AREA.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MR. OTTO KORPELA	Bayfield County Court House Washburn, WI	BAYFIELD COUNTY REGISTER OF DEEDS

Submitted by: Name CDR DONALD L. SULLOFF Title CDR/NOAA Date 9-13-84  
 Agency NATIONAL OCEAN SERVICE of NOAA Address 439 W. YORK ST. NORFOLK, VA.  
 Person who prepared this copy if other than above: Name ENS. KAY L. MILLER Title ENSIGN / NOAA Date 9-13-84

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name
	Name change	2nd LANDING
	Changed application	State: WISCONSIN
	<input checked="" type="checkbox"/> Other New Name	County: Ashland

Lat. 46° 38' 00.0" N. Long. 90° 46' 42.0" W. Mouth End / A Center (Circle one)  
 Lat. ° ' " N. Long. ° ' " W. Heading N / E (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

This is a new small boat landing area on the east shore of Chequamegon Bay, near the city of Ashland. (East End.)

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MR. Bill METZINGER	Ashland County Court House Ashland, WI 54806	LAND DESCRIPTION

Submitted by: Name CDR DONALD L. Snloff Title CDR/NOAA Date 9-13-84  
 Agency NATIONAL OCEAN SERVICE of NOAA Address 439 W. YORK ST NORFOLK, VA.  
 Person who prepared this copy if other than above: Date 9-13-84  
 Name ENS KAY L. MILLER Title ENSIGN /NOAA

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name <b>Pulp Hoist</b>
	<input checked="" type="checkbox"/> Name change	State <b>WISCONSIN</b>
	Changed application	County <b>ASHLAND</b>
	Other	

Lat. 46° 35.450' N. Long. 90° 53.16.0" W (NOAA CHART M974) Mouth End  Center  (Circle one)  
 Lat. \_\_\_\_\_ "N. Long. \_\_\_\_\_ "W. Heading N/A (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

The Pulp Hoist is an extension of land (occupied by a railroad) which is located to the west of the Ashland Wastewater Treatment Plant.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

Formerly the Commercial Dock, "Pulp Hoist" is the locally preferred name for this area, which is now owned by the Northland College of Ashland. It is the proposed site for a city MARINA.

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MRS. VIVIAN HANSEN	Ashland City Hall Ashland, WI 54806	Ashland City Assessor

Submitted by Name: **CDR DONALD L. SKEEFF** Title: **CDR/NOAA** Date: **9-13-84**  
 Agency: **NATIONAL OCEAN SERVICE of NOAA** Address: **439 N. YORK ST. NORFOLK, VA.**  
 Person who prepared this copy if other than above: \_\_\_\_\_ Date: **9-13-84**  
 Name: **ENS. KAY L. MILLER** Title: **ENSIGN/NOAA**

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name
	<input checked="" type="checkbox"/> Name change	The C. REISS Coal Co.
	Changed application	State: WISCONSIN
	Other	County: ASHLAND

Lat. 46° 36' 12.0" N, Long. 90° 52' 33.0" W (NOAA Chart 14974) Mouth Eng. N/A Scaler (Circle one)  
 Lat. \_\_\_\_\_ "N, Long. \_\_\_\_\_ "W, Heading N/A (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

The C. REISS Coal Co. dock (formerly the CLARKSON Coal Co. dock) is an INACTIVE PIER LOCATED TO THE EAST of the Soo LINE ORE Dock.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

The CLARKSON Coal Co. dock is now owned by the C. REISS Coal Co.

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MRS. VIVIAN HANSEN	Ashland City Hall Ashland, WI 54806	ASHLAND City Assessor

Submitted by: Name CDR DONALD L. SULOFF Title CDR / NOAA Date 9-13-84  
 Agency NATIONAL OCEAN SERVICE of NOAA Address 439 W YORK ST. NORFOLK, VA  
 Person who prepared this copy if other than above: Date 9-13-84  
 Name ENS KAY L. MILLER Title ENSIGN / NOAA

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name
	<input checked="" type="checkbox"/> Name change	Soo Line RR
	Changed application	State: WISCONSIN
	Other	County: ASHLAND

Lat. 46° 34' 49.0" N. Long. 90° 55' 00.0" W. (CHART 14974) Mouth End Center (Circle one)  
 Lat. \_\_\_\_\_ "N. Long. \_\_\_\_\_ "W. Heading N/A (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

The railroad is labeled at this position on NOAA chart 14974. It eventually branches into two sets of tracks at the west end of the City of Ashland; one set parallels the shoreline and ends just east of the Soo Line Ore Dock, while the other runs to the City Depot.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

Formerly owned by Chicago & North Western Trans Co, this railroad is now jointly owned by the City of Ashland and Soo Line RR.

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MRS VIVIAN HANSEN	Ashland City Hall Ashland, WI 54806	Ashland City Assessor

Submitted by: Name CDR DONALD L. SULLOFF Title CDR / NOAA Date 9-13-84  
 Agency NATIONAL OCEAN SERVICE OF NOAA Address 439 W. YORK ST. NORFOLK, VA  
 Person who prepared this copy if other than above: Date 9-13-84  
 Name ENS KAY L. MILLER Title ENSIGN / NOAA

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name
	<input checked="" type="checkbox"/> Name change	JAMES RIVER CORPORATION
	Changed application	State: WISCONSIN
	Other	County: ASHLAND

Lat. 46° 36' 16.0" N, Long. 90° 51' 27.0" W, (NOAA CHART 14974) Mouth End Center (Circle one)  
 Lat. \_\_\_\_\_ "N, Long. \_\_\_\_\_ "W, Heading N/A End (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

James River Corporation consists of 3 permanent buildings and a prominent stack. The business is located on the east end of the City of Ashland and is visible from Chequamegon Bay.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

ORIGINALLY THE AMERICAN CAN CO., NOW OWNED AND OPERATED BY THE JAMES RIVER CORPORATION.

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
MRS. VIVIAN HANSEN	ASHLAND City Hall ASHLAND, WI 54806	ASHLAND City Assessor

Submitted by Name: CDR DONALD L. SHLOFF Title: CDR / NOAA Date: 9-13-84  
 Agency: NATIONAL OCEAN SERVICE OF NOAA Address: 439 W YORK ST. NORFOLK, VA.  
 Person who prepared this copy if other than above: \_\_\_\_\_ Date: 9-13-84  
 Name: ENS. KAY L. MILLER Title: ENSIGN / NOAA

Form 9-1343 (Apr. 1967)

UNITED STATES DEPARTMENT OF THE INTERIOR BOARD ON GEOGRAPHIC NAMES WASHINGTON, D.C. 20242 DOMESTIC GEOGRAPHIC NAME REPORT	Controversial name	Recommended name <i>ASHLAND WATER Utility</i>
	<input checked="" type="checkbox"/> Name change	State <i>WISCONSIN</i>
	Changed application	County <i>ASHLAND</i>
	Other	

Lat. *46° 36.030' N*, Long. *90° 52.18.0' W*, (<sup>NOAA</sup> Chart *M774*) Mouth *N/A* Center (Circle one)  
 Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " N, Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " W, Heading *N/A* End (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

*The Ashland Water Utility is located at the east end of the City of Ashland (east of the Soo Line Ore Dock) near the WATERFRONT. The facility consists of 2 permanent buildings.*

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application:

*CHARTED NAME IS City Waterworks, although the facility is referred to locally as The Ashland Water Utility.*

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
<i>MRS VIVIAN HANSEN</i>	<i>Ashland City Hall Ashland, WI 54806</i>	<i>ASHLAND CITY ASSESSOR</i>

Submitted by: Name *CDR DONALD L. SUEOFF* Title *CDR. / NOAA* Date *9-13-84*  
 Agency *NATIONAL OCEAN SERVICE of NOAA* Address *439 W YORK ST. NORFOLK, VA.*  
 Person who prepared this copy if other than above: Name *ENS. KAY L. MILLER* Title *ENSIGN / NOAA* Date *9-13-84*



**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

May 31, 1985

N/MOP21x2/SRI

TO: N/MOP - Robert L. Sandquist *RLS*  
 FROM: N/MOP21 - David W. Yeager *David W. Yeager*  
 SUBJECT: Preprocessing Examination for H-10147

I. SURVEY INFORMATION

- A. Field No. WH-5-1-84 Registry No. H-10147
- B. State Wisconsin  
 General Locality Lake Superior  
 Sublocality Ashland Harbor
- 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 18, 1984  
 Field Work Completed October 10, 1984  
                   plus 6 weeks = November 24, 1984  
 Data Received at Atlantic Marine Center March 15, 1985  
 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-10147 was performed by personnel of the NOAA Ship WHITING, Cdr. Donald 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 mention of dangers to navigation were found in the descriptive report. A report or negative report of dangers to navigation is required to be included in section L of the Descriptive Report (Hydrographic Manual, section 5.9).

