

9705

Diagram Chart No LS-3

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

Type of Survey Hydrographic.....
Field No. HSB-10-1-77.....
Office No. H-9705.....

LOCALITY

State New York.....
General Locality Lake Erie.....
Locality Buffalo Harbor.....

1977

CHIEF OF PARTY
LCDR. W.R. Daniels.....

LIBRARY & ARCHIVES

DATE November 13, 1980.....

9705

AREA-7

CHARTS

14820

14822

14823-M ~~Apr 1980~~

14832

14833

HYDROGRAPHIC TITLE SHEET

H-9705

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.

HSB-10-1-77

State New York

General locality Buffalo Lake Erie, Buffalo

Locality Buffalo Harbor

Scale 1:10,000 Date of survey 1 Jun 77 - 23 Sep 77

Instructions dated 25 Jan 77 Project No. OPR-300

Vessel Launch 1255, Launch 1012, Launch 1278

Chief of party LCDR William R. Daniels

Surveyed by K. Andreen, J. Bennett, J. Wilder

Soundings taken by echo sounder, hand lead, pole DE 719B and DE 723D echo sounders

Graphic record scaled by KA, JB, JW, EF, GM, WS, KG, EM, SW, JB, CH, JR

Graphic record checked by KA, JB Verification Branch (AMC)

Protracted by _____ Automated plot by AMC - GALCOMP 610
Xynetics 1201 Plotter (AMC)

Verification by AMC Verification Branch L.G. Cram

Soundings in ~~fathoms~~ feet at ~~NEW XXXX~~ IGLD 1955: 568.6 feet

REMARKS: This survey is complete and adequate to supersede prior surveys. For

other reference reports, see section(s) Changes made in red ink

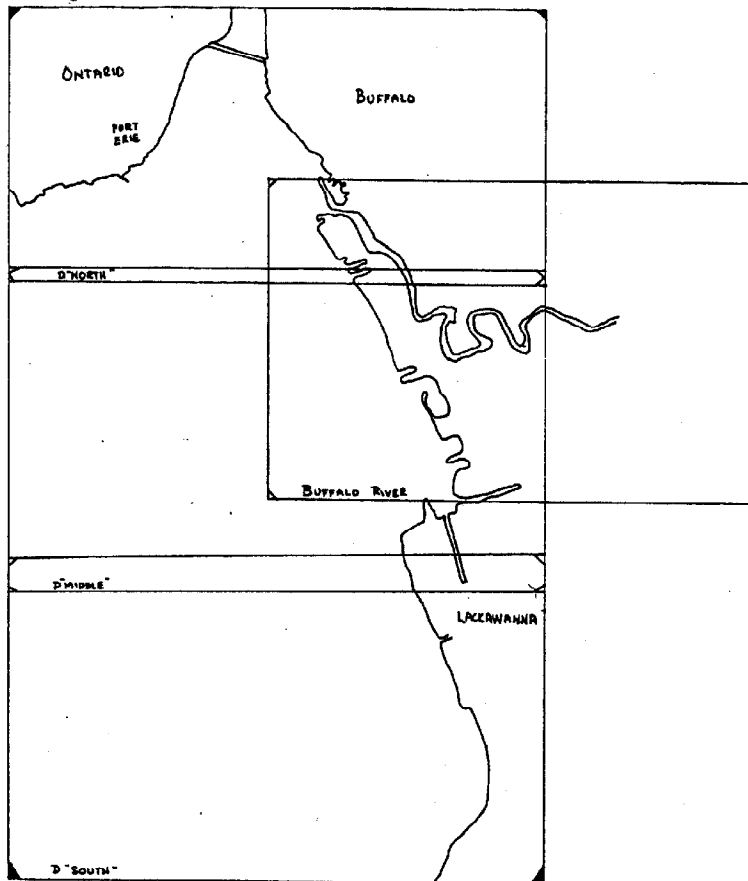
Time Meridian: 0° (GMT) are by the verifier during verification

Disc. Data, removed from the D.P., is filed with the field records

STANDARDS CHECKED 8-9-82

C. W. J.

SHEET
LAYOUT
H-9705
HSB 10-1-77

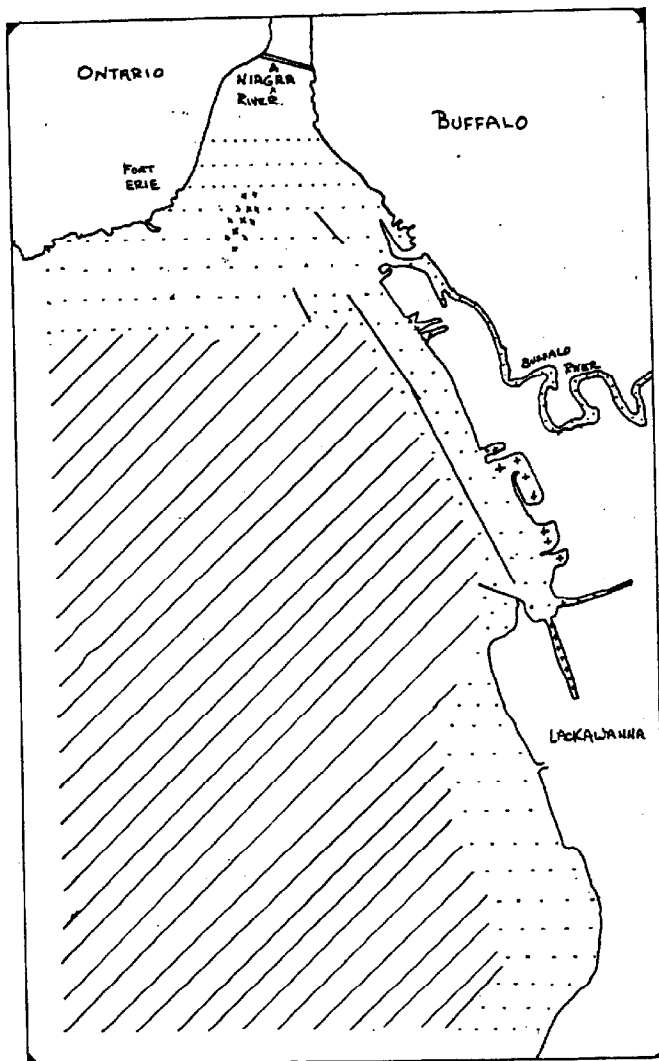


+ 42°45'
78°55'

Chart: 14822
(formerly LS31)
1:80000
"NIAGARA RIVER AND 22ED.
WELLAND CANAL" Nov 9/79

SURVEY AREA : H-9705

HSB 10-1-77





+ 42° 45'
78° 55'


CHART: 14822
(FORMERLY LS31)

1:80,000
"NIAGARA RIVER
AND WELLAND CANAL"

SURVEY AREA:

LAUNCH 1255 

LAUNCH 1012 

LAUNCH 1278 

22 ED. NOV 9/74

DESCRIPTIVE REPORT
To Accompany
Hydrographic Survey H-9705 (HSB-10-1-77)

Scale 1:10,000 1977 Lt. Cdr. Daniels, Chief of Party
Surveyed by: NOAA Launch 1255 O.I.C. - J. Bennett, Lt., NOAA
 NOAA Launch 1012 O.I.C. - K, Andreen, Lt(jg) NOAA

A. PROJECT

This hydrographic survey was conducted in accordance with PROJECT INSTRUCTIONS OPR-300-HFP-77, Lake Erie and Upper Niagara River dated 25 January 1977 with the following supplements to the instructions: Change No. 1 dated 30 March 1977; Change No. 2 dated 31 March 1977; Change No. 3 dated 31 May 1977 and Change No. 4 dated 11 July 1977.

B. AREA SURVEYED

The area encompassed by Sheet HSB-10-1-77 is an irregular section of the extreme northeastern end of Lake Erie, bounded north by the mouth of the Niagara River (Latitude 42°53.75'N) and east by the Buffalo Harbor and waterfront. The southern limit of this survey is Latitude 42°46.77'N, and the western limit ^{is} ~~was~~ Longitude 78°56.65'W. The navigable portion of the Buffalo River is also included as per PROJECT INSTRUCTIONS. This survey commenced on 1 June 1977 (J.D. 152) and ended on 23 September 1977 (J.D. 266).

C. SOUNDING VESSEL

NOAA Launches 1012, 1255 and 1278 were used to obtain all soundings for this survey.

Launch 1255 was used to accomplish the majority of deep water hydrography. Launch 1012 was used for shoaler waters, the Buffalo River, and the harbor and waterfront areas. Launch 1278 was used when it was impractical due to depths, dangers to navigation, or size of area for Launch 1255 or Launch 1012. All vessels were used in obtaining bottom samples.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

Raytheon survey fathometers were used by all launches.

<u>Launch</u>	<u>Model No.</u>	<u>Serial No.</u>
1255	DE 723	1279, 2934
1012	DE 723	1278, 2924, 34207
1278	DE 719	5458

Problems encountered and the days used by the various Raytheon Model DE 723 units were as follows:

<u>Launch</u>	<u>Serial No.</u>	<u>Days Used</u>	<u>Problems Encountered</u>
1255	2934	157-164	Broken gear on paper drive
	1279	165-195	No further problem
1012	2924	152-159	No visible trace
	1278	160-195	Broken paper drive
	2924	200-262	No visible trace
	34207	266	No further problem

No problems were encountered that affected the accuracy of the above fathometers.

The bar check depth values were checked with a steel tape prior to the start of hydrography. The bar check of Launch 1255 was found to be of the correct length at the usual five feet increments. The bar check of Launch 1012 was found to be an additional .25 foot in length from the bar to the marked five feet increments. Therefore, .25 was added to all bar depths when corrections were determined.

On every day except J.D. 160, this .25 corrector was added to the 5 foot increment when determining velocity correctors. On J.D. 160, launch personnel compensated for the .25 foot correction by holding the marked increment .25 feet above the water surface. Depth corrections were obtained by averaging bar check values. Five graphs were constructed and velocity corrections were scaled in accordance with Table 3 of the revised Hydrographic Manual. No appreciable changes in depth corrections occurred between the first and last days of hydrography. The graphs, corrector value abstracts, and bar check abstracts are included with this report. Settlement and squat correctors for all launches were obtained as outlined in Section 4.9.4.2 of the revised Hydrographic Manual.

There were two settlement and squat correctors determined for Launch 1278, because two engines of different horsepower were used for the survey. The first engine had 85 horsepower and the second had 70 horsepower.

The graphs and settlement and squat corrector abstracts are included with this report. Daily TRA correctors were determined as outlined in Section 4.9.4.1 of the revised Hydrographic Manual.

Frequent A to F scale checks were taken to insure correct stylus length for the Raytheon Model 723. All initial settings were adjusted to zero. The Raytheon DE-719B model was checked by adjusting the CAL ZERO control knob until the calibrate zero line fell directly on the chart paper zero

line, and by adjusting the Potentiometer R210, along with the speed of sound knob until the second calibrate pulse fell on the chart paper "calibrate" line.

Technicians monitored the fathometers continuously during hydro operations and kept the initial value on the analog trace at zero. Fathograms for Launches 1012 and 1255 were scanned after hydrography and the analog trace was compared to the digitized value. When scanning showed a discrepancy, a depth was determined from the analog trace. On Launch 1278, fix marks were made manually, with the depth determined from the analog trace and recorded in the sounding volumes. All fathograms were scanned, and peaks and deeps were inserted with an emphasis on field plotting clarity.

E. HYDROGRAPHIC SHEETS

Field sheets were constructed, raw master tapes were logged and data plotted by both Launch 1255's and Launch 1012's onboard PDP 8/e Hydroplot systems. Edited master and corrector tapes, velocity tapes, signal tapes and TC/TI tapes were logged by launch personnel and submitted for smooth plotting to Processing Division, Atlantic Marine Center.

The central meridian for the project was 79°20'00"W and the control latitude was 4692,000 meters north of latitude zero.

In addition to three (3) 1:10,000 scale smooth main scheme sheets, one (1) 1:10,000 scale smooth sheet of the Buffalo River is submitted with this report. Also included are three (3) 1:10,000 scale and two (2) 1:5,000 scale smooth development sheets. Velocity correctors were applied to all smooth field sheets. *References are to smooth field sheets*

Rough plots were made daily with the final plot constructed continuously as the survey progressed. All smooth ^{field} sheets except the Buffalo River sheet were constructed by Launch 1255's onboard PDP 8/e Hydroplot System. The Buffalo River smooth ^{field} sheet was constructed by Launch 1012's PDP 8/e Hydroplot System. All smooth ^{field} plotting was done by the hydroplot system onboard Launch 1255. Velocity correctors, TRA and water-level correctors were applied to the smooth field sheets. No discernable distortion could be detected in the Mylar boatsheets during the period of final plot.

During the time of the survey, a problem with the plotter on Launch 1255 was discovered. When two identical boat sheets with identical parameters were constructed by the Hydroplot System onboard Launch 1255, discrepancies were evident. When laying the identical sheets atop one another, it was impossible for both the G.P.'s and XY's to line up

correctly. When the G.P.'s were lined up correctly, the XY's would be offset up to about three (3) millimeters visa versa when lining up the XY's of both sheets. This problem was revealed after the majority of the survey was complete, therefore smooth plotting was carried on as before with no attempt to correct the situation. This discrepancy could effect the smooth plotted data and should be considered. ^{field sheet}

F. CONTROL STATIONS

Control stations Point Abino, Breakwater, 1909; West, 1962; Start, 1977; Guard, 1977; Lamp, 1977; Chert, 1977; Slip, 1977; Mark, 1977; Dump, 1977; Soaked, 1977; Marina, 1977; Cloud-maker, 1977; Cargill, 1977; Hamburg 2, 1929; Sturgeon Point Tide Gage House; Break, 1962; City Hall, 1941; N-6, 1942; Old Buffalo Lighthouse, 1941; Horseshore Reef Light, 1941; North End Light, 1941; Crib Light; North Breakwater South End Light, 1909; and Rand Building Tower, 1929; were established or verified by Photo Party 61, Coastal Mapping Division, Atlantic Marine Center. Refer to Horizontal Control Report, OPR-300, Lake Erie and Niagara River, for surveying methods, geodetic abstracts and computations.

Control stations Start 2, 1977; Start (EEC), 1977; Soaked (ECC), 1977 and Buffalo Lighthouse (ECC), 1977 were established by Launch personnel using a steel tape measure, sextant, and Program RK 407. Printouts of RK 407 are included in this report.

Control stations Walter, 1977; and Forget It, 1977 were established by launch personnel. Control station Trailer, 1977 was relocated by launch personnel. The stations were established using a Wild T-2 Theodolite, resection method, and Program RK 410. Refer to Supplemental Reports, OPR-300, Lake Erie and Niagara River, for surveying methods, geodetic abstracts and computations. Computations for station Trailer, are included in the separates following the text.

G. HYDROGRAPHIC POSITION CONTROL

Del Norte position equipment, which operates in a range-range mode; range-azimuth, using a Del Norte unit with a Wild T-2 theodolite and "See Boat Sheet" methods were used on this sheet to control the hydrography on Sheet HSB-10-1-77. Thirteen (13) control networks were used on this sheet for the control stations used. All shore stations were located at or eccentric to established third-order triangulation, intersection or traverse stations.

Whenever possible, calibration was established twice daily by positioning the launches at known third-order traverse or intersection stations, or when necessary, three point sextant calibrations were used. Del Norte ranges were compared to range calculated by the PDP 8/e using Program RK 300 or RK 407. Refer to daily raw printouts or sounding volumes for calibration data, and see appendix for abstract of electronic correctors. *See Verifiers Report*

Del Norte equipment, in general, worked well. S/N 216 remote was damaged beyond repair on 19 July 1977 (J.D. 200) when it was knocked off a breakwater by high winds, and sent in to be replaced by S/N 174. Immediately prior to 12 July 1977 (J.D. 193) S/N 247 was damaged by an electrical storm and a card was replaced. On J.D. 193, Launch 1012 calibrated and acquired hydrography without making the proper adjustments for the new card. Therefore, ~~high~~ *large* correctors were experienced.

A maximum difference of seven (7) meters between morning and evening calibrations was observed, with the mean standard deviations of calibrations ranging between zero and 5.19 meters. Calibration distances varied between 653 and 23824 meters.

The following is a summary of equipment utilization during the project. Refer to the enclosed signal list for shore station names and locations:

Shore Stations (Launch 1012)

Signal Number	S/N	Julian Days Used
016	180	159, 121
018	216	159, 171
034	247	160, 161, 165, 167, 175, 193, 195, 200, 201, 220, 221, 224, 227, 236, 241, 249
002	252	160, 161, 165, 167, 175, 187, 188, 200, 201, 220, 221, 224, 227, 236, 241, 249, 266
022	180	171
022	216	172
020	180	172
028	216	172
030	180	172
043	216	187, 188, 192, 193, 195, 196
102	180	192, 193
006	180	196, 266
004	216	196
043	180	220
043	174	227
028	180	266
004	174	266

Launch 1278

043	180	196, 203
006	216	196
004	180	196, 221
034	247	201, 203, 207, 221
002	252	201
028	180	207, 223
012	174	223
014	174	224
100	174	223

Shore Stations (Launch 1255)

034	247	157, 158, 160, 161, 165, 166, 167, 172, 187, 195
002	252	157, 158, 160, 161, 165, 166, 167, 172, 195
043	216	187

In reference to "See Boat Sheet" control, positions were plotted by hand during times of hydrography. The X and Y coordinates were then scaled off and converted to ranges from control stations using Program RK 300. These calculated ranges were then logged by launch personnel and used for plotting on either Launch 1012 or Launch 1255.

H. SHORELINE

Shoreline and topographic details were transferred from blow-ups of Charts LS 314 and 14822 since no other source was available. Shoreline details have not been field edited because shoreline manuscripts were not available, however, any large changes were noted on the final field sheet by the hydrographer. All details in black ink on the final field sheet, were verified, additions in red ink*, with deletions in green ink? In reference to Sheet D South, Chart 14822 blow-up was used for shoreline determination. The blow-up of Chart 14822 did not have parallels of latitude, therefore, Chart 314 blow-up was used as an overlap with Chart 14822. It should be noted that there is at least a 50 meter discrepancy between the two chart blow-ups. In reference to the entire survey, there were instances of soundings being plotted on shore, and this, most likely, is due to the using of chart blow-ups for establishing shoreline.

TP 00455 of 1978. These additions and deletions were in agreement with this shoreline manuscript. See Verifiers Report.

I. CROSSLINES

Crosslines totaled 55.3 miles or 12% of the main scheme soundings. All crosslines compared to main scheme agreed within two feet. See Verifiers Report

J. JUNCTIONS

No contemporary junctions with prior surveys were required or made. Junctions of the work done by Launch 1255 and Launch 1012 were made and agreed within two feet. Joins H-9706 (1977) to the west and south, and H-9841 (1979) to the north.
See Verifiers Report

K. COMPARISONS WITH PRIOR SURVEYS

Comparison with the prior surveys, U. S. Army Corps of Engineers, (1937), ~~LS-1714~~, Scale 1:15,000; U. S. Lake Survey (1960) ~~LS-2040~~, Scale 1:80,000; U. S. Army Corps of Engineers (1875), ~~LS-631~~, Scale 1:10,000 shows general agreement within two feet. U. S. Lake Survey Sheet ~~LS-2040~~ (1960) on several occasions showed depths less than contemporary survey ranging up to ten feet. For the following numbered and unnumbered Presurvey Review items, all depths referred to this Contemporary Survey (H-9705) have had corrections of water level, TRA and velocity applied. The water level correction was obtained by erecting a staff that corresponded to IGLD (International Great Lakes Datum) and taking readings prior to and after each period of hydrography. The readings were then transferred and used in the form of a tide tape when smooth plotting. *see Verifiers Report.*

1. Shoal Depths charted at 42°47.60'N; 78°51.80'W was 5 feet REP verified by Launch 1012 running 25 meter sounding lines in both east-west and north-south directions. A least depth of three feet (insert between the sixth sounding out of Position 5600 and Position 5601) was found at 42°47.70'N; 78°51.85'W. *It is recommended that this three foot depth replace the previously charted five foot depth. concur*
Several least depths of 3ft. were found on this shoal. Chart area as shown on present survey.
2. Seneca Shoal charted in the vicinity of 42°47.50'N; 78°55.70'W was verified by Launch 1255 running 50 meter mainscheme sounding lines normal to the depth curves and 50 meter sounding lines parallel to the axis of the shoal. The developed area is approximately 1650 x 950 meters in length and width, and the least depth obtained was ~~twelve~~ ^{thirteen} feet (insert between position 1008 and the first sounding) at 42°47.50'N; 78°55.80'W. *It is recommended that the shoal be retained on the chart, charted from the present survey. Retain charted least depth of 12ft.*
From prior survey LS-1214 (1910-11)
Retain charted 12ft sdg. 12'sdg was brought fwd during Q.C.I. from LS-1214(1910-11)
5. RKS, PA 28.5 ft. REP located at 42°48.80'N; 78°56.10'W. Twenty-five meter sounding lines covering a square mile area run by Launch 1255 centered at the reported position. No indication

Investigation is considered adequate to verify that the rocks have been removed. Chart the area as shown on the present survey.

was obtained. In the "Disposition Form" issued by the Army Corp of Engineers, the removal of the rocks was reported and verified by side scan sonar. It is recommended to list as possible obstruction in area and to wire drag in the future to determine if any spilled stone exists in an area larger than that scanned by the Army Corps of Engineers. ~~concur~~ Do not concur

6.C. Dangerous Submerged Wreck charted at 42°53.02'N; 78°55.03'W. (Pst-65)

There is a six foot shoal approximately 55 meters south of this wreck with least depths of 5ft.

Retain charted subm. dangerous wreck

Launch 1278 ran 50²⁵ meter arcs in a north-south direction and 25 meter arcs in an east-west direction and obtained a least depth of 87 feet (second sounding out of position 7103) at 43°53.02; 78°55.00'. The retention of this wreck on the chart is recommended. ~~concur~~ source unavailable

7. Visible Wreck charted at 42°53.42'N; 78°53.97'W

from prior survey NS-1778 (1940)

Chart position of wreck as shown on the present survey. Wreck uncovers 4 ft at LWB.

was visually examined by Launch 1012. Detached Position 6991 (visible wreck) is approximately five meters lakeward of the actual position of the wreck which is approximately thirty feet long and ten feet wide and bares .5 feet (3.5) Tide -3.0 (water levels not applied). It is recommended that the wreck be retained on the chart at 42°53.42'N; 78°53.97'W. ~~concur~~ 2486^N 53.04^W

8. Pier Ruins charted at 42°52.95'N; 78°55.80'W was

* Sounding Vol #3 has verified this position as a most end at 42°52.97'N; 78°55.72'W. (Detached Position 6846). The ruins were also verified by Launch 1278 which obtained a least depth of .5 feet (bares 2.0 feet when corrections are applied) at 42°52.95'N; 78°58.90'W (Detached Position 9050)*. It is recommended that the charting of pier ruins be retained. ~~concur~~ Prior Survey NS-1778 (1940) has pier ruins in different configuration

Chart the configuration of the ruins as shown on the present survey.

9. 29 foot shoal charted at 42°49.97'N; 78°56.28'W was

from prior survey NS-1714 (1937)

Retain the charted 29 ft least depth.

investigated by Launch 1255 running 50 meter sounding lines in an east-west direction and verified with a least depth of 30¹ feet (insert between the first and second soundings out of Position 2342). It is recommended that this shoal be retained on the chart. Should have been better developed; N-S lines, 25 meter spacing. Recommend retaining the 29ft. ~~concur~~

fathometer depth, lead line not used.

Launch

1285

- 9) 26 foot shoal charted at 42°49.92'N; 78°54.14'W was investigated by Launch 1255 with 50 meter mainscheme sounding lines. The twenty-six foot shoal was not verified; however, a twenty-nine foot sounding was obtained (second sounding out Position ²⁵³⁰ at 42°49.96'N; 78°54.17'W). It is recommended that the twenty-nine foot shoal be charted in this position and the twenty-six foot shoal be deleted. *Do not concur* (see Approval Sheet)
- from LS-1714 (1937)*
Due to the incomplete nature of this development it is recommended this 26ft be retained
concur
26' sdg was brought fwd to the present survey from LS-1714 (1937)
- 9) 29 foot shoal charted at 42°49.00'N; 78°54.07'W was investigated by Launch 1255 running 50 meter east-west sounding lines. The twenty-nine foot shoal was not verified, and it is recommended that it be deleted from the chart. *Do not concur*
- Same Recommendation as above - Retain 29 ft sdg as charted. 29 ft sdg from LS-1714 (1937) was brought fwd to the present survey.*
- 9) 26 foot shoal charted at 42°49.83'N; 78°53.80'W was investigated by Launch 1255 running 50 meter east-west sounding lines. The least depth for this shoal was found to be ³¹28 feet (Position ²⁵³⁰ at the ^{approx. 70 meters south} charted position. ^{105.100 305} It is recommended that the ²⁸26 replace the 26 at the charted position. *Do not concur* *(See Approval Sheet)
- Same recommendation as above*
26' sdg was brought fwd to the present survey. Retain the 26ft sdg as charted
- 9) 10 foot shoal charted at 42°51.80'N; 78°56.20'W was investigated by Launch 1255 running 50 meter east-west sounding lines and 50 meter sounding lines parallel to the axis of the shoal. A least depth of 10 feet (second sounding out of position 658) was verified at 42°51.80'; 78°56.21'. It is recommended that this shoal be *re-charted as shown* ~~retained on the chart.~~ *concur*
- shown*
- 9) 25 foot shoal charted at 42°50.66'N; 78°55.62'W was verified by Launch 1255 running 50 meter east-west sounding lines. It is recommended that this shoal be charted at 42°50.64'N; 78°55.62'W. *from the present survey* ^{38.15"}
- from LS-1714 (1937)*
Chart depths as shown on the present survey.
40.05"
- 9) 29 foot shoal charted at 42°50.30'N; 78°55.25'W was verified by Launch 1255 running 50 meter east-west sounding lines. The shoal exists from 42°50.33'N north-northwest to 42°50.40'N at longitude 78°55.32'W. A least depth of 28 feet (insert between the first and second soundings of Position 116) was obtained. It is recommended that this shoal be ~~retained on the chart.~~ *concur* *charted from the present survey*

9) 30 foot shoal charted at 42°50.48'N; 78°54.47'W was investigated by Launch 1255 running 50 meter east-west sounding lines, and no evidence of a 30 foot shoal was found. Since a least depth of 35 feet was obtained, it is recommended that this shoal be deleted from the chart. *No. Do not concur, retain 30ft ch'd sdg.*

Source Unavailable
 Recommend retaining this 30ft as charted as the development is not adequate
concur

10) 30ft Shoals charted in the vicinity of 42°50.20 N; 78°-54.6 were ~~was~~ investigated by Launch 1255 running 50 meter east-west sounding lines. The *27-foot shoal charted at 42°50.30 N; 78°54.30 W was verified with a least depth of 28-feet (third sounding out of 2566) located at 42°50.36'N; 78°54.34'W. The *30-foot shoal charted at 42°50.17'N; 78°54.40'W was verified with a least depth of 30 feet (fourth sounding out of 2553) at the charted position above. The *30-foot shoal charted at 42°50.22'N; 78°54.75'W was verified with a least depth of 28 feet (insert between the fifth sounding out of position 95 and position 96) at 42°50.20'N; 78°54.75'W. It is recommended that the shoals mentioned above be retained. **There was no indication of the thirty foot shoals charted at 42°50.15'N; 78°54.51'W and 42°50.18'N; 78°54.79'W. It is recommended that these shoals be deleted from the chart. *There are 31ft soundings in these areas that are shallower by 5 to 6 ft than the other hydro.*

The existence of these shoals were verified, however 50 meter dev. is considered inadequate to ascertain least depths. Retain the following charted sdgs.