One danger to navigation was identified during the preprocessing examination of the final field sheet. The danger was reported to the Ninth Coast Guard District (Attachment A). An additional copy with a chartlet was forwarded to N/CG222, and DMAHTC was notified through the ANMS.

### B. Compliance With Instructions

Survey H-10147 is generally in compliance with the project instructions except as mentioned in sections M and Q of the Descriptive Report concerning numerous incomplete AWOIS investigations.

The width of the survey limits exceeded maximum allowed values and will require the smooth sheet to be skewed (Hydrographic Manual section 1.2.4).

### C. Final Field Sheet

The two detached position overlays were annotated in pencil, which is subject to fading. Ink is preferred because it is more legible and reproducible.

The shoreline verification required in this area was extensive and the field units survey efforts are commendable. The results of the shoreline verification were not, however, completely displayed on the final field sheet. While the detached position overlay will be valuable to the verifier, the hydrographer should make cartographic representation of features such as piers, ruins, cribs, rocks and groins on the final field sheet (Attachment B, Hydrographic Survey Guideline 17).

Significant least depths plotted on overlays should be transferred to the final field sheet (Attachment B, Hydrographic Manual 4.5.7.2).

A significant peak which was properly scanned and plotted near position 3438 should have been further investigated (Attachments B and C, Hydrographic Manual section 1.4.3).

### D. Descriptive Report

The Descriptive Report was generally well written.

The Abstract of Positions should contain station numbers (Hydrographic Manual figure 5-10).

#### E. Echograms

The echograms were well annotated and scanned.

The sidescan records mentioned in the Descriptive Report, section P, should have been submitted for review as required by section 7.12.3.2 of the project instructions.

#### F. Sounding Volumes

The Descriptive Report states check fixes were not observed on detached positions due to the numerous amount taken. Check fix information should be taken, if possible, particularly for isolated and/or new features (Hydrographic Manual section 4.4.1).

#### G. Sounding Correctors

The Descriptive Report, section D, states water level corrections were not applied because predictions were not possible. Predicted lake levels are available as a table published on each Great Lake chart. Application of this published correction or a preliminary correction determined from the nearest water level station would make final field soundings more useful (Hydrographic Manual section 4.9.3).

Discrepancies at crossings of two feet between soundings obtained by different vessels in the vicinity of latitude  $46^{\circ}36'45''N$ , longitude  $90^{\circ}51'15''W$  should have been discussed in section I of the Descriptive Report (Attachment B, Hydrographic Manual section 4.6.3).

#### I. Horizontal Control

Six horizontal control stations are plotted with cartographic code 250 on the final field sheet, while the Descriptive Report, section E, states that these stations are supplemental and should have been code 254 (Hydrographic Manual Appendix B).

#### J. Positioning Control

The field unit is recording an observed check initial angle during range/azimuth position control. It is useful to verifiers and the field unit to record also the result of a comparison of the computed and observed check initial angle, particularly at the beginning of a set-up.

#### N. Survey Acceptance

The preprocessing examination for H-10147 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 H-10147 not be accepted for Nautical Chart Branch processing until completion of the additional field processing discussed in the separate memo, "Condition of Surveys H-10147 and H-10148".

Prepared by,



Stanley R. Iwamoto

DEPTH  
more B)

PROJECT DEPTH 25 FT  
(see note B)

Depth over Crib 13 feet

pile uncovers  
1.0ft at Low  
Water

46°36'

15006

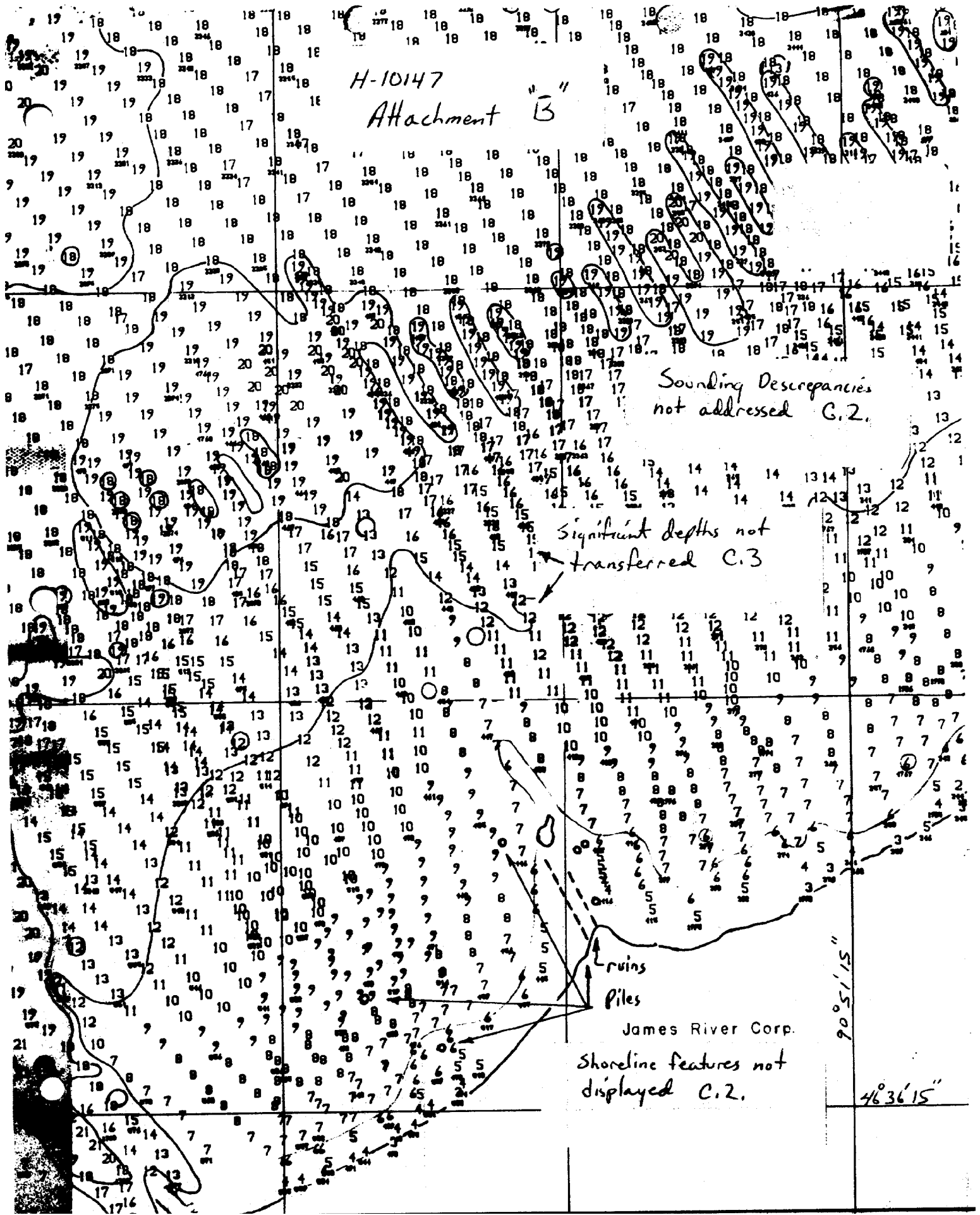
Chart 14974  
21st Ed.  
Attachment A

Temporary changes  
navigation are not included  
Notice to Mariners  
During some years  
changed by local ports  
replaced by other type  
CA  
Improved channels  
are subject to shoaling

REQUEST FOR  
Mariners are urged to report promptly  
National Oceanic and Atmospheric Admin  
conditions found to differ from or to be  
order that they may be fully investigated  
instances a section of the chart should  
don't which events a new chart will  
the revised chart of the current edition

Chart No.	Scale	Year	Notes
14974	1:50,000	2011	21st Ed.
14974	1:50,000	2008	20th Ed.
14974	1:50,000	2005	19th Ed.
14974	1:50,000	2002	18th Ed.
14974	1:50,000	1999	17th Ed.
14974	1:50,000	1996	16th Ed.
14974	1:50,000	1993	15th Ed.
14974	1:50,000	1990	14th Ed.
14974	1:50,000	1987	13th Ed.
14974	1:50,000	1984	12th Ed.
14974	1:50,000	1981	11th Ed.
14974	1:50,000	1978	10th Ed.
14974	1:50,000	1975	9th Ed.
14974	1:50,000	1972	8th Ed.
14974	1:50,000	1969	7th Ed.
14974	1:50,000	1966	6th Ed.
14974	1:50,000	1963	5th Ed.
14974	1:50,000	1960	4th Ed.
14974	1:50,000	1957	3rd Ed.
14974	1:50,000	1954	2nd Ed.
14974	1:50,000	1951	1st Ed.