	Lat.	Long.
27'	42°50.32'	78°54.27'
30'	42°50.19'	78°54.35'
30'	42°50.13'	78°54.43'
30'	42°50.12'	78°54.54'

See comments on left for G.C. recommendations

11 foot shoal charted at 42°53.45'N; 78°55.00'W was verified by Launch 1012 running 25 meter sounding lines with a least depth of 8 feet, fathometer sounding. The shoal exists from 42°53.34'N; 78°55.08'W northeast to 42°53.5'N; 78°54.95'W, and it is recommended that this shoal be charted with a least depth of eight feet. **concur**

5 foot shoal charted at 42°53.30'N; 78°54.42'W was investigated by Launch 1012 running 25 meter east-west and north-south sounding lines. A least depth of 10 feet was found. It is recommended that this 5 foot sounding be deleted from the chart. **concur** *(Suspect that 5' sdg is actually a 15' sdg)*

Wreck submerged 10 ft charted at 42°52.37'N; 78°54.08'W was verified by Launch 1012 with a least depth of 13 feet (insert between position 6522 and the first sounding) at 42°52.40'N; 78°54.07'W. It is recommended that this wreck be retained on the chart with least depth of 10ft. as the survey is not considered adequate to disprove the charted 10ft. **concur**

Retain wreck as charted covered 10 ft at LWP

20 foot shoal charted at 42°51.50'N; 78°55.42'W was investigated by Launch 1255 running 50 meter

Retain the 20 ft. least depth as charted.

east-west sounding lines. A least depth of ~~20~~ feet (insert between the third and fourth soundings out of position 110) was obtained at 42°51.50'N; 78°55.35'W. It is recommended that ~~this 20 foot sounding be charted at this location.~~ The 20 ft. be retained, added to the smooth sheet. *Concur*

logged

18 foot shoal charted at 42°51.05'N; 78°56.57'W was investigated by Launch 1255 running 50 meter east-west sounding lines. A shoal was found to exist from 42°50.90'N; 78°56.60' north to 42°51.3'N; 78°56.6'W with a least depth of 18' sds. Retain 20' feet (insert between Position 2398' and the first sounding). It is recommended that this shoal be charted as described above. See Verifiers Report (pg. 13 of V.R. item 60b)

Development is considered inadequate to disprove 18' sds. Retain 18 ft sds as charted.

logged

28 foot shoal charted at 42°51.05'N; 78°55.5'W was investigated by Launch 1255 running 50 meter east-west sounding lines and nothing was found in this vicinity. However, a 28' foot shoal* (first and second soundings out of Position 113) was located at 42°50.97'N; 78°55.33'W. It is recommended that this shoal be added to the chart. *Concur* * Approximately 280 meters east southeast.

from LS-2040 (1960) The 28' sds is considered misplaced on its source & is considered discredited by the pres. survey.

not

27 foot shoal charted at 42°51.05'N; 78°54.46'W was investigated by Launch 1255 running 50 meter east-west sounding lines. There was no evidence of any shoal in the area. It is recommended that the 27-foot sounding be deleted from the chart. *Not developed & charted.*

Source Unavailable 27' sds on pres. survey indicates rise. Retain the 27' sds as charted.

29 foot shoal charted at 42°50.60'N; 78°55.80'W was investigated by Launch 1255 running 50 meter east-west sounding lines. There was no evidence of any shoal in the area, with the least depth being 35-feet (insert between the fifth out of position 2589 and position 2590). It is recommended that this shoal be ~~deleted from~~ ^{retained on} the chart. The development is not adequate to disprove this depth. *Concur*

from LS-2040 (1960) Retain the 29 ft. sds as charted.

logged

23 foot shoal charted at 42°50.68'N; 78°54.16'W was verified by Launch 1255 running 50 meter east-west sounding lines with a least depth of 27' feet (insert between the fourth and fifth soundings out of Position 82) at the charted position. It is recommended that this shoal be retained on the chart. *Concur*

from LS-1714 (1937) Retain the 23 ft sds as charted

logged

24 foot shoal charted at 42°49.85'N; 78°53.32'W was verified by Launch 1255 running 50 meter east-west sounding lines with a least depth of 27' feet (insert between the first and second soundings out of Position 329) at 42°49.86'N; 78°53.37'W. It is recommended that the 27' foot sounding be charted at the position above. *Concur*

from LS-1714 (1937) Chart area as shown on the present survey.

285

26 foot shoal charted at 42°50.34'N; 78°56.28'W was investigated by Launch 1255 running 50 meter east-west sounding lines. A least depth of 27-foot (insert between the second and third sounding out of position 469) was obtained at the charted position. It is recommended that this shoal be retained on the chart with a depth of 27 feet.

?? unknown source
Retain 26ft. sdg. as charted.

logged
Do not concur

29 foot shoal charted at 42°48.80'N; 78°53.30' was verified by Launch 1255 running east-west sounding lines. There are several 29 foot shoals at the following positions: 42°48.76'N; 78°53.29'W; 42°48.67'N; 78°53.21'W; 42°48.75'N; 78°53.20'W; 42°48.76'N; 78°53.16'W; 42°48.70'N; 78°53.10'W. It is recommended that these shoals be added to the chart.

No source available
100 meter dev. is inadequate to disprove 29 ft. sdg.
Retain 29' sdg. as charted.

not
However

Depth Over Crib charted at: (A) 42°48.00'N, 78°52.35'W; (B) 42°48.00'N; 78°52.24'W; (C) 42°47.19'N; 78°51.22'W; (D) 42°46.97'N; 78°51.84'W. These cribs were investigated by Launch 1012 running 25 meter east-west and north-south sounding lines. The least depths were as follows: (A) 17 feet (fifth sounding out of position 5641); (B) 15 feet (insert between the fifth and sixth soundings out of position 5626); (C) 10 feet (third sounding out of Position 5510); (D) 8 feet (insert between the second and third soundings out of Position 5490). It is recommended that this information be charted as above.

(E) 42°51'01" 78°52'48"
Depth over Intake Crib 17ft. from chart No. 314
Investigation by field least depth in area 17ft (Pas # C 187)

No detached positions for these cribs and no real attempt to get leadline location by field non-existent.
See Verifiers Report Item 4.6.(3)

L. COMPARISON TO THE CHART

This survey was compared with Chart LS 314 (Buffalo Harbor, Scale 1:15,000, 19th Edition, Mar 14, 74) and Chart 14822 (Niagara River and Welland Canal, Scale 1:80,000, 22nd Edition, Nov. 9, 74). Soundings from this Survey (H-9705) were in excellent agreement to within three feet with a few discrepancies.

The following differences are to be noted:

Chart LS 314 has a 5 foot depth located at 42°53.20'N; 78°54.43'W where the Contemporary Survey has a least depth of 12 feet (25 meter east-west and north-south sounding lines were run in this vicinity with no indication of the five foot depth); a 25 foot depth charted at 42°52.23'N; 78°54.04'W in 37 feet of water this survey; an 18 foot depth charted at 42°51.05'N; 78°56.55'W in 27 feet of water this survey; a 20 foot sounding charted at 42°51.51'N; 78°55.41'W in 26 feet of water this survey; a 28 foot sounding charted at 42°51.02'N; 78°55.52'W in 30 feet of water this survey; a 25 foot sounding charted at 42°51.57'N; 78°54.53'W in 32 feet of water this survey; a 28 foot sounding at 42°50.07'N; 78°51.98'W in 33 feet of water; a 29 foot sounding at 42°49.80'N; 78°54.06'W in 37 feet of water; a 26 foot sounding at 42°-

* These soundings are in channel areas and are believed to be superseded by possible channel dredging.

5ft. charted
shoal considered
discredited
25' sdg. is considered
discredited
inv. by from LS-1216 (1911) was retained
20' sdg. from 15-1141 (1912) was retained
28' - discredited
25' - discredited
26' - discredited
29' - discredited

(14833)

³ 49.82'N; 78°53.80'W in 30 feet of water this survey; a 9 foot sounding charted at 42°49.27'N; 78°52.61'W in 173 feet of water this survey; (25 meter east-west and north-south sounding lines were run by Launch 1012 and there was no indication of a nine foot sounding. Most of the soundings discussed here have been discussed under section K p. 10-15 of this Report. Those that haven't are recommended to be deleted from chart and the areas charted as shown on this survey. ^{26'-retain} ^{9'-discredited}
 Chart LS 314 shows a number of rocks in the middle reef area ^{from prior survey} ¹⁹⁴⁰ Launch 1278 ran 50 meter north-south sounding lines over this area, and the separate rocks could not be verified, due to strong current and water level 3.0 feet above IGLD (International Great Lakes Datum). Since the fathogram shows shoal depths and an extremely rough bottom, it is recommended that the rock symbols ~~remain on the chart in the Middle Reef Area.~~ ^{concur}
~~Rock symbols are also predominant on the Canadian shore on Chart LS 314. Finding this area extremely rough and rocky, it is recommended that these symbols remain on the chart and the area with depth less than 3 feet curve should be labeled "Hazardous to Navigation, Rocky Area." The dashed black line with note "outlined in dashed black lines, labeled foul with rocks, to be charted" "The dashed black line with note "foul with rocks or originates with the hydrographers boat sheet, with some revision during verification, to include the charted rock awash symbols within the foul area. Source of rocks not readily ascertainable during verification." "The dashed black line with note "foul with rocks or originates with the hydrographers boat sheet, with some revision during verification, to include the charted rock awash symbols within the foul area. Source of rocks not readily ascertainable during verification." ^{as per}
 Chart LS 314 shows a submerged rock at 42°53.48'N; 78°53.75'W. Launch 1012 ran 50 meter sounding lines in the area and a shoal was noted, but there were no rocks found. ^{no source available at the time of verification.} ^{Recommend retention of this rock as charted on} ^{cht 314}~~

Chart 14822 has six foot soundings at 42°49.27'N; 78°52.60'W and at 42°49.06'N; 78°52.72'W in 15 feet and 17 feet of water this survey, respectively (both soundings were investigated by Launch 1012 with 25 meter east-west and north-south sounding lines); an 8 foot sounding at 42°48.85'N; 78°52.67'W in sixteen feet of water this survey and a 7 foot sounding at 42°48.60'N; 78°52.32'W in 18 feet of water this survey (investigated by Launch 1012 with 25 meter east-west and north-south sounding lines). ^{least depth 13 ft. and to 18 ft. least depths found.} ^{in depths of 13 to 17 ft.}

Recommend charting these areas from present survey. ^{Charted shoal edges just outside of dumping ground limits are considered discredited by the present survey. Chart area as shown on the present survey.}

M. ADEQUACY OF SURVEY
 HSB-10-1-77 (H-9705) is a thorough survey of the area covered by the limits of this boat sheet. All fathogram field survey records were scanned and checked for peaks and deeps and appropriate changes were made to the original records where necessary. See Verifiers Report

This survey is complete and adequate to supersede prior surveys for charting. See Verifiers Report

N. AIDS TO NAVIGATION

Comparison of aids to navigation to Chart LS 314 showed Black Rock Canal Buoy No. 8 to be out of position (Detached Position 6616). This buoy was later moved to the correct position at the edge of the channel (detached Position 7788).

195

Comparison of the buoys in the Black Rock Canal to the Light List shows the following discrepancies: lighted Buoy No. 3 (2' in Lt. List) was found in 13 feet of water; lighted Buoy No. 5 was found (20' in Lt. List) in 11 feet of water; lighted Buoy No. 11 was found in 8 feet (20' in Lt. List) of water and lighted Buoy No. 13 was found in 8 feet of water (20' in Light List)

During the period of the survey, a new light was established west of South Pierhead Light at the end of the newly constructed breakwall. For further information, refer to NOAA Form 76-40, Landmarks For Charts, included in the separates following the text. The light is maintained by the U.S. Coast Guard. The South Pierhead Light is still maintained to be used as a range.

All other aids to navigation have been found to be adequately positioned for their intended purpose. See Verifiers Report ✓

O. STATISTICS

This survey contains 463.4 nautical miles of sounding lines covering 32.7 square nautical miles. This data was obtained by the following launches:

<u>Vessel</u>	<u>Nautical Miles</u>	<u># Positions</u>	<u>#B.S</u>
1255	461.5	2704	50
1012	336.4	2570	41
1278	30.6	476	1

Refer to the abstract of positions in the separates following the text for further information concerning statistics.

P. MISCELLANEOUS

On JD 152 and JD 172 onboard Launch 1012, it was found that the computer controlled sounding interval was inconsistent. Rather than sounding at the prescribed sounding interval dialed in on the hydroplot controller, the computer sounded ambiguously with no set pattern. On JD 152 when control was "SEE BOATSHEET", the computer was used as a logger, and no explanation was derived regarding the inconsistent sounding interval. However, on JD 172 launch personnel noticed that the inconsistent sounding interval seemed to occur when the Del Norte was erratic.

The only lattices put on smooth sheets are from (034) Sturgeon Point and (002) Point Abino. This is due to the fact that the majority of hydrography was acquired using these two stations, and the number of control networks would do nothing but add confusion to the smooth sheet if their lattices were plotted.

On JD 192 and JD 193, when hydrography was being conducted in the Black Rock Canal, an observer took staff readings prior to, during (at 15 minute intervals), and after times of hydrography.

7PS

These records were sent to the tides and water levels branch in Rockville, Maryland. The staff was leveled to three benchmarks prior to and after times of hydrography. A discrepancy was found between the before leveling and after leveling, therefore, the staff was leveled ~~to~~^{for} a third time. The third leveling agreed with the second, and since there was no possible means of staff movement, the first leveling was considered a bust.

The area immediately east of the north breakwater in Buffalo Harbor had extensive growth of grass. Because of this, a lead line was used to obtain soundings in this area. The lead line was measured prior to and after times of hydrography. Correctors to lead line soundings can be found in the sounding volume for Launch 1012.

No 2.14 p.23

In reference to Sheet D South, Chart 14822 blow-up was used for shoreline determination. The blow-up of Chart 14822 did not have parallels of latitude, therefore, Chart LS 314 blow-up was used as an overlap with Chart 14822. It should be noted that there is at least a 50 meter discrepancy between the two chart blow-ups.

The Union Canal, which adjoins the south end of the ~~Outer Buffalo~~ Harbor, underwent dredging operations as of 26 July 1977 according to "notice to Mariners #31-77". Hydrography was conducted in the canal prior to the time of dredging. Hydrography should have been postponed until after dredging; Union canal is a small body of water. *concur*
In reference to verification or revision to the Great Lakes Pilot, a complete study was made during the spring and summer of 1977 by Lt. Pamela Chelgren for Coast Pilot Branch. This report should be reviewed for all pertinent information. *not a function of G.C.B.*
Unavailable during verification

For plotting purposes of smooth ^{field} sheets, preliminary velocity tables were computed using the bar checks from the initial days of hydrography. This was done in order to meet requirements and to keep up with processing. The final velocity tape, however, is not identical to the preliminary velocity tapes. *Printouts of the preliminary tapes are included in the separates following the text. *Removed from D.P. & filed with survey records

Hydrography obtained by Launch 1278 was recorded manually and then logged by launch personnel. After logging, the hydrography was then plotted on either Launch 1255 or Launch 1012 using the onboard PDP 8/e hydroplot systems.

During the period of the survey, the U.S. Army Corps of Engineers also engaged in a hydrographic survey of the Buffalo Harbor. For comparison and completeness of the Black Rock Canal, it is suggested that they be contacted for pertinent information. *deferred to chart compiler*
Not available during verification

Also during the period of this survey, the Buffalo River underwent maintenance dredging after the time of hydrography. It is suggested that the U.S. Army Corps of Engineers be contacted for all relevant information. *deferred to chart compiler*

✓ JPS

Q. RECOMMENDATIONS

It is recommended that a larger scale chart, 1:5,000, be published of the Black Rock Canal. This recommendation is based on conferences with the U.S. Coast Guard, local authorities, and the amount of both pleasure craft and commercial traffic. *If a 1:5,000 scale chart is recommended, the area should have been surveyed at 1:5,000 scale or larger.*

It is also recommended that a new lighted fixed aid to navigation be established at 42°51.62'N; 78°53.9'W, on the end of the outer breakwall. This entrance to the harbor is used constantly and is extremely difficult to find both at night and during the day. *conv ✓*

R. AUTOMATED DATA PROCESSING

Data acquisition and processing was accomplished as per instructions in the Provisional Hydro Manual and the AMC Manual. Soundings and position data were obtained by both the Hydrolog/Hydroplot System utilizing computer Program RK 111 and manually recording in sounding volumes with all data transferred to master tapes using a manual logger, AM 602 (Elinore) and RK 330 (Reformat and data check). ✓

For each master tape there is a corresponding corrector tape which includes the vessel's TRA and the Del Norte daily electronic corrections, along with depth corrections including missed peaks, deeps, and time and course corrections for Del Norte busts. ✓

Computer programs used during the survey are included in the following list of programs: ✓

<u>Program</u>	<u>Name</u>	<u>Version Date</u>
RK 111	Range, Range Real Time Hydroplot	1/30/76
RK 201	Grid, Signal, & Lattice Plot	4/18/75
RK 211	Range-range non real time plot	1/15/76
RK 212	Visual Station Table Load	4/1/74
RK 216	Range/Azimuth Non Real Time Plot	2/5/76
RK 300	Utility	2/5/76
RK 330	Reformat and Data Check	5/4/76
PM 360	Electronic Corrector abstract	3/21/74
AM 401	Mercator Conversion	4/1/73
RK 407	Geodetic Direct/Inverse	10/23/75
RK 409	Geodetic Utility Package	9/15/73
RK 410	Geodetic 3-Pt. Fix	8/23/73
RK 500	Predicted Tide Generator	11/10/72
AM 602	Elinore	5/21/75

7PS

S. REFERENCES TO REPORT

Horizontal Control Report OPR-300, Lake Erie and Upper Niagara River, 1977. ✓

Supplemental Report to Horizontal Control Report, OPR-300, Lake Erie and Upper Niagara River, 1977. ✓

Great Lakes Pilot, 1977. ✓

Descriptive Report, OPR-300-Upper Niagara River and Lake Erie, H-9706, HSB-20-1-77. ✓

Respectfully Submitted,

for Robert Lewis
John D. Wilder
Ensign, NOAA

✓
7PS

Field Water Level Note

Predicted tide corrections were not applied to the sounding data due to insignificant tidal effects in Lake Erie. However, non-periodic water level changes due to wind setup, were observed by launch personnel, ranging up to 3.5 ft. in only a couple hours. In order to compensate for this when comparing the contemporary survey with prior surveys, a staff was erected at the Buffalo Coast Guard Base, with the 1 foot mark on the staff equal to the zero foot level of the IGLD (International Great Lake Datum). This was accomplished by reference to the gage at the Buffalo Base. Staff readings were taken by launch personnel at the beginning and end of each day of hydrography. These readings were then used to construct a water level tape, using AM500, and applied to the soundings on the smooth field sheets for the entire project area.

Two ADR water level gages and two bubbler gages were installed in the following locations:

<u>Site & Number</u>	<u>Location</u>	<u>Period</u>
*Squaw Is. South #906-3224	Lat: 42° 54.8' Lon: 78° 54.2'	5/12/77 - 6/29/77
*Dunkirk #906-3029	Lat: 42° 29.4' Lon: 78° 20.2'	5/11/77 - End of Survey
Fort Erie, Ont., Canada #906-3114	Lat: 42° 53.9' Lon: 78° 55.2'	5/25/77 - End of Survey
Cattaraugus Creek #906-3229	Lat: 42° 34.2' Lon: 79° 08.2'	6/01/77 - End of Survey

* ADR gages

The ADR gage at Squaw Island South was discovered missing on June 29, 1977, apparently due to vandalism. With consideration to the amount of work required to reinstall this gage, plus the area affected by it during the 1977 field season, it was decided not to replace this gage, instead the area of survey was changed. Refer to the PROJECT INSTRUCTIONS.

The ADR gage values were set 10 ft. higher than staff values, whereas the bubblers had the orifice at the staff's zero mark. All the gages had the time set at GMT. Contracted observers monitored all the gages throughout the project, except for the Fort Erie gage. The observer for the Fort Erie gage quit on the 15th of August, when he moved out of the area. All records were sent to the Tides and Water Levels Branch, Rockville.

In addition to data collected from the above mentioned water level gages, data was also acquired from an Army Corps of Engineers gage located at the Peace Bridge, in Buffalo. Copies of the monthly records plus hourly heights from the Corps' district office were sent to the Water Levels Branch, Rockville.

Due to a water level difference between the Black Rock Canal and the mouth of the Niagara River, a staff was erected in the canal at $42^{\circ} 54.5'$, $078^{\circ} 54.2'$. The staff was leveled to three different bench marks. Launch personnel took 15 minute staff readings prior to, during, and after times of hydrography in the canal. All information concerning leveling and observations were sent to the Tides and Water Level Branch.

All gages operated well during the period of operations, except for the bubbler at Fort Erie which had several problems. On the 8th of June, the entire gage had to be replaced; on Sept. 16th, the chart drive spring broke, and on a couple occasions, the gage stopped when the clock ran down.

All gages were leveled at the time of installation and will be releveled when they are removed at the end of the 1977 Great Lake field season.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Hydrographic Surveys Branch
439 W. York Street
Norfolk, Virginia 23510

October 12, 1977

TO: Chief, Tides Branch, C331
FROM: *Robert Lewis*
William R. Daniels, CAM11
Chief, Hydro. Surveys Branch

SUBJECT: Request for Water Level Data

Please provide water level data to AMC Processing Division (CAM3) for survey H-9705 (HSB-10-1-77) Project OPR-300-HFP-77 (Lake Erie). See enclosed Field Water Level Note for locations of gages within survey area.

The following times of hydro include two hours before and after actual times:

<u>J.D.</u> (1977)	<u>FROM</u>	<u>TO</u>
152	1200	2000
157	1200	1900
158	1100	1600
159	1300	2000
160	1000	2200
161	1000	2100
165	1000	2300
166	1100	2200
167	1100	2200
171	1100	1600
172	1000	2200
174	1500	2000
175	1000	2200
187	1200	2200
192	1200	2000
193	1100	2200
195	1000	2300



VELOCITY CORRECTIONS

NOAA LAUNCH 1255

H-9705

HSB-10-1-77

TABLE #1

000058 0 0000 0001 000 125500 010177

000397 0 0002

000476 0 0004

999999 0 0006

VELOCITY TABLES

OPR: 300

H:9705

HSB: 10-1-77

000192 0 0002 0002 000 101200 009705

000394 0 0004

999999 0 0006

000070 0 0002 0003 000 101200 009705

000300 0 0004

000377 0 0002

999999 0 0000

000042 1 0004 0004 000 127800 009705

000057 1 0002

000083 0 0000

000122 0 0002

000203 0 0004

999999 0 0006

000010 1 0001 0005 000 101200 009705

000093 0 0000

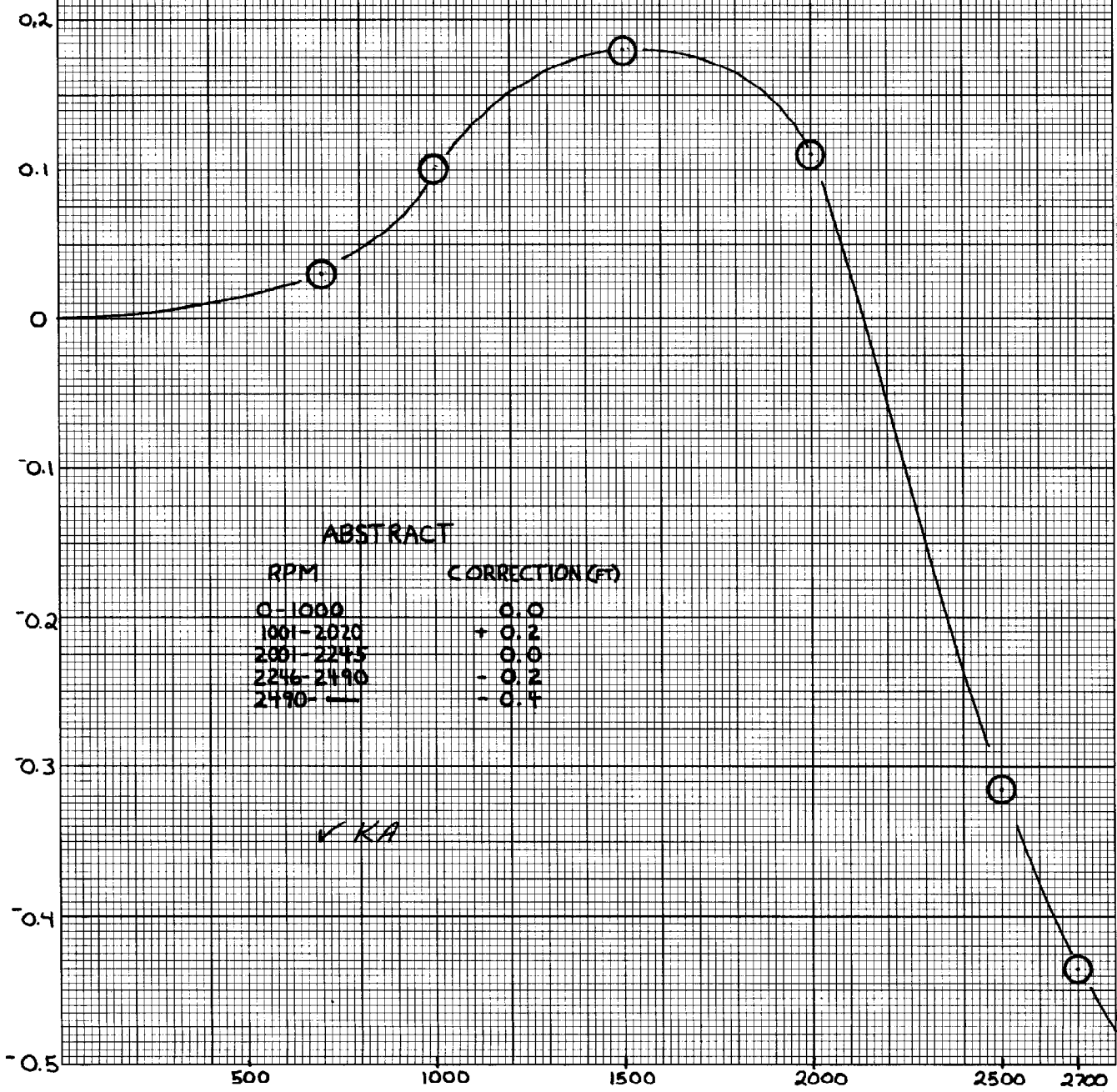
999999 0 0002

RPM	S/S
0	00
700	0.03
1000	0.10
1500	0.18
2000	0.11
2500	0.32
2700	0.44

SETTLEMENT & SQUAT
LAUNCH 1012
MAY 26, 1977

EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 341-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