H-10147  
Attachment "B"



Sounding Discrepancies  
not addressed C.2.

Significant depths not  
transferred C.3.

Ruins  
Piles  
James River Corp.  
Shoreline features not  
displayed C.2.

90° 51' 15"

46° 36' 15"

F3437  
00 FT

F3438

F3439

00 FT

10 FT

10 FT

20 FT

20 FT

Attachment "C"

30 FT

30 FT

LR

163908

164008

164108

164208

40 FT

40 FT

50 FT  
60 MM/MIN.

50 FT  
60 MM/MIN.



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

*WVH*  
*NOA*  
XO  
2

June 21, 1985

N/MOP21:DWY

TO: N/MOA - Wesley V. Hull

FROM: N/MOP - Robert L. Sandquist

*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



**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  
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

<u>BAR DEPTH</u>	<u>JD235</u>		<u>JD236</u>	
	<u>AM</u>	<u>PM</u>		
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	

	<u>JD243</u>		<u>JD244</u>	
	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>
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

	<u>JD248</u>	
	<u>AM</u>	<u>PM</u>
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

	<u>JD249</u>		<u>JD250</u>		<u>JD251</u>	<u>JD252</u>	
	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>		<u>AM</u>	<u>PM</u>
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	

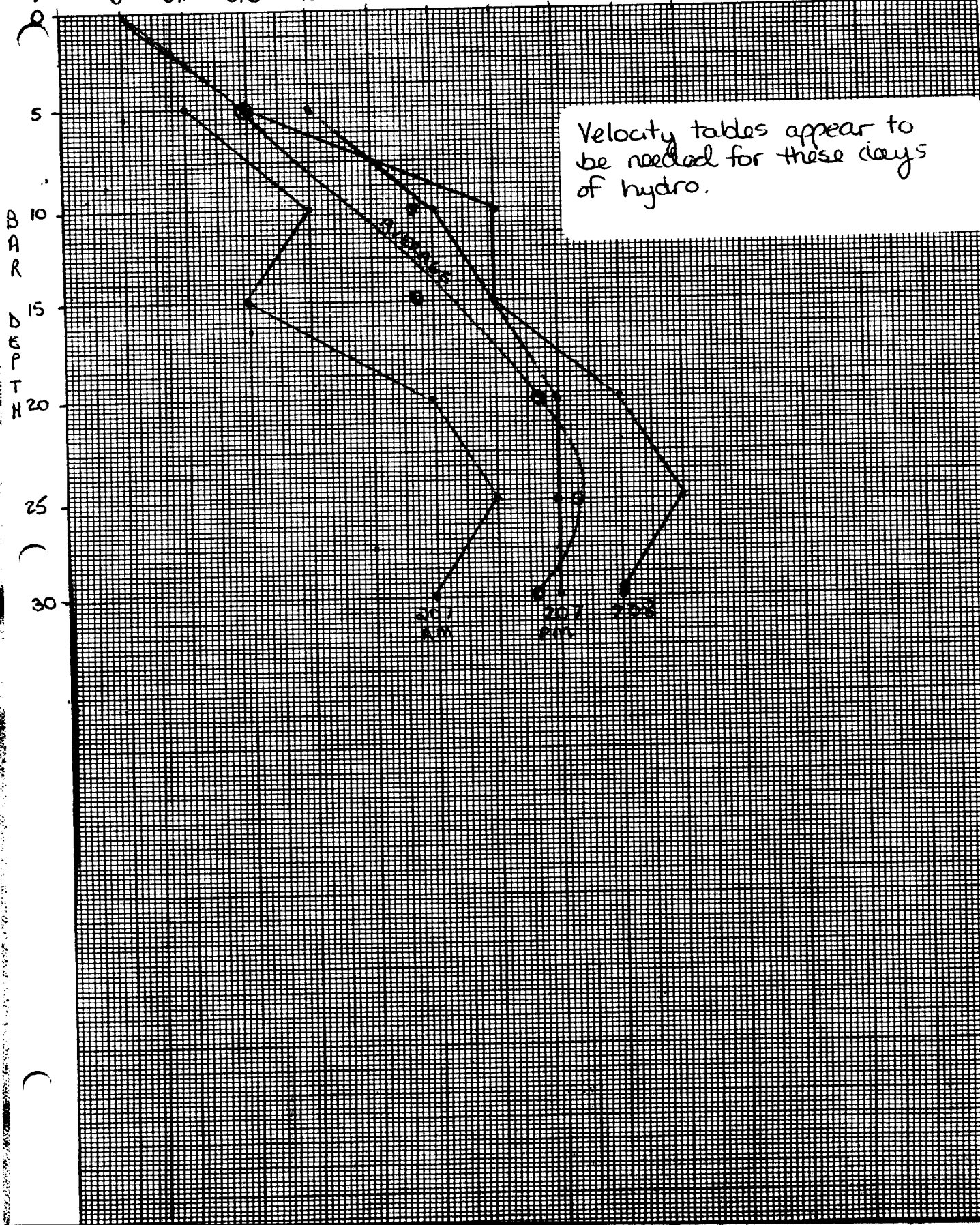


# MIRAFHMENT ☺

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



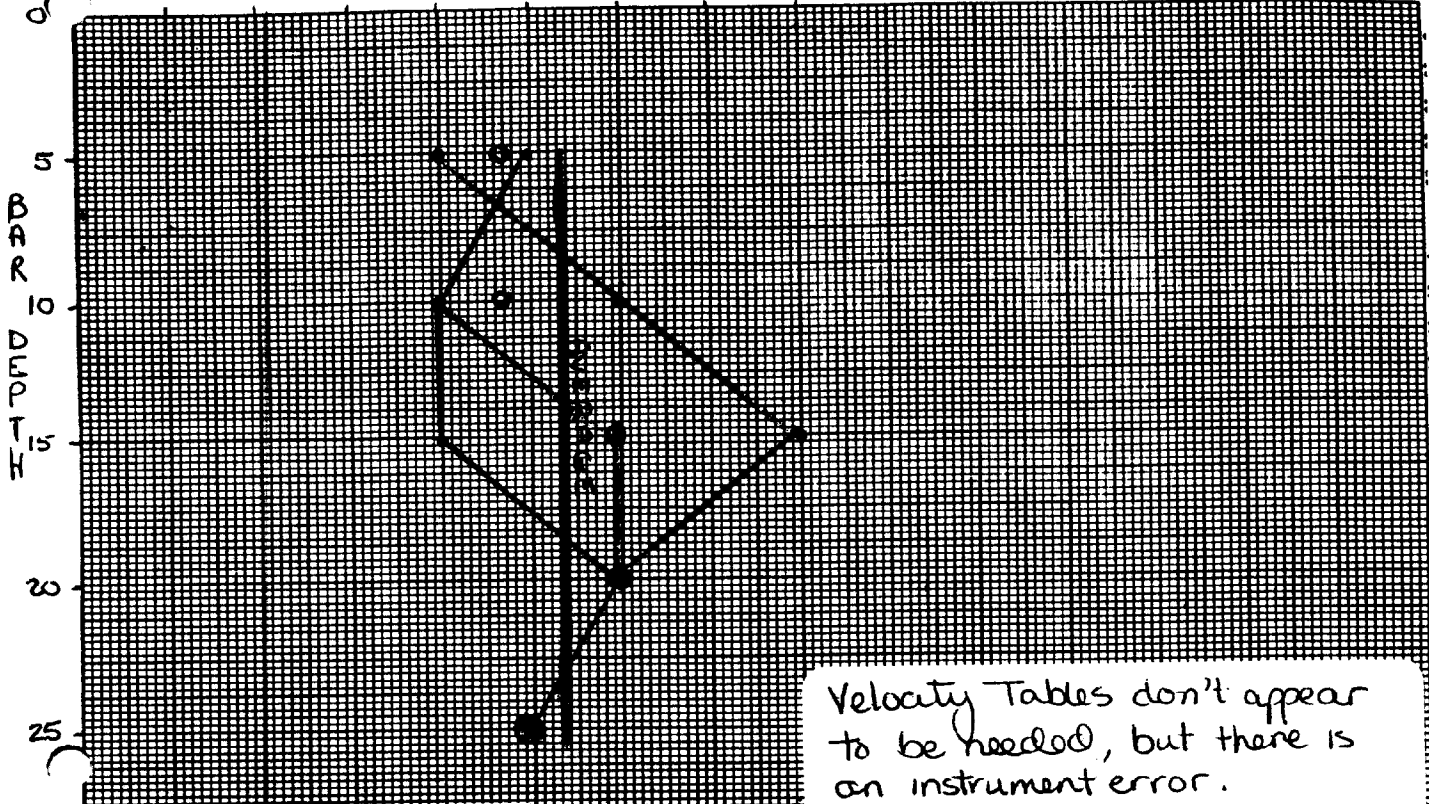
# ATTACHMENT D

Instrument Error  
gain or calibration

JD 243-244

VELOCITY + INSTRUMENT ERROR  
0.5 0.6 0.7

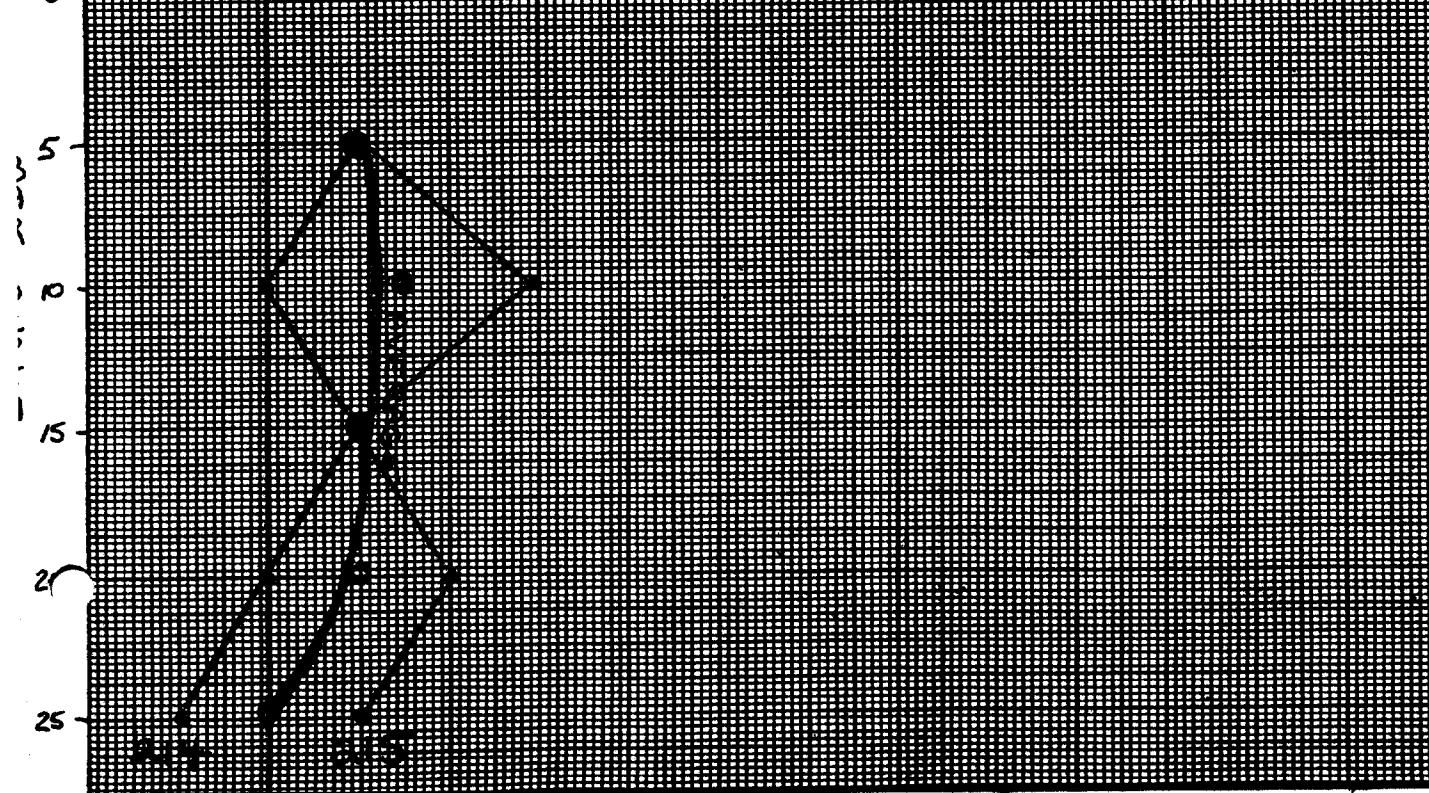
0 0.1 0.2 0.3 0.4



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

JD 214-215

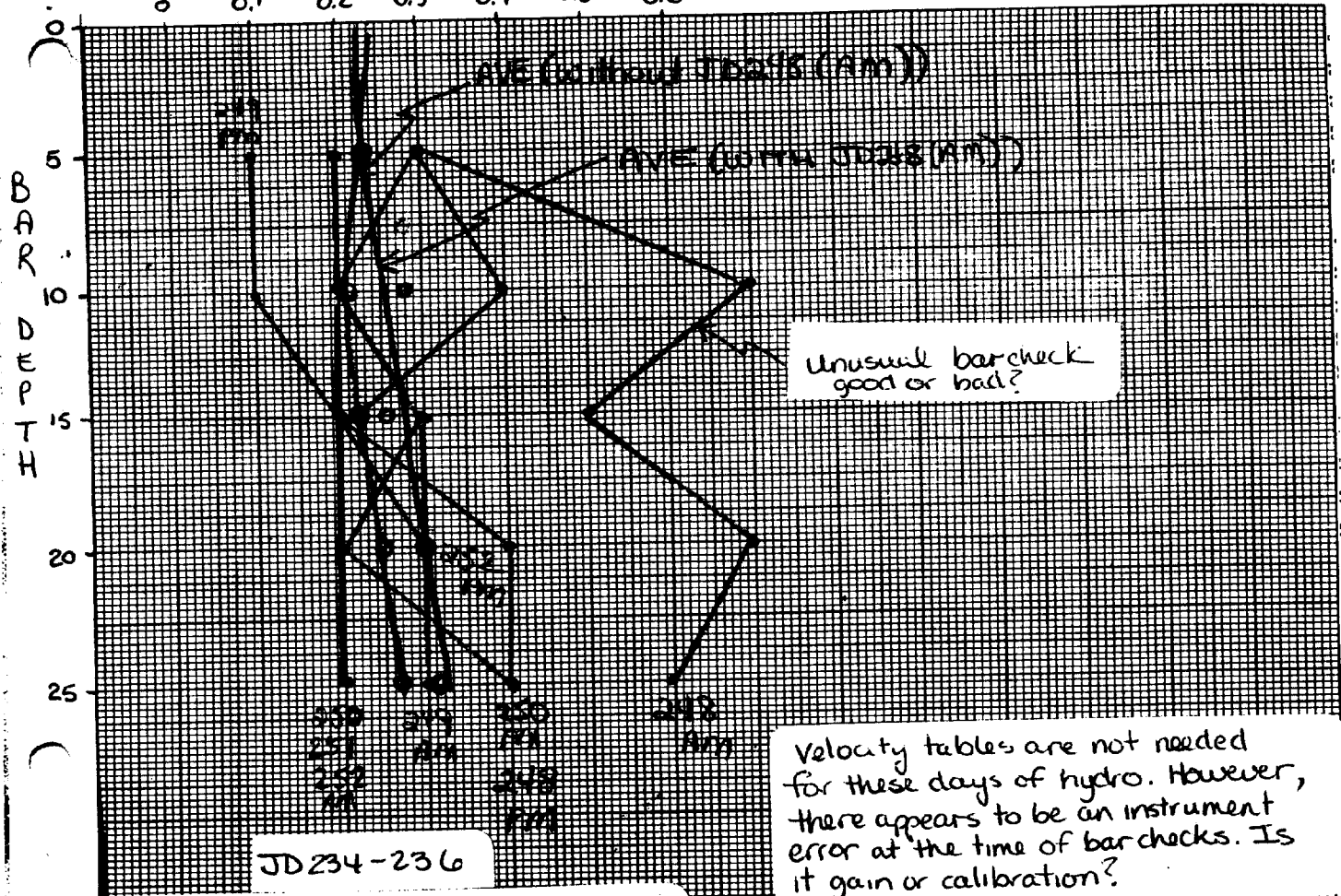
0 0.1 0.2 0.3 0.4 0.5



Instrument error?  
gain or calibration

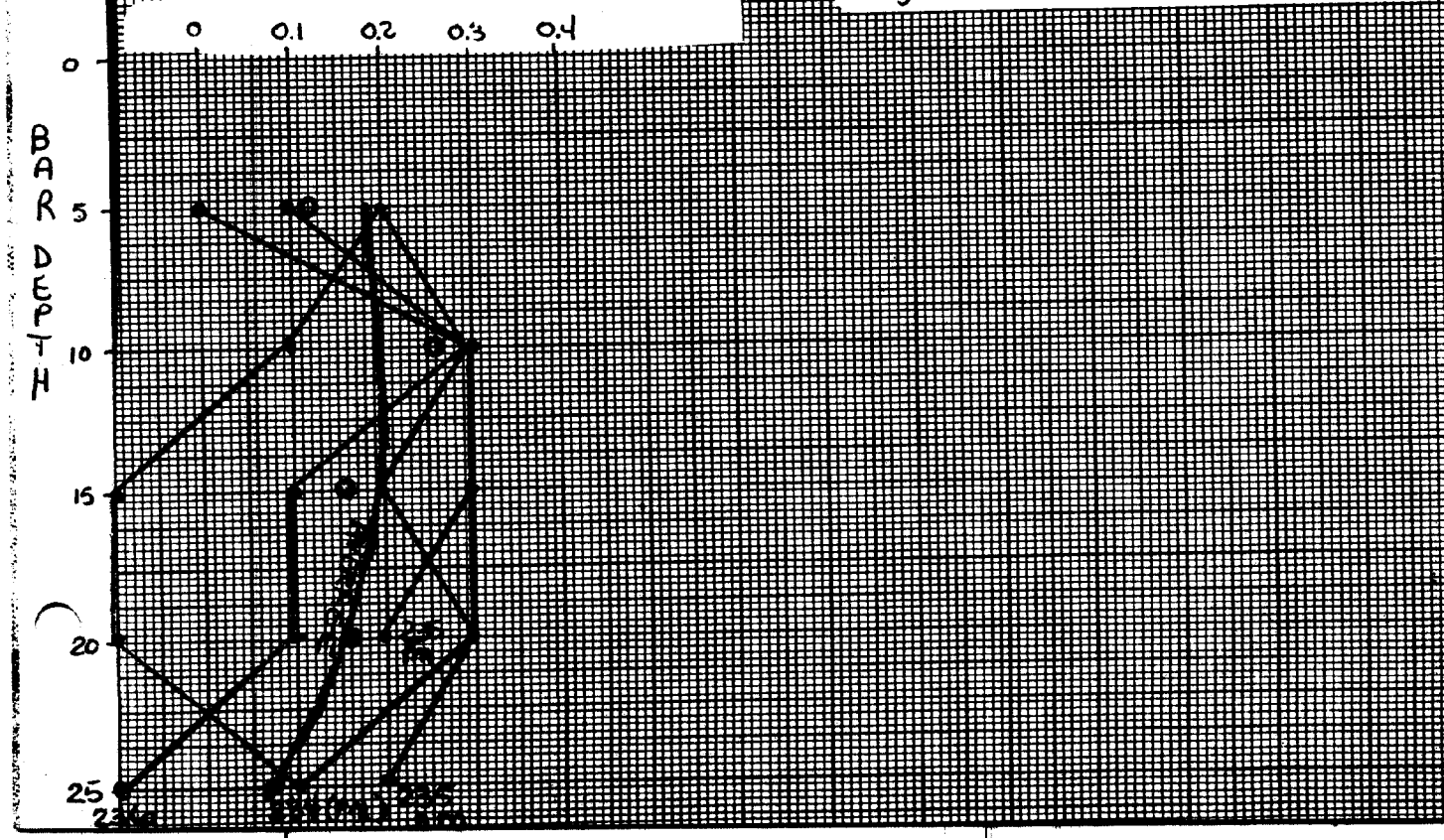
HIHCHHINI E

JD 248-252  
VELOCITY + INSTRUMENT ERROR



Velocity tables are not needed for these days of hydro. However, there appears to be an instrument error at the time of bar checks. Is it gain or calibration?