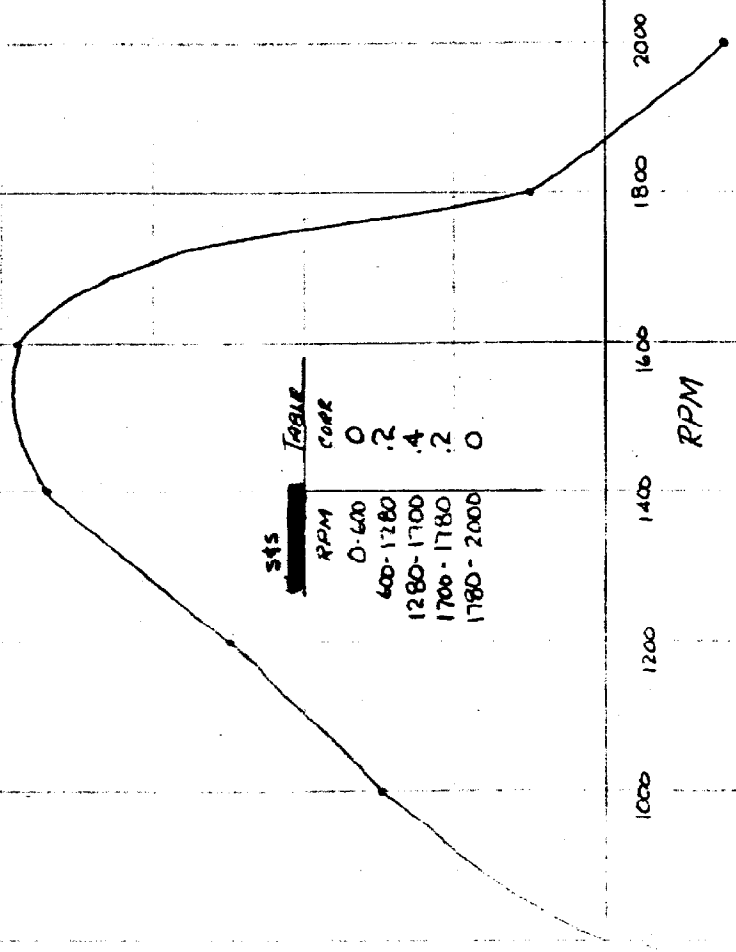


ABSTRACT

RPM	CORRECTION (ft)
0-1000	0.0
1001-2020	+ 0.2
2001-2245	0.0
2246-2490	- 0.2
2490-	- 0.4

✓ KA

SETTLEMENT & SQUAT
 NOAA LAUNCH 1255
 MAY 26, 1977 - JD 146
 BUFFALO HARBOUR - BUFFALO, N.Y.



RPM	CORRECTION (FE)	(ACTUAL VALUES USED TO PLOT CURVE)
000	0	
1000	.15	
1200	.25	
1400	.37	
1600	.39	
1800	.05	
2000	-.08	

345

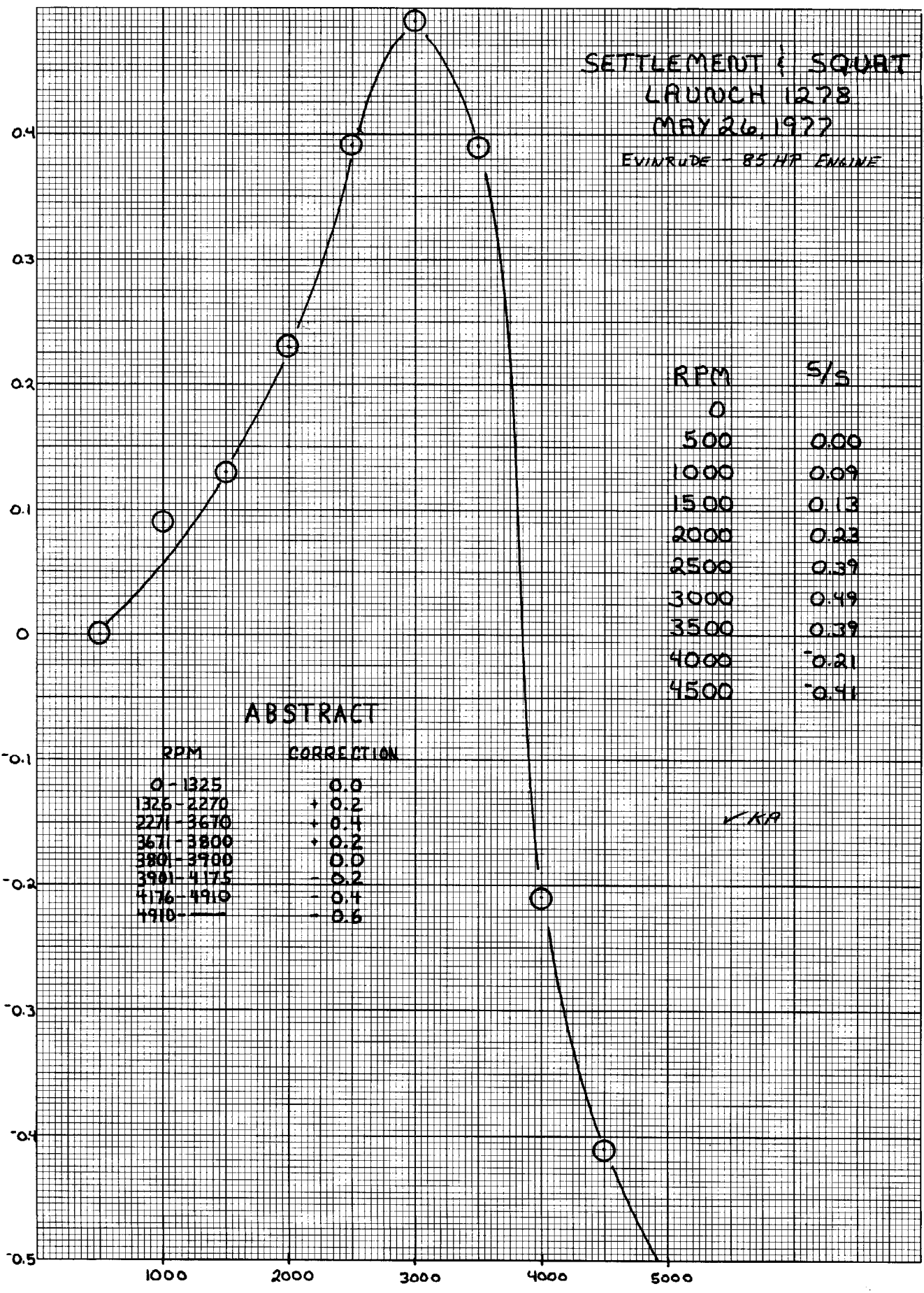
RPM	CORR
0-600	0
600-1280	.2
1280-1700	.4
1700-1780	.2
1780-2000	0

✓ KA

EUGENE DIETZGEN CO.
MFG. IN U. S. A.

NO. 341-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

SETTLEMENT / SQUAT
LAUNCH 1278
MAY 26, 1977
EVINRUDE - 85 HP ENGINE



RPM	S/S
0	0.00
500	0.00
1000	0.09
1500	0.13
2000	0.23
2500	0.39
3000	0.49
3500	0.39
4000	0.21
4500	0.11

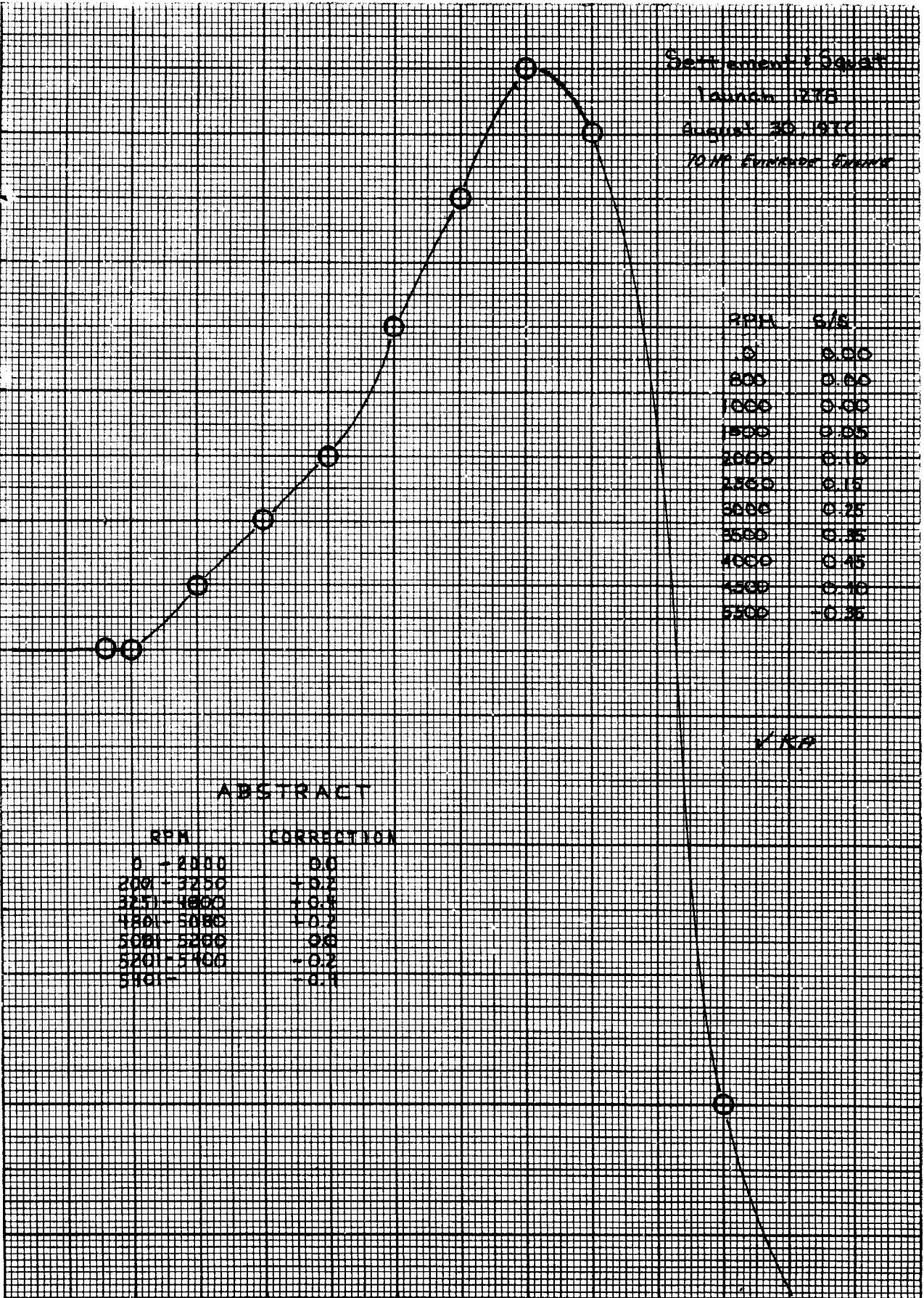
ABSTRACT

RPM	CORRECTION
0 - 1325	0.0
1325 - 2270	+ 0.2
2270 - 3670	+ 0.4
3670 - 3800	+ 0.2
3800 - 3900	0.0
3900 - 4175	- 0.2
4175 - 4910	- 0.4
4910 -	- 0.6

VKA

Sartament / Saset
 Launch 27B
 August 30 51C
 10 HP Emerson Turbine

0.4
 0.3
 0.2
 0.1
 0
 -0.1
 -0.2
 -0.3
 -0.4



RPM	G/S
0	0.00
200	0.00
1000	0.00
1500	0.05
2000	0.10
2500	0.15
3000	0.25
3500	0.35
4000	0.45
4500	0.40
5200	-0.35

ABSTRACT

RPM	CORRECTION
0 - 2000	0.0
200 - 3250	+0.2
3250 - 4000	+0.3
4000 - 5000	+0.2
5000 - 5200	0.0
5200 - 5400	-0.2
5400 -	-0.1