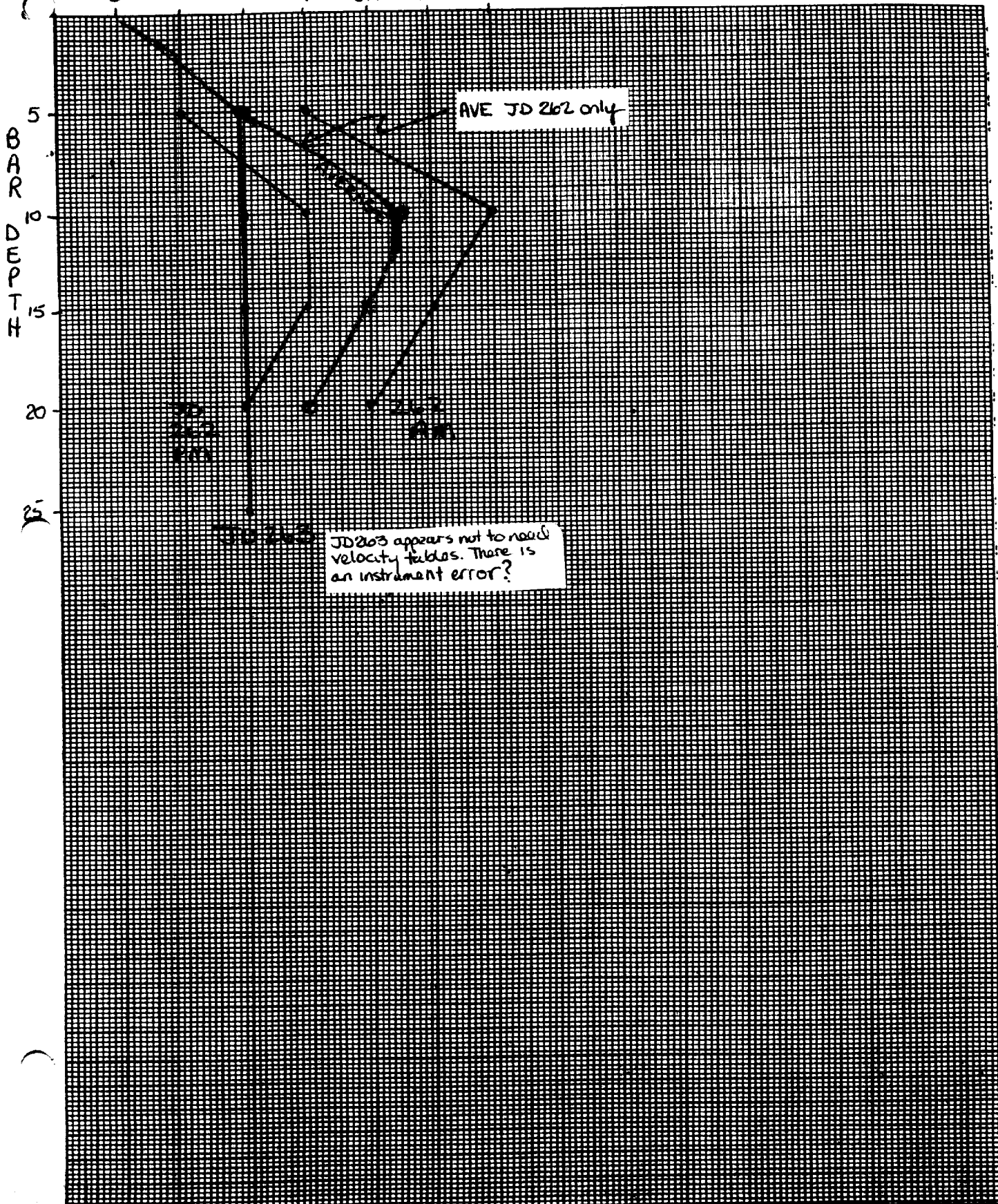
JD 234-236





# ATTACHMENT F

JD 262-263  
VELOCITY + 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  
OFFICE OF CHARTING AND GEODETIC SERVICES  
ROCKVILLE, MARYLAND 20852

RECEIVED

MAR 10 1986

MAR 6 1986

N/CG24x1:DEW

PACIFIC MARINE CENTER

*LOW 3/10  
ADP 4  
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.



all DM  
copy  
**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**

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

May 31, 1985

Commander (OAN)  
Ninth Coast Guard District  
1240 E. 9th Street  
Cleveland, Ohio 44199

Dear Sir:

During preliminary office review of hydrographic survey H-10147, Ashland Harbor, Lake Superior, Wisconsin, an uncharted pile was noted and was considered a danger to navigation. Questions concerning the survey may be directed to Lt. Cdr. David W. Yeager, Chief, Nautical Chart Branch, telephone (206) 526-6835.

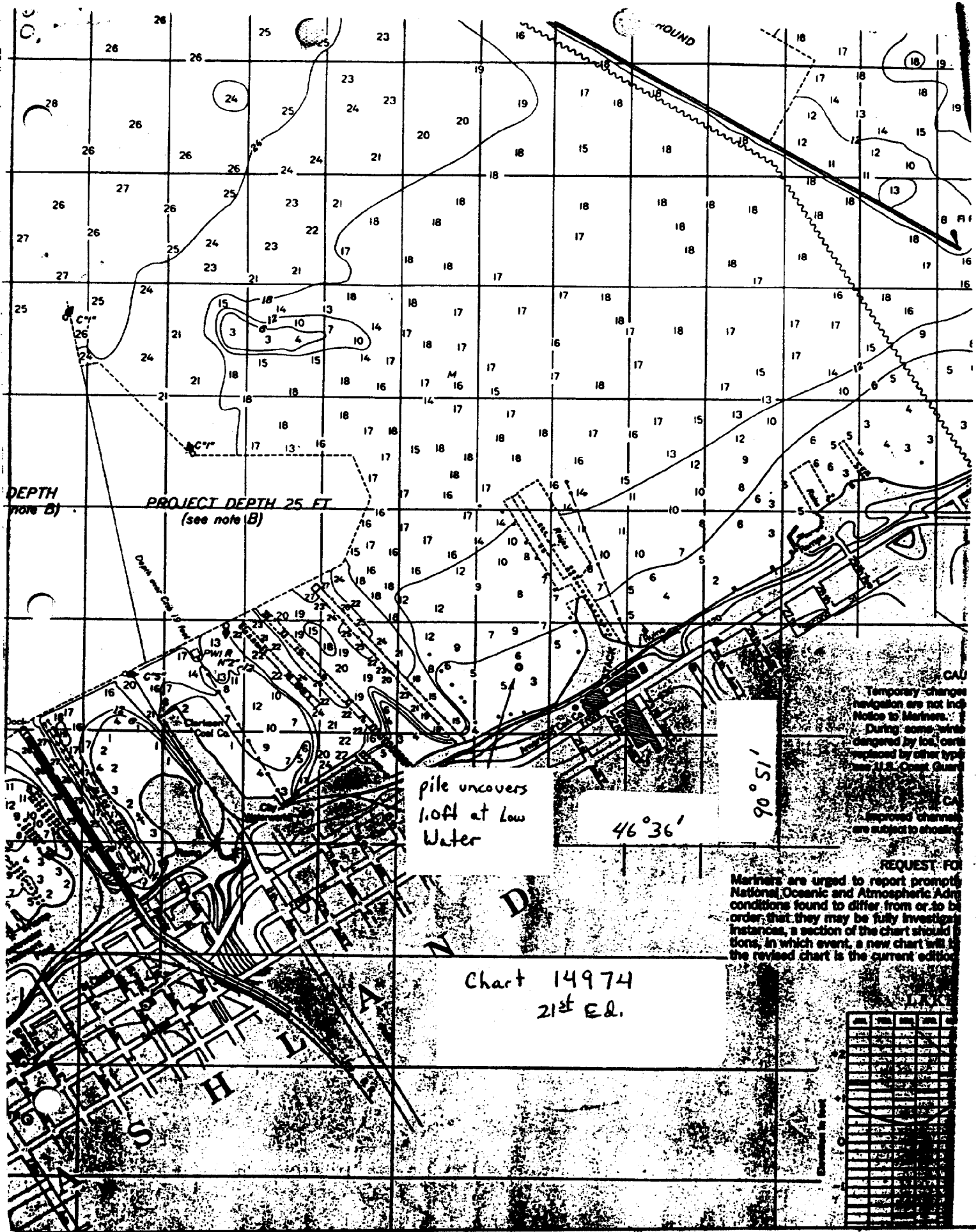
The following statement is recommended for inclusion in the Local Notice to Mariners:

"An uncharted pile uncovered 1.0 ft. (based on predicted Low Water) is at latitude 46°36'19"N, longitude 90°51'41"W, in Ashland Harbor, bearing 285° true, 300 meters from the American Can Company Stack (chart 14974)."

Sincerely,

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





DEPTH  
note B)  
PROJECT DEPTH 25 FT  
(see note B)

pile uncovers  
1.0ft at Low  
Water

46°36'

90°51'

**CAUTION**  
Temporary changes  
navigation are not in  
Notice to Mariners.  
During some times  
dangered by ice, until  
replaced by other type  
see 112 Coast Guard

**CAUTION**  
Improved channels  
are subject to shoaling

**REQUEST FOR**  
Mariners are urged to report promptly  
National Oceanic and Atmospheric Admin  
conditions found to differ from or to be  
order that they may be fully investigated.  
Instances, a section of the chart should  
tions, in which event, a new chart will be  
the revised chart is the current edition.

Chart 14974  
21st Ed.

NO.	DATE	REVISION	DESCRIPTION
1			
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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 Schwab*

David J. Schwab  
Oceanographer

cc: D. Reid

JENNIS,  
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  
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



GEOGRAPHIC NAMES

H-10147

Name on Survey	Source of Name										No.
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP ATLAS	GRAND McNALLY	U.S. LIGHT LIST			
ASHLAND											1
ASHLAND HARBOR (title)											2
BAY CITY CREEK											3
CHEQUAMEGON BAY											4
SUPERIOR, LAKE (title)											5
WISCONSIN (title)											6
											7
											8
											9
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											24
											25

Approved:

*Charles E. Harrington*  
Chief Geographer - NCG 2x5

AUG 10 1988

**HYDROGRAPHIC SURVEY STATISTICS**

H-10147

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		7
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		6
DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	2				
ENVELOPES					1
VOLUMES	16				
CAHIERS					
BOXES					

**SHORELINE DATA**

- SHORELINE MAPS (List):
- PHOTOBATHYMETRIC MAPS (List):
- NOTES TO THE HYDROGRAPHER (List):
- SPECIAL REPORTS (List):
- NAUTICAL CHARTS (List):

**OFFICE PROCESSING ACTIVITIES**

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			4365
POSITIONS REVISED			20
SOUNDINGS REVISED			300
CONTROL STATIONS REVISED			0
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	105.0		105.0
VERIFICATION OF SOUNDINGS	212.0		212.0
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	105.5		105.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		50	50
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT	45	39	43.5
GEOGRAPHIC NAMES			
OTHER' Digitizing			10.0
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS		
	427.0	89	576

Pre-processing Examination by <b>M.R. Kenny, J. Wilder, S. Iwamoto</b>	Beginning Date 11/20/85	Ending Date 12/30/86	Hours 57.5
Verification of Field Data by <b>T.O. Jones, L. Deodato</b>	Time (Hours) 427		11/20/86
Verification Check by <b>J. Stringham, S. Otsubo, R.A. Olmstead,</b> J.S. Green	Time (Hours) 575		12/30/86
Evaluation and Analysis by <b>Gordon E. Kay</b>	Time (Hours) 89		12/30/86
Inspection by <b>Dennis J. Hill</b>	Time (Hours) 24		12/31/86

PACIFIC MARINE CENTER  
EVALUATION REPORT  
H-10147

1. INTRODUCTION

H-10147 was accomplished by the NOAA Ship WHITING (S-329), 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 was intended to be a basic survey of the Ashland harbor area which is located on the south shore of Lake Superior. The survey extends off shore and the bottom gradually slopes to depths of 28 feet. The bottom is composed of brown mud.

H-10147 contained numerous field problems when it was received at PMC. H-10147 was originally submitted for processing during March 1985. The preprocessing examination noted deficiencies, the most important of which was the lack of sound velocity correctors. The survey was returned to the hydrographer for additional field processing. This additional processing did not resolve the velocity problem. Upon instructions from the 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 this 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, the depths on this survey may be up to 1 foot deeper than depicted on the smooth sheet.

The survey was not considered complete when the vessel departed the area because a number of AWOIS investigations had not been completed. It was reasoned that since the vessel was not scheduled to return to the area for several years the survey should be submitted for processing. These unresolved AWOIS items included almost all of the charted waterfront, and resulted in the transfer to the present survey of much unsuperseded data from the 1901 prior survey. There remains a requirement for a significant amount of additional field work.

See Exam Rpt  
item 3

The survey exceeds the maximum allowable sheet size as specified in section 1.2.4 of the Hydrographic Manual. A copy of the correspondence requesting 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 zoned 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, a registered Class III map, which originates from photography dated April 1978. The final registered shoreline map is TP-00439 (1978-1980)~~

## 3. HYDROGRAPHY

Hydrography within the limits of this survey 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 had 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, the AMC OPORDER, and applicable portions of the PMC OPORDER except as noted in the Preprocessing Examination Report, dated May 31, 1985 and as follows:

- a. H-10147 is an oversized sheet. The length exceeds by 14 centimeters the maximum length requirements specified in the Hydrographic Manual 1.2.4.
- b. Many AWOIS items that were investigated were not investigated thoroughly enough to adequately verify or disprove the feature. The recommendations for supersession in the hydrographer's report for many of the items was based on investigations that did not extend to the limits of the feature as depicted on the prior survey and chart. The potential for submerged ruins remains. See Exam Rpt item 3

c. Sound velocity was 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 the Preprocessing Critique.