SIGNAL LIST

HSB-10-1-77, H-9705

HSB-20-1-77, H-9706

002	0	42	50	07454	079	05	43726	250	0000	000000	Point Abino
004	7	42	53	04272	078	54	06569	250	0000	000000	Breakwater, 1909
006	7	42	52	28858	078	54	19613	250	0000	000000	West, 1962
007	7	42	52	26410	078	53	46168	243	0000	000000	Start 2, 1977* <i>non recov.</i>
008	7	42	52	26630	078	53	45701	243	0000	000000	Start, 1977
009	7	42	52	26919	078	53	45749	243	0000	000000	Start (Ecc), 1977* <i>less than 3rd order</i>
010	7	42	52	35203	078	53	27486	243	0000	000000	Guard, 1977
012	2	42	52	42624	078	53	02168	254	0000	000000	Lamp, 1977
014	7	42	52	40173	078	53	22912	254	0000	000000	Trailer, 1977* <i>non recov.</i>
016	7	42	51	56943	078	53	19655	254	0000	000000	Chert, 1977
018	7	42	52	03098	078	52	59039	254	0000	000000	Slip, 1977
020	0	42	51	36589	078	53	01637	250	0000	000000	Mark, 1977
022	4	42	51	48288	078	52	45146	254	0000	000000	Dump, 1977
024	7	42	50	36795	078	52	23866	254	0000	000000	Soaked, 1977
025	7	42	50	36899	078	52	23582	243	0000	000000	Soaked (Ecc), 1977*
026	7	42	50	46564	078	51	57071	243	0000	000000	Marina, 1977*
028	7	42	50	13858	078	52	07751	254	0000	000000	Cloudmaker, 1977
030	2	42	50	20807	078	51	47312	254	0000	000000	Cargill, 1977
032	4	42	46	49927	078	51	30808	139	0000	000000	Hamburg 2, 1929
034	7	42	41	28215	079	02	52307	250	0000	000000	Sturgeon Pt. Tide Gage House
038	2	42	52	15207	078	54	09912	139	0000	000000	Break, 1962
040	5	42	53	11610	078	52	46311	139	0000	000000	City Hall, 1941
042	7	42	52	39980	078	53	23059	139	0017	000000	Old Buffalo Lighthouse, 1941
043	6	42	52	40004	078	53	23122	254	0017	000000	Buffalo Lighthouse (Ecc), 1977*
044	1	42	52	52413	078	54	55254	139	0000	000000	Horseshoe Reef Light, 1941
046	3	42	54	26722	078	54	10121	139	0000	000000	N-6, 1962
048	7	42	52	39267	078	53	56320	139	0000	000000	North End Light, 1941 ⁴⁸
049	0	42	52	46334	078	54	44657	139	0000	000000	Crib Light
050	0	42	52	49470	078	53	45568	139	0000	000000	N. Breaker S. End Lt., 1909
052	0	42	53	09900	078	52	25349	139	0000	000000	Rand Building Tower, 1929
100	7	42	51	00046	078	52	40092	254	0000	000000	Walter, 1977* <i>non recov</i>
102	7	42	53	40092	078	55	19068	254	0006	000000	Forget It, 1977*

*Stations located by Hydrographic Field Party #2

**Station re-located by HFP #2

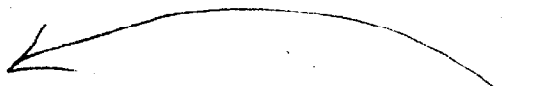
All other stations located or verified by Photo Party 61

* Nbr to CANCEL:

Do Nbr Apply - POSITIONS ONLY

FIELD USUALLY VERIFIED, Nbr FIELD DETERMINED.

C. Long C322



9 HCCG Dist,
76-401's (HCCG Dist) - copy of same prime, make - address in print being sent to D.M. 1-2-83 or to positions of positions 1/1/83

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

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

Replaces CGS Form 567.

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT (If field Party, Ship or Office)
NOAA LAUNCH 1012

STATE
NEW YORK

LOCALITY
LAKE ERIE

DATE
9-77

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)

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.
OFR PROJECT NO. 300
JOB NUMBER
SURVEY NUMBER H-9705, 9706

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	LATITUDE		LONGITUDE		METHOD AND DATE OF LOCATION (See Instructions on reverse side)	OFFICE	FIELD	CHARTS AFFECTED
		DATUM LAKE ERIE 2.W.D. 568.6 FEET	D.M. Meters	D.P. Meters	D.P. Meters				
NBKUSGDLH A6VUS731M	NORTH BREAKWATER SOUTH END LIGHT Buffalo North Breakwater South End Light	42 52	49.470	78 53	45.568			F-VIS-V	L.S. 314 14822 L.S. 312
LA 4 FR	LIGHT & FIRED RED Block Rock Canal Light 4 L.L.IV 1977 p.27	42 53	16.468	78 53	33.174			"	"
LA17 FIG	LIGHT 17 FLASHING GREEN	42 53	58.459	78 54	12.436			"	"
TR	TOWER, FORMERLY HORSE SHOE PILE LIGHT	42 52	52.413	78 54	55.254			"	"
CNB LA GP HW	CNB LIGHT GROUP FLASHING WHITE Buffalo Inlake Grid Light L.L.IV, 1977 p.25	42 52	46.334	78 54	44.657			"	"
NEND LT HW vs 65M	NORTH END LIGHT FLASHING WHITE VISIBLE 6 STAPUTE MILLS Buffalo Harbor. Old Breakwater North End Light L.L.IV, 1977 p.25	42 52	39.267	78 53	56.320			"	"
ASide Lt HW vs 65M	ASIDE LIGHT FLASHING GREEN VISIBLE 6 STAPUTE MILLS Buffalo Harbor North Side Light L.L.IV 1977 p.25	42 52	39.236	78 53	56.140			"	"
S Side Lt HW R	SOUTH SIDE LIGHT FLASHING RED Buffalo Harbor South Side Light L.L.IV, 1977 p.25	42 52.4		78 53.8				"	"
Buffalo Harbor L.W. vs 30 S.W. vs 65M HW R	BUFFALO HARBOR LIGHT FLASHING WHITE VISIBLE 30 STAPUTE MILLS RABID BEACH, HW R L.L.IV, 1977 p.25	42 52	14.205	78 54	09.220			"	"
ENTER Lt OCC R	BUFFALO RIVER Buffalo River Entrance Light L.L.IV, 1977 p.25	42 52	40.457	78 53	23.398			"	"

RESPONSIBLE PERSONNEL

TYPE OF ACTION

NAME

ORIGINATOR

OBJECTS INSPECTED FROM SEAWARD

K. ANDREWS, LT(56)

- PHOTO FIELD PARTY
 HYDROGRAPHIC PARTY
 GEODETIC PARTY
 OTHER (Specify)

POSITIONS DETERMINED AND/OR VERIFIED

FIELD ACTIVITY REPRESENTATIVE

FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES

OFFICE ACTIVITY REPRESENTATIVE

- REVIEWER
 QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER "METHOD AND DATE OF LOCATION"

(Consult Photogrammetric Instructions No. 64.)

OFFICE I. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E(C)6042
8-12-75

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P-8-V
8-12-75
74L(C)2982

FIELD

I. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

- | | |
|-------------------|----------------------|
| F - Field | P - Photogrammetric |
| L - Located | Vis - Visually |
| V - Verified | |
| 1 - Triangulation | 5 - Field Identified |
| 2 - Traverse | 6 - Theodolite |
| 3 - Intersection | 7 - Planetable |
| 4 - Resection | 8 - Sextant |

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8-12-75

**PHOTOGAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

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

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)

Replaces CGCS Form 567.

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
(Field Party, Ship or Office)
NOAA LAUNCH 1012

STATE
NEW YORK

LOCALITY
LAKE ERIE

DATE
9-77

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.
OPR PROJECT NO. 300 JOB NUMBER H-9705-9706 SURVEY NUMBER LAKE ERIE LWD. 568.6 FEET

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	LATITUDE		LONGITUDE		METHOD AND DATE OF LOCATION (See instructions on reverse side)	OFFICE	FIELD	CHARTS AFFECTED
		DATUM	D.M. Meters	D.P. Meters	D.P. Meters				
CITY' AILE TR	TOWER CITY HILL landmark not on Smooth Sheet, falls in area of inset (charted)	42 53	11.643	78 52	46.264			F-VIS-V	L.S. 314 14822 L.S. 312
HAND TR occ R LT	HAND TOWER landmark not on Smooth Sheet, falls in area of inset (charted)	42 53	09.900	78 52	25.349			"	"
MICROTR (FR)	TOWER, FIXED RED LIGHT (FINISHING) landmark not on Smooth sheet, falls in area of inset (charted)	42 52	59.457	78 52	41.078			"	"
N.Y. STATE Bldg	BUILDING, OCCULTING WHITE LIGHT (ADENTWEST) landmark, not on Smooth Sheet, falls in area of inset (charted)	42 53	08.333	78 52	32.112			"	"
N.Y. STATE Bldg	BUILDING, OCCULTING WHITE LIGHT (SOUTHWEST) landmark, not on Smooth Sheet, falls in area of inset (charted)	42 53	07.881	78 52	29.833			"	"
MICRO TR occ R, 2FR	TOWER, OCCULTING RED, 2 FLASHING RED LIGHTS landmark, not on Smooth sheet, falls in area of inset (charted)	42 53	05.510	78 52	18.563			"	"
TANK	TANK, FREEZER FOODS INC. (Landmark)	42 51	11.563	78 52	02.674			"	"
TANK	TANK, PILLSBURY COMPANY (Landmark)	42 51	59.508	78 52	23.469			"	"
MAINE WINDMILL CHARTER FR	BUILDING, FIXED RED LIGHT (WINDMILL) 500TH WEST landmark, not on S.S., falls in area of inset	42 52		78 52.5				"	"
MAINE WINDMILL CHARTER FR	BUILDING, FIXED RED LIGHT (COURTHERWEST) not on S.S., falls in area of inset	42 52.8		78 52.4				"	"

RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
OBJECTS INSPECTED FROM SEAWARD	K. ANDRESEN, LT (SG)
POSITIONS DETERMINED AND/OR VERIFIED	
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	
INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION' (Consult Photogrammetric Instructions No. 64.)	
OFFICE I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75	FIELD (Cont'd) B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982
FIELD I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection P - Photogrammetric Vis - Visually 5 - Field Identified 6 - Theodolite 7 - Planetable 8 - Sextant A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75	II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75 III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75 **PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.
*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.	

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

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

ORIGINATING ACTIVITY

- Replace CGS Form 567.
- TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
(Field Party, Ship or Office)
NOAA LAUNCH 1012

STATE
NEW YORK

LOCALITY
LAKE ERIE

DATE
9-77

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

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.
 OPR PROJECT NO. 300

JOB NUMBER

SURVEY NUMBER

DATUM

POSITION

METHOD AND DATE OF LOCATION
(See Instructions on reverse side)

CHARTS
AFFECTED

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	LATITUDE		LONGITUDE		OFFICE	FIELD	CHARTS AFFECTED
		D.M. Meters	"	D.P. Meters	"			
UNUS S16 ST	TOWER (Landmark)	42 52.7		78 53.3			F-VIS-V	L.S. 314 14822 L.S. 312
TR	OLD BUFFALO LIGHTHOUSE (Landmark)	42 52	39 980	78 53	23 059		"	"
FR	FIXED RED LIGHT WEST SIDE LACKAWANNA, CANAL	42 49.8		78 51.7			"	"
TR	FIXED RED LIGHT EAST SIDE LACKAWANNA, CANAL	42 49.9		78 51.6			"	"
STACK	STACK, ABCTN, BETHLEHEM STEEL (Landmark)	42 49.8		78 51.8			"	"
STACK	STACK, SOUTH, BETHLEHEM STEEL (Landmark)	42 49.7		78 51.0			"	"
UNUS CANAL LT, FR	FIXED RED LIGHT, UNUS CANAL No position. (Charted)	42 49.9		78 51.6			"	"
FR	FIXED RED LIGHT, INSIDE UNUS CANAL No position, uncharted.	42 50.0		78 51.4			"	"
FR	FIXED RED LIGHT, WYNDOTTE No position accurate enough for smoothing. Sheet plotting.	42 50.1		78 51.6			"	"
TALK	TALK, WYNDOTTE CEMENT CO. (Landmark)	42 50.2		78 51.3			"	"

This item is scheduled but no T-sheet or hydro. location by attached pos.

RESPONSIBLE PERSONNEL		ORIGINATOR	
TYPE OF ACTION	NAME		
OBJECTS INSPECTED FROM SEAWARD	K. Anderson, LTJG	<input type="checkbox"/> PHOTO FIELD PARTY	<input checked="" type="checkbox"/> HYDROGRAPHIC PARTY
		<input type="checkbox"/> GEODETIC PARTY	<input type="checkbox"/> OTHER (Specify)
POSITIONS DETERMINED AND/OR VERIFIED		FIELD ACTIVITY REPRESENTATIVE	
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		OFFICE ACTIVITY REPRESENTATIVE	
INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'			
(Consult Photogrammetric Instructions No. 64.)			
OFFICE	FIELD (Cont'd)		
1. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75	B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982	<input type="checkbox"/> REVIEWER	
FIELD	I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field P - Photogrammetric L - Located Vis - Visually V - Verified 1 - Triangulation 5 - Field Identified 2 - Traverse 6 - Theodolite 3 - Intersection 7 - Planetable 4 - Resection 8 - Sextant	<input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE	
	II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75		
	III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75		
**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.			
*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.			

NONFLOATING AIDS OR LANDMARKS FOR CHARTS
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

Replaces C&GS Form 567.

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
(If field party, ship or office)
NOAA LAUNCEY 1012

STATE
NEW YORK

LOCALITY
LAKE ERIE

DATE
9-77

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)

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.
OPR PROJECT NO. 300
JOB NUMBER
SURVEY NUMBER H-9705, 9706

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	LATITUDE	POSITION		LONGITUDE	METHOD AND DATE OF LOCATION (See instructions on reverse side)	OFFICE	FIELD	CHARTS AFFECTED
			D.M. Meters	D.P. Meters					
FR	FIXED RED, USCG EXTRAPOLATE Buffalo Coast Guard Slip Light L.S. Vol. III p.25	42 52	38.143	78 53	28.189			F-VIS-V	L.S. 314 14822 L.S. 312
FR	WEST BUOY AFTER DEATH END LIGHT Buffalo Harbor West Breakwater Light Vol. III 1977 p.25 (No position)	42 52	29.545	78 54	20.108			"	"
FR	NORTH SIDE LIGHT, FISHING GREEN VISIBLE T STRUCTURE MILES SOUTH Buffalo North Side L.S. Vol. III 1977 p.27 (No position)	42 50	07.361	78 52	02.954			"	"
FR	SOUTH SIDE LIGHT, FISHING RED VISIBLE 25 STRUCTURE MILES, ADD BGC SOUTH Buffalo South Side Light L.S. Vol. III 1977 p.27 (No pos)	42 50	01.063	78 52	03.436			"	"
FR	SOUTH PIER N LIGHT FISHING RED VISIBLE 13 STRUCTURE MILES, NORTH Buffalo Pierhead Lt. Vol. III 1977 p.27	42 50.1		78 52.5				"	"
FR	SOUTH BUFFROD DE DISPOSAL LIGHT N Z, QUICK FISHING WHITE	42 50.2		78 52.6				"	"
FR	FISHING RED, NORTH END ERIE BASIN MARIANA?? Could be State Beacon Lt. 2 (No other rd lights charted)	42 53.2		78 53.4				"	"
FR	FISHING GREEN, SOUTH END ERIE BASIN MARIANA, charted (No position)	42 52.7		78 53.3				"	"
FR								"	"

New Light. (No pos to accuracy standards for smooth sheet plotting)

RESPONSIBLE PERSONNEL

TYPE OF ACTION

NAME

ORIGINATOR

OBJECTS INSPECTED FROM SEAWARD

K. ANDRESEN, LT (56)

- PHOTO FIELD PARTY
 HYDROGRAPHIC PARTY
 GEODETIC PARTY
 OTHER (Specify)

POSITIONS DETERMINED AND/OR VERIFIED

FIELD ACTIVITY REPRESENTATIVE

OFFICE ACTIVITY REPRESENTATIVE

FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW.