#### 5. JUNCTIONS

H-10147 junctions with H-10148 (1984) to the west, north and east. Soundings were transferred from H-10148 to justify depth curves and to portray shoaler information. The junction has been adequately effected.

#### 6. COMPARISON WITH PRIOR SURVEYS

LS-895 (1901) 1:10,000.

A comparison with LS-895 indicates significant changes in the area since the earlier survey. Most of these changes are directly related to the many cultural improvements which have been made throughout the harbor. Many of the piers no longer exist in their previous form; while depths and the shoreline configuration have also changed due to dredging and filling activities.

In general, there has been a variable change in depths throughout the survey area although some areas have been apparently unaffected by the development of the harbor. The present survey, despite its inherent deficiencies, is considered adequate to supersede the prior survey hydrography.

The present survey, however, is not adequate to supersede many of the piers. Those features not superseded have been carried forward to the present survey smooth sheet as submerged ruins and are listed below by their AWOIS number. Detailed information regarding position and history is contained in the AWOIS. } See Exam Rpt  
item 3

AWOIS items 3355-3363, 3366, 3368, 3378-3382, 3388-3389, 3393 and 3397-3398, charted piers originating with LS-895, were not completely investigated. While some ruins were found there is no evidence that potential submerged ruins have been disproven. To supplement the survey, the limits of the piers as depicted on LS-895 have been carried forward to the smooth sheet as submerged ruins. } See Exam Rpt  
items 2,3

With the transfer of the previously mentioned features, H-10147 is adequate to supersede LS-895.

#### 7. COMPARISON WITH CHART

Chart 14973, 24th Edition, dated Jan.19, 1980; scale 1:60,000  
 Chart 14973, 25th Edition, dated Jan.25, 1986; scale 1:60,000  
 Chart 14974, 21st Edition, dated June 2, 1979; scale 1:15,000  
 Chart 14974, 22nd Edition, dated Dec.7, 1985; scale 1:15,000

a. Hydrography - Charted information originates from the before mentioned prior survey and miscellaneous sources. Comparison with chart 14973, 25th Edition and chart 14874, 22nd Edition was accomplished since these were the latest editions at the time of survey processing.

The following charted depths were not verified or disproven by the hydrography on this survey. The source of these soundings should be checked and if still valid these soundings retained as charted. The positions for these soundings on NAD 1927 are:

SOUNDING	LATITUDE NORTH	LONGITUDE WEST
4-feet	46°36'00"	90°53'02" (misc. source)
9-feet (22nd Ed. only)	46°36'15"	90°54'30" (field sheet H-10148(1984))

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

AWOIS item 3347, piers and rocks, charted in the vicinity of latitude 46°35'01.8"N, longitude 90°55'05.5"W, was investigated by the hydrographer. The AWOIS states that the area contains nine piers and nine rocks awash. A review of the chart does not support this description. There are, in fact, a mixture of rocks and piers/groins. The present survey adequately addresses the charted features. The disposition of the AWOIS features however, is questionable. See Exam Rpt  
item 1

AWOIS item 3354, a submerged crib, charted at latitude 46°36'20.4"N, longitude 90°52'31.2"W, was not fully investigated by the hydrographer. He states that the diver investigation was called off due to concerns over suction from the water intake pipe. There are no records of this partial search other than the statement in the report. It is likely that the crib continues to exist as evidenced by the shoal depths in the vicinity and along the route of the charted pipeline to shore. To insure that the feature is retained as charted, a submerged crib symbol has been added to the smooth sheet at the charted position. The intake pipeline to shore was not investigated either, however it has not been added to the smooth sheet. It is recommended that both features be retained as charted. See Exam Rpt  
item 4

AWOIS 3367 - This pier, charted at latitude 46°35'34.8"N, longitude 90°53'34.0"W, was not completely investigated since the limit of these 2 rows of pilings was not determined. One visible pile was located. The remaining charted piles should be revised to submerged piles. and piling were

lat. 46°35'35.5" long. 90°53'12.5"

AWOIS 3372 - This visible pile, charted at latitude 46°35'31.8"N, longitude 90°53'14.2"W, was not located by the hydrographer. His description of a pile located at position 1518 is a new feature 65 meters to the northeast. TP-00439, however, shows a dolphin only 30 meters to the west which could be the charted pile. The AWOIS item is considered resolved despite the fact that the AWOIS listing indicates TP-00439 was reviewed and was not considered to be sufficient verification of the charted feature. It is recommended that the position of the charted pile be revised to latitude 46°35'32.3"N, longitude 90°53'15.7"W, the position of the dol located on the present survey.



AWOIS 3374 - These visible piles, charted at latitude 46°35'22.5"N, longitude 90°53'41.8"W, were not completely investigated. Based on the hydrographer's statement in the field records that the area contains visible and submerged piles a foul limit line has been indicated on the smooth sheet at the farthest offshore extent of charted piles. This limit line terminates to the west at its intersection with the configuration of submerged pier ruins carried forward from survey LS-895. Within the foul area the specific dashed symbolization of lines of piles apparent from TP-0439 has been deleted to prevent possible confusion with the dashed symbolization of the foul limit line. With the exception of piles portrayed as visible at sounding datum on the smooth sheet it is recommended that the presently charted piles be revised to submerged in their present configuration in the vicinity of latitude 46°35'24"N, longitude 90°53'40"W.

AWOIS 3375 - These visible piles, charted at 46°35'49.4"N, longitude 90°53'04.6"W were not completely investigated. Seaward limits of these rows of piles were not determined. Some piles were located and are shown on the smooth sheet, however there was no apparent investigation within the offshore area of the group of charted piles. It is recommended that they be revised to submerged and be retained in their present configuration in the vicinity of latitude 46°35'49"N, longitude 90°53'05"W.

Geographic names appearing on the smooth sheet originate with and are plotted in accordance with Chart 14974. See Exam Rpt. Item 7

The hydrographer has recommended that the previously charted piers which were not completely investigated be revised to submerged features and retained in their presently charted locations. This recommendation is basically concurred with except that the presently charted configurations may not be adequate to encompass all potential submerged ruins. Prior survey LS-895 originally depicted the piers with considerably more extent that is presently charted. The source for the reduction in size on the chart is unknown, however, it is likely that this source was as deficient as the present survey in assessing the status of submerged ruins. It is recommended that the potential for uncharted submerged hazards to navigation be reevaluated and that the delineation of piers originating with survey LS-895 and depicted on the present survey be considered for charting. See Exam Rpt. Item 3

Except as noted previously in this report, H-10147 is adequate to supersede charted hydrography within the common area.

A Dangers to Navigation Report (copy appended) was submitted to the Ninth Coast Guard and DMA on May 31, 1985 by the Pacific Marine Center. No additional dangers, discovered during this field work, were identified during office processing.

b. Controlling Depths - There are four maintained areas with controlling depths within the limits of this survey. These four areas are centered as follows:

LATITUDE NORTH	LONGITUDE WEST	PROJECT DEPTH	SURVEY LEAST DEPTH
46°35'36"	90°54'06"	21 FEET	16 FEET
46°35'51"	90°53'39"	21 FEET	189 FEET
46°36'30"	90°53'00"	27 FEET	261 FEET
46°36'33"	90°52'24"	25 FEET	243 FEET

The first two areas are apparently experiencing minor shoaling along their southern limits. It is difficult to accurately evaluate the shoaling since the frequency and quality of maintenance dredging is unknown. The user is reminded that the smooth sheet depths have not been corrected for velocity and may be in error one foot or more.

c. Aids to Navigation - The only fixed aid within the limits of this survey is Ashland Breakwater South Light, Light List number 14585, located by this survey at latitude 46°37'03.894"N, longitude 90°50'32.885"W. The 19 floating aids are adequately discussed in the hydrographer's report section N, page 16-17. Charted aids to navigation have been located and adequately serve their intended purpose.

8. COMPLIANCE WITH INSTRUCTIONS

H-10147 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 partially 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 is recommended to resolve the following AWOIS items: 3347-3349, 3354-3373, 3373-3375, 3375-3378, 3378-3386, 3388-3389, 3391-3393, and 3397-3399. Investigation of these items is recommended on a non-priority basis. 3383-84, 3386

Submitted,

*Paul E. Key*  
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-10147

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 12/31/86  
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWMordock

Robert L. Mordock 12/31/86

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. Mordock 12-31-86  
Director, Pacific Marine Center (Date)



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

November 9, 1988

TO: N/CG24 - Russell C. Arnold  
 FROM: N/CG242 - *George K. Myers, Jr.*  
 SUBJECT: Examination of Hydrographic Survey H-10147 (1984), Wisconsin, Lake Superior, Ashland Harbor

Chief of Party ..... Donald L. Suloff  
 Field Unit ..... NOAA Ship WHITING  
 Processed by ..... Pacific Marine Center  
 Examined by ..... S. R. Baumgardner

An examination of hydrographic survey H-10147 (1984) was accomplished to monitor the survey for adequacy with respect to data acquisition, conformance with applicable project instructions, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, shoreline transfer, decisions made and actions taken by the evaluator, and the cartographic presentation of data.

Cartographic deficiencies and constructive comments are noted on a full-scale copy of the survey smooth sheet which will be forwarded to the marine center. Digital data on magnetic tape were not available during the examination of this survey. Therefore, an inspection of a graphic plot from the certified tape was not performed.

In general, the survey was found to conform to National Ocean Service standards and requirements except as stated in the Evaluation Report and as follows:

1. The discussions of AWOIS item 3347, nine rocks awash in the vicinity of latitude 46°35'01.8"N, longitude 90°55'05.5"W, by the hydrographer and evaluator are inadequate. Recommendations are unclear and geographic positions are not provided. See below for final dispositions of the rocks.



Charted Position

<u>Rock Awash</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>	<u>Recommendation</u>
1	46°34'58.8"	90°54'44.5"	Verified, chart as indicated on present survey
1	46°34'58.8"	90°54'49.5"	Verified, chart as indicated on present survey
1	46°34'59.5"	90°54'54.5"	Not disproved, retain as charted
1	46°35'00.5"	90°55'03.0"	No longer charted due to shoreline revision
1	46°35'01.9"	90°55'05.5"	Verified, chart as indicated on present survey
1	46°35'01.9"	90°55'08.5"	No longer charted due to shoreline revision
3 vicinity of	46°35'02.6"	90°55'12.0"	Not disproved, retain as charted

2. A 7-foot lead line depth, corrected for water level, from a diver investigation of old pier remains (AWOIS item 3393), should be appropriately charted at latitude 46°36'38.0"N, longitude 90°51'41.3"W. This sounding was not processed. Consequently, it does not appear on the smooth sheet or in the sounding listing. (See section L., item 3393, of the Descriptive Report.)

3. Nine piers have been brought forward to the present survey from LS-895 (1901) as submerged ruins at the positions listed below. Numerous subsequent chart revisions from miscellaneous sources and revisory surveys reveal extensive changes to these ruins. The disposition of these features is deferred to the compiler for final resolution.

<u>Latitude (N)</u>	<u>Longitude (W)</u>
46°36'45"	90°50'53"
46°36'45"	90°51'01"
46°36'45"	90°51'04"
46°36'21"	90°52'15"
46°36'17"	90°52'15"
46°36'00"	90°52'55"
46°35'56"	90°53'05"
46°35'52"	90°53'04"
46°35'30"	90°53'54"

4. During marine center processing of AWOIS item 3354, a submerged crib, charted in latitude 46°36'20.4"N, longitude 90°52'31.2"W, was erroneously brought forward from the chart to the present survey. (See section 7.a. of the

Evaluation Report.) The crib originated with a miscellaneous source and was not verified or disproved by the present survey. The hydrographer's recommendation to retain the charted submerged crib in 19 feet of water is appropriate and no further discussion is required. (See section L. of the Descriptive Report.) The submerged crib plotted on the smooth sheet should be disregarded.

5. The following charted items, originating with miscellaneous sources, were neither verified nor disproved by the present survey and should be retained as charted.

<u>Item</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
log booms	46°36'03"	90°52'43"
submerged pipeline (extends 500 meters from shore)	46°36'12"	90°52'24"

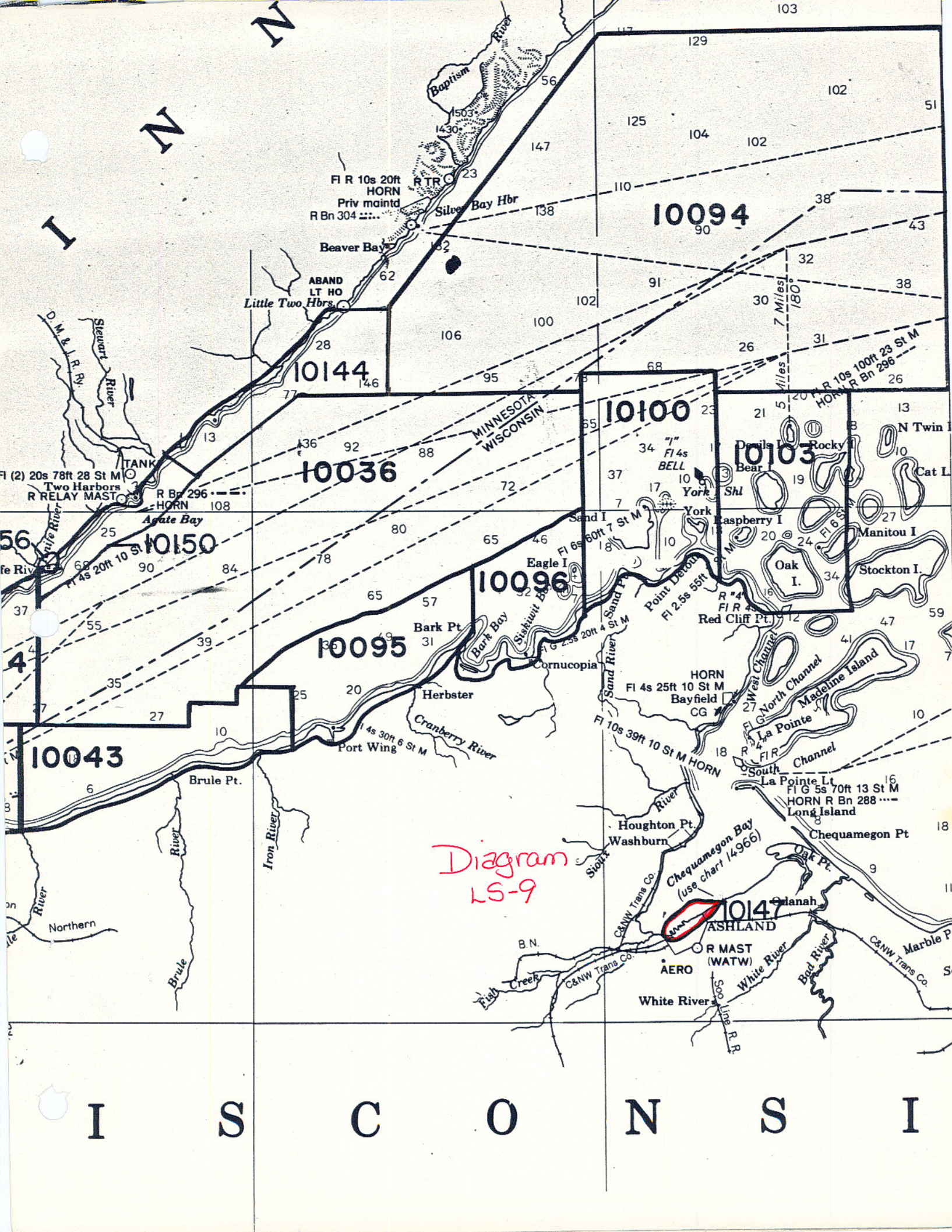
6. The hydrographer did not make a comparison with LS-895 (1901), the most recent prior survey in the area of the present survey. The comparison is discussed in section 6 of the Evaluation Report.

7. The NOAA Form 76-155 "Geographic Names" was not approved by the Chief Geographer as required. (See Hydrographic Survey Guideline No. 22.) Approval was obtained during this examination.

8. Most of the AWOIS items addressed in section L of the Descriptive Report were not adequately documented. Investigations were not fully described. Some items had no accompanying geographic positions, while others had positions that were recorded to only a tenth of a minute.

9. The extent and orientation of numerous piers, ruins, and jetties, for which detached positions obtained were not graphically drawn on the field sheet nor clearly described in the field records. This made processing difficult, as it was unclear how these features should be delineated on the smooth sheet.

10. Some of the triangulation stations are not identified by the year of establishment on the survey as data and supporting documentation for these stations were not available during marine center processing. It is assumed that triangulation specifications were complied with and that the necessary records and computations will be forwarded to, and the stations accepted by, the National Geodetic Survey Division.



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Diagram  
LS-9

I S C O N S I

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

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10147

**INSTRUCTIONS**

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
14974	9/12/89	Nancy Chouh	Full <del>Part Before</del> After Marine Center Approval Signed Via <i>full application</i> Drawing No. <i>of Sdgs from SS</i>
14973	10/11/89	Nancy Chouh	Full <del>Part Before</del> After Marine Center Approval Signed Via <i>full application</i> Drawing No. <i>of Sdgs from SS</i>
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.

*appd to STds 2-11-87 BHT*