REVIEWER

QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

ACTIVITIES

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64)

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E(C)6042
8-12-75

FIELD (Cont'd)

B. Photogrammetric field positions** require

entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P-8-V
8-12-75
74L(C)2982

FIELD

I. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

- F - Field P - Photogrammetric
- L - Located Vis - Visually
- V - Verified
- 1 - Triangulation 5 - Field Identified
- 2 - Traverse 6 - Theodolite
- 3 - Intersection 7 - Planetable
- 4 - Resection 8 - Sextant

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

APPROVAL SHEET

Survey H-9705 (HSB-10-1-77)

The hydrographic records transmitted with this report are complete and adequate.

No direct supervision was given by me during field work and the field sheet was examined only during routine field inspection of the hydro party.

*Examination of the prior surveys available to us indicate these soundings are single point soundings and not part of a scheme of sounding lines. Unless there is more positive source information to verify the prior survey soundings, I concur with the recommendations of the hydrographer.

This survey is complete and adequate with no additional field work recommended.

Approved and forwarded,

For/ Robert Lewis

WILLIAM R. DANIELS
LCDR, NOAA
Chief, Hydrographic Surveys Branch

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

WATER LEVEL NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center: CAM 3

Hourly heights are approved for

Water Level Station Used: See remarks

Period: 1 June - 23 September 1977

HYDROGRAPHIC SHEET: H-9705

OPR-300-HFP-77

Locality: Lake Erie

Plane of reference: Low Water Datum (IGLD 1955 : 568.6 Feet)

Remarks:

- | | | |
|-----------------------------|------------|----------------------------------|
| 1. Buffalo, New York | 906-3020 ✓ | Lat. 42° 52.7
Long 78° 53.4 |
| 2. Lackawanna, New York | 906-3024 | Lat 42° 49.9
Long 78° 51.2 |
| 3. Sturgeon Point, New York | 906-3028 ✓ | Lat. 42° 41.5'
Long 79° 02.8' |

Philip C. Morris
Chief, Water Level Section

Don M. Spillman 8/15/78
Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST			
LIMEKILN REEF											1
WAVERLY BEACH (Pp)											2
WAVERLY SHOAL											3
											4
											5
											6
											7
											8
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											23
											24
											25

Approved:

Chas. C. Harrington

Chief Geographer - CSX5

13 Feb. 1981

APPROVAL SHEET
FOR
SURVEY H-9705 (1977)

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~not~~ been made. A new final sounding printout has/~~not~~ been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date:

10/31/80

Signed:



Title:

Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

H-9705 (1977)

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS Boat sheets		16	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POSARC, EXCESS		3	
DESCRIP- TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES						1-misc. data
CAHIERS	4. with row printouts					
VOLUMES	4					
BOXES			2- Smooth			

T-SHEET PRINTS (List)

SPECIAL REPORTS (List) 2- Cht. mark-ups, 1- Cht blow-up

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	PRE- VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			5750
POSITIONS CHECKED		50	
POSITIONS REVISED		15	
SOUNDINGS REVISED		100	
SOUNDINGS ERRONEOUSLY SPACED		-	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED			
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	2		
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS		213	
VERIFICATION OF SOUNDINGS		483	
COMPILATION OF SMOOTH SHEET		150	
APPLICATION OF TOPOGRAPHY		80	
APPLICATION OF PHOTOBATHYMETRY		-	
JUNCTIONS		24	
COMPARISON WITH PRIOR SURVEYS & CHARTS		100	
VERIFIER'S REPORT		40	
OTHER		-	
TOTALS	2	1090	1092

Pre-Verification by	K.R.A.	Beginning Date	12/1/77	Ending Date	12/1/77
Verification by	PMN, MBH, FDL, LGC	Beginning Date	12/15/77	Ending Date	7/10/80
Verification Check by	H.R. Smith	Time (Hours)	16	Date	7/25/80
Marine Center Inspection by	H.I.T.	Time (Hours)	25	Date	11/Sept, 1980
Quality Control Inspection by	J.P. Saulsbury	Time (Hours)	2.37	Date	8-31-81
Requirements Evaluation by	D.J. Hill	Time (Hours)	6	Date	3/17/82

B. Meyer 30 hrs 9/2/81

Reg. No. A-9705

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

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

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

ATLANTIC MARINE CENTER

VERIFIER'S REPORT

REGISTRY NO: H-9705

New York; ~~Buffalo~~, ^{Lake Erie} Buffalo Harbor, ~~Lake Erie~~

SURVEYED: June 1, 1977, through September 23, 1977

SCALE: 1:10,000

FIELD NO: HSB-10-1-77

PROJECT NO: OPR-300

SOUNDINGS: DE-723D, DE-719 B Fathometers,
Leadline and Pole

CONTROL: Range-Range (Del-Norte)
Range-Azimuth (Del-Norte and
Theodolite) and "See Boatsheet"

Chief of Party

W.R. Daniels

Surveyed by

K. Andreen

J. Bennett

J. Wilder

Automated Plot by

Xynetics 1201 Plotter (AMC)

Verified and Inked by

L. G. Cram

Date

July 10, 1980

I. Introduction

a. Unusual problems ~~that~~ were encountered as follows:

I. The incomplete nature of the sounding volumes and lack of notes on printouts detracted from the completeness of the survey. ✓

2. The lack of detached positions on Presurvey Review Items and in some cases the incomplete nature of the developments on these items and other features made verification difficult and in some cases impossible. *These items were generally investigated with developments, however no examination to ascertain least depths was conducted.*

3. The correlation between the electronic corrector listing in the Descriptive Report and the daily calibrations as expressed in the sounding volumes and the raw data printouts is difficult to ascertain. ✓

b. Notes and changes were made in red ink in the Descriptive Report by the verifier during verification. ✓

c. A portion of this survey which includes the Black Rock Canal and Erie Basin Marina was shown as an inset on the smooth sheet at 1:7,500 scale to better depict the delineation of the area. ✓

2. CONTROL AND SHORELINE

a. The source of control is adequately described in sections "F" and "G" of the Descriptive Report. Additional information can be found in the "Horizontal Control Report". There were some problems with the "See Boatsheet Control" the discussion of which can be found under section "4" of this report. ✓

b. The shoreline shown on this survey originates with a photographic enlargement (1:15,000 to 1:10,000 scale) of a class III shoreline manuscript TP-00455 of 1978. There was no field inspection or field edit; however, the map does have a final review. The photography for this map is dated approximately one year subsequent to the field work of the hydrographic survey. This map was used to delineate the

shoreline on the smooth sheet; a better correlation exists between it and the hydrographic survey than the survey with the contemporary nautical chart.

*The compiler should use TP00455 (1978) 1:15,000 when charting shoreline
Do not use shoreline shown on the hydro. survey for charting.*

It should be noted that no shoreline exists for the smooth sheet, south of Lat. $42^{\circ} 49' 03''$, from topographic sources and the chart covering this area is at 1:80,000 scale. The scale difference between the chart and the survey is so large as to be meaningless for any accurate presentation of the shoreline in this area. The

Descriptive Report, section "H", page 9 has a statement pointing out the futility of using the chart for an accurate representation of the shoreline. There are some

conflicts between the hydrography on this survey and the shoreline manuscript which was not available to the hydrographer at the time of the survey. These conflicts are

as follows: *Missing S.L. should be acquired at an opportune time.*

nearshore area

1. The ~~shoreline~~ on the Canadian side (west) of the survey area has numerous rocks and pier ruins from Lat. $42^{\circ} 52' 58''$ to Lat. $42^{\circ} 53' 55''$ on the chart. The positions taken by the hydrographer on the pier ruins and rock walls in the vicinity of Lat. $42^{\circ} 52' 45''$, Long. $78^{\circ} 56' 40''$ differ by varying amounts up to 40 meters with the shoreline manuscript which shows these features extending from

further offshore by these amounts. *(considered due to erosion of S.L.)*

The field unit dashed in red an area extending from Lat. $42^{\circ} 52' 58''$ to Lat. $42^{\circ} 53' 55''$ and recommended this area be labeled foul with rocks. During verification it was determined that this dashed *delimiting line* disagreed with the shoreline manuscript and at times was in disagreement with the hydrography. The line was dashed in black with revisions as necessary to bring it into

agreement with the shoreline manuscript and the hydrography. *(office compilation)*
Concur
Chart the area as shown on the present survey.

2. The shoreline in the area of Lat. $42^{\circ} 53' 40''$, Long. $78^{\circ} 54' 20''$ as shown on the boatsheet in black ink is in conflict with the shoreline manuscript. The island

shown in this vicinity is not shown on the shoreline manuscript as baring on the east side of the breakwater. The field sheet has a black line showing an island in this position with a red dashed line noting, area "covered with grass". This area was put on the smooth sheet from the boatsheet and it is considered to be the best delineation, contemporary with the hydrography of the area concerned because of a lack of field edit and field inspection of the shoreline manuscript. *Do not concur The area was shown as delineated on TP-00455 (1978) which supersedes the hydrographic field sheet.*

3. The shoreline in the area of Lat. $42^{\circ} 51' 38''$, Long. $78^{\circ} 52' 27''$ as shown on the boatsheet in green ink (deletions) and red dashed lines is in conflict with the shoreline manuscript. The shoreline manuscript has a pier and boat ramp in this area that would be covered by the fill area according to the boatsheet. The area was shown on the boatsheet as portrayed on the shoreline manuscript. Recommend the photographs be reviewed to ascertain what should be charted. *Do not concur TP-00455 (1978) supersedes hydrographic information in this area. Chart the Sl., pier & ramp as shown on TP-00455 (1978)*

4. The shoreline in the area of Lat. $42^{\circ} 50' 00''$, Long. $78^{\circ} 52' 30''$ as shown on the boatsheet is in conflict with the shoreline manuscript. The shoreline in conflict is a bulkhead in this area and the conflict appears to be one in positioning of this bulkhead and shoreline just south of the bulkhead. This bulkhead and the shoreline are shown on the smooth sheet as per shoreline manuscript as no detached positions or other positioning of this bulkhead was made available to the verifier during verification by the field. *concur - Use TP-00455 (1978) for charting this area.*

The problems encountered when verifying the shoreline on this survey stem from statements in the Descriptive Report that says, "shoreline from chart was verified but not field edited", and that in fact, the photography for the shoreline

manuscript was done a year after the completion of the survey. A note to the effect that the hydrographic survey should be consulted for final delineation of the shoreline

exists on the shoreline manuscript. *There is no note on the topo. manuscript that the hydro. survey should be consulted for S.L.. The note (disclaimer) on the topo. manuscript refers to items offshore from the high water line or shoreline.*

3. HYDROGRAPHY

a. The agreement at crossings on this survey is adequate; depths agree within the limits prescribed by the Hydrographic Manual. ✓

b. The standard depth curves could be drawn in their entirety with the exception of the 0 foot curve and the areas of bulkhead and channels where deep depths close to these bulkheads and shoreline precluded the drawing of some curves. Dashed curves, supplemental curves and brown curves were used to better delineate some features. There were some problems in areas of irregular bottom and highly developed features in that the deeper soundings in excess could not always be included in the curves. The congestion of shoaler soundings precluded bringing these soundings to the zero excess level and in most cases they were within one foot of the shoaler soundings. *In congested areas, sdgs were selected to depict a representative bottom & are considered adequate for charting.*

c. This survey is considered adequate to delineate the bottom configuration and to determine least depths only when consideration is given to the following: ✓

i. The developments run on this survey for the most part are not adequate to verify or disprove the existence or extent of the items being investigated. The use of 50 meter East-West lines to split 100 meter East-West lines is not in accordance with the guidelines as expressed in the Hydrographic Manual. A discussion of the developments can be found in section "K" of the Descriptive Report. *Charting recommendations are made on all items discussed in section K.*

2. Upon finding a shoal or Presurvey Review item no apparent attempt was made to obtain a least depth with leadline or any other method save a fathometer search. *CONCUR*

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports comply with the requirements of the Hydrographic Manual with the exceptions listed in sections 1, 2 and 3 and the following:

a. Using "See Boatsheet" control in areas of shoreline with the chart being the only source led to problems in some areas on this survey. Approximately ten to twelve positions had to be revised to bring the hydrography into agreement with the shoreline manuscript. An example exists in the area of Lat. $42^{\circ} 52' 10''$, Long. $78^{\circ} 53' 00''$ where four positions (#5180, 5181, 5183, 5184) were revised. In reviewing the control setups in the survey area it was determined that at least two other methods (range azimuth, range-range) should have been attempted in place of the "See Boatsheet" control. *CONCUR*

b. Shoals, Presurvey Review Items and shoal indications were not developed adequately, in most cases only east-west lines were run and in some instances these resulted in lines being run parallel to the feature. The line spacing run on some of these items was inadequate (50 meters) to provide sufficient data for adequate delineation of the items on the smooth sheet. Examples for these problems are as follows:

(1) A shoal in the vicinity of Lat. $42^{\circ} 51' 15''$, Long. $78^{\circ} 53' 59''$ with depths ranging from 19 to 24 feet was developed in only a east-west direction with 50 meter line spacing. *concur*
chart as shown on the present survey.

(2) A shoal in the vicinity of Lat. $42^{\circ} 51' 25''$, Long. $78^{\circ} 55' 29''$ with depths ranging from 22 to 24 feet in an area with surrounding depths of from 25 to 32 feet. This was only developed in an east-west direction with 50 meter line spacing, and the shoal appears to be orientated in an east-west direction. *concur - Retain the charted 20ft sdg which is the least depth in the vicinity.*

(3) There are four items with dashed-circles on the Presurvey Review described as cribs in the survey area. Two of these are in the vicinity of Lat. $42^{\circ} 48' 00''$, Long. $78^{\circ} 52' 18''$, while the other two are in the vicinity of Lat. $42^{\circ} 47' 00''$, Long. $78^{\circ} 51' 30''$. These items were investigated with 25 meter line spacing in east-west and north-south direction; however, no apparent searches for least depths were made with anything but fathometers which is in conflict with the Instructions of the Presurvey Review Items. *concur - see pg 15 of V.R.*

(4) A shoal indication (18-foot) was found in the vicinity of Lat. $42^{\circ} 51' 40''$, Long. $78^{\circ} 54' 00''$, depths in the surrounding area range from 20 to 24 feet. This shoal indication was only developed to 50 meters in a east-west direction.

(5) A shoal indication (29 feet) was found in the vicinity of Lat. $42^{\circ} 50' 59''$, Long. $78^{\circ} 55' 25''$, depths in the surrounding area range from 31 to 32 feet. This shoal was found on a crossline (Pos 113-114) and no other development was run (regular line spacing 100 meters).

(6) Presurvey Review Item #9_A ^{in lat. 42°49.92'N, long. 78°54.14'W} which was a 26-foot sounding, ^{ch'd from 25-1714 (1937)} was investigated with 50 meter line spacing in only an east-west direction. The shoalest depth located by this development was 29 feet. *Retain the charted 26ft. sdg.*

c. The field unit did not locate all the fixed aids to navigation or the landmarks that were charted and there are numerous aids and landmarks that were not accounted for in the hydrographic records. More detailed information on these items can be found under section 7c of this report. *These items are deferred to the compiler for resolution.*

d. The use of green shoreline on the boatsheet is not an accepted manner for depicting shoreline changes as prescribed by the Hydrographic Manual. Section 2, b of this report explains additional problems and difficulties in the shoreline depicted on both the boatsheet and the smooth sheet. *concur*

e. The field records lack proper annotation as to entries such as dates, time; positions and weather. *concur*

f. In general, very little work was done on shoal and submerged item investigations with leadlines and/or sounding poles. A fathometer search was the only method used on nearly all of the shoal features, etc. on this survey. While approximately half of these were intensive fathometer searches, there should have been an attempt to conform the least depths with a leadline or other means as prescribed by the Hydrographic Manual, sections 1.4.1 and 1.4.3 and the requirements of the Presurvey Review. *concur*

5. JUNCTIONS

Adequate junction was made with H-9706 (1977) to the south and west. All curves were brought into coincidence ^{during Q.C.I.} and no further work is necessary on this survey.

A junction with H-9841 (1979) to the north was not completed (pencil) as the data for this survey is in the preliminary stages. It will be necessary for Quality Control to ink the junctional curves on this sheet when H-9841 (1979) becomes available. It may be necessary to effect some minor adjustments to the depth curves on H-9706 to obtain precise agreement if desirable. *Adjustments to the depth curves on H-9706 were made during Q.C.I., junction is adequate.*

6. COMPARISON WITH PRIOR SURVEYS

a.	LS-631	(1875)	1:10,000 ✓
	LS-1214	(1910-11)	1:20,000 ✓
	LS-1215	(1911)	1:20,000 ✓
	LS-1714	(1937)	1:15,000 ✓
	LS-1778	(1940)	1:40,000 ✓
	LS-2040	(1960)	1:80,000 ✓

These are the most recent prior surveys in this area that provide complete coverage. ✓

In general, the agreement is good 0-1-foot (70%) with some occurrences of differences of 2-3 feet (25%) with the prior surveys being shoaler and a few incidences of differences in the 5 to 10-foot (5%) range with the present survey being shoaler. These larger differences reflect the changing shoreline (man-made). Fairly extensive

dredging and filling operations are apparent in the survey area as evidenced in the area of Lat. $42^{\circ} 53' 00''$, Long. $78^{\circ} 53' 25''$ where a bulkhead and small boat basin have been constructed since the 1940's. As an example of the ongoing changes in the vicinity of Lat. $42^{\circ} 49' 50''$, Long. $78^{\circ} 52' 30''$, a bulkhead has been constructed and the enclosed area is being filled. In the offshore areas, away from bulkheading and dredging, the bottom configuration and general depths appear to be fairly stable (± 1 to 2 feet). It is possible to attribute most of the larger amounts of change to man made changes. *concur*

It was noted that prior survey LS-1714 (1937) had areas that were a combination of hydrography and wire sweep. The copy available during verification had no apparent hangs nor any cleared depths as ^{re}prescribed by current wire drag policy.

The swept areas agree with the present survey with the following exceptions:

(1) The "swept to 23 feet" note on the prior survey has a 20-foot depth in the vicinity of Lat. $42^{\circ} 51' 30''$, Long $78^{\circ} 55' 27''$ and a 21-foot in the vicinity of Lat. $42^{\circ} 51' 40''$ Long. $78^{\circ} 54' 31''$ these are in areas of 22 to 24 feet on the present survey. They were both added ^(brought forward) to the smooth sheet and are recommended for *retention on the chart.* ~~charting.~~ See Descriptive Report section "K" p. 13 para. 6. ✓

(2) The "swept" to 18 feet" note on the prior survey has a 17-foot depth in the vicinity of Lat. $42^{\circ} 51' 40''$, Long. $78^{\circ} 53' 56''$ in an area of two 18-foot depths on the present survey. There is an 18-foot depth approximately 220 meters north of the above position ~~in 23 and 24-foot depths on the present survey and~~ ^{which is discredited by} another 18-foot depth ^{from a 1911 survey} 250 meters southwest of the above position, ~~in 25-foot depths on the present survey.~~ ^{which is discredited by} ~~All three of these soundings~~ ^{The 17 ft. sdg. was} were carried forward to the smooth sheet. Also ²⁴⁻²⁵ *(The two 18ft sdgs are not charted on the comparison chart.)*

there is another ^{charted} 17-foot depth on the prior survey in the vicinity of Lat. $42^{\circ} 51' 33''$, Long. $78^{\circ} 53' 32''$ in an area of 18 feet on the present survey. ~~All of the above shoal depths were carried forward to the smooth sheet and it is recommended that this area be charted from the smooth sheet.~~ ^{not disproven} *Charted bottom characteristics from an unknown source, should be retained on these shoals.*

(3) The "swept to 22 feet" note on the prior survey has 22-foot depths on the present survey in the vicinity of Lat. $42^{\circ} 51' 22''$, Long. $78^{\circ} 54' 17''$. A 23-foot depth ^{from a 1911 survey & charted} on the prior survey ^{is discredited by} approximately 675 meters south of the above position ^{in 30} and 31-foot depths on the present survey, ~~was brought forward to the smooth sheet as~~ ^{charted} was a 19-foot depth ^{is to be retained as charted.} approximately 480 meters northeast of the 23 in 21 and 23-foot depths on the present survey. A 23ft. depth in 25 and 29 feet on the present survey in the vicinity of Lat. $42^{\circ} 51' 10''$, Long. $78^{\circ} 53' 18''$ ^(Retain 23ft sdg as charted) was brought forward to the smooth sheet. It is recommended that these areas be charted from the smooth sheet. *concur*

^{within the area} (4) The "swept to 28 feet" ~~note~~ ^{shown in brown ink & simply identified as originating with a 1942 survey falls} on the prior survey LS-1714 (1937) has a 19-foot depth ^{in 24 feet} on the present survey in the vicinity of Lat. $42^{\circ} 50' 40''$, Long. $78^{\circ} 54' 08''$. The 19-foot depth was brought forward to the smooth sheet. There are numerous 24 and 25-foot depths in this area on the present survey. Recommend charting this area ^{for} the smooth sheet. *This 19 ft. sdg. is not shown on the comparison chart (L.S. 314-Mar 14, 1974). Since it is not charted it may have been disproved by a source that was unascertainable during Q.C.I. and its charting is deferred to the compiler for resolution.*

(5) The "swept to 24 feet" ~~note~~ ^{shown in red ink on LS-1714(1937) & simply identified as originating with a 1911 survey} on the prior survey has a least depth of 20 feet ^{charted} in the vicinity of Lat. $42^{\circ} 50' 42''$, Long. $78^{\circ} 56' 20''$, the present survey has 22 feet in this area. The 20-foot depth was brought forward to the smooth sheet and it is recommended to chart this area as shown on the smooth sheet. *concur*

(6) The "swept to 30 feet" note on the prior survey has a least depth of ^(Part of DSP item #9) 26 feet in the vicinity of Lat. $42^{\circ} 49' 54''$, Long. $78^{\circ} 54' 09''$, the shoalest depth in this

area on the present survey is 29 feet. The prior survey has a 29-foot depth approximately 250 meters southeast of the above position in depths of 36 and 37 feet on the present survey. These shoal depths from the prior survey were brought forward to the smooth sheet and the area is recommended for charting from the smooth sheet. See section "K" p. 12 paragraph 1 and 2 of the Descriptive Report for additional information. *concur*

(Part of PSR item #9)

(7) The "swept to 24 feet" note on the prior survey has a least depth of 26 feet in the vicinity of Lat. $42^{\circ} 49' 48''$, Long. $78^{\circ} 53' 48''$, the shoalest depth in this area on the present survey is 31 feet. The 26-foot depth, ^{*charted*} from the prior survey was added to the smooth sheet and it is recommended that this area be charted from the smooth sheet. See section "K" p. 12 paragraph 3 of the Descriptive Report for additional information. *concur*

(Part of PSR item #9)
 (8) The "swept to 30 feet" note on the prior survey has a least depth of 29 feet in the vicinity of Lat. $42^{\circ} 49' 58''$, Long. $78^{\circ} 56' 16''$, the shoalest depth on the present survey is 31 feet approximately 65 meters south of the 29-foot depth. The 29-ft. depth was added from the prior survey and it is recommended that the area be charted from the smooth sheet. For additional information see section "K" p. 11 paragraph 5 of the Descriptive Report. *concur*

(9) The "swept to 28 feet" note on the prior survey has a least depth of 28 feet in the vicinity of Lat. $42^{\circ} 51' 00''$, Long. $78^{\circ} 55' 15''$, the shoalest depth on the present survey in this area is 31 to 32 feet. The 28-foot from the prior survey was brought forward to the smooth sheet and the area is recommended to be charted from the present survey. *concur*

(10) The 18-foot shoal in the vicinity of Lat. $42^{\circ} 51' 03''$, Long. $78^{\circ} 56' 33''$, charted from prior survey LS-1215 (1911) was added to the smooth sheet as well as another ^{charted} 18-foot ^{sdg.} approximately 375 meters north-northeast of the 18-foot shoal. Recommend retaining these as charted. *concur*

(11) There are numerous shoal depths (11) from prior surveys LS-1215 (1911) and LS-1714 (1937) that are not charted. These depths are in the vicinity of Lat. $42^{\circ} 50' 15''$, Long. $78^{\circ} 54' 30''$ which includes Presurvey Review Item 10 and an area approximately 450 meters northeast of item 10. These prior survey depths range from 22 to 29 feet and are shoaler than present survey depths by 1 to 10 feet. Nine of these depths were removed ^(area dredged) by Notice to Mariners Item #475 of 1953 to a depth of 27 feet. However, this 27-foot depth is still shoaler, in the case of #11 this page, by 2 to 3-feet than the charted depths and the 27-foot dredged depth is approximately 3 feet ^s shoaler than the current survey depths. It is recommended that this area be examined by Quality Control for resolution of this apparent discrepancy. *These prior survey shoal depths are considered to have been disproved by sources unavailable to the Q.C. Inspector. Resolution is deferred to the chart compiler.*

(12) There are numerous shoal depths (10) from prior surveys LS-1215 (1911) and LS-1714 (1937) that are not charted. These depths are in the vicinity of Lat. $42^{\circ} 50' 55''$, Long. $78^{\circ} 55' 45''$ and all fall in a shoal area (27 ft.) on the chart. The prior survey depths range from 21 to 26 feet and are shoaler than the chart by 1 to 6 feet. The least depth on the present survey is 27 feet with the rest of the depths being in the 28 to 30-foot depth range. The same rationale and recommendations used in item 11 above applies to this area also. *Resolution is deferred to the chart compiler.*

(13) Three rocks (awash) were added to the present survey from prior survey LS-1778 (1940) in the vicinity of Lat. $42^{\circ} 52' 50''$, Long. $78^{\circ} 54' 55''$. There

was no information on these rocks from either the topographic or hydrographic sources. It is recommended that the rocks be charted as shown on the smooth sheet. *CONCUR*

(14) Five rocks (awash) were added to the present survey from prior survey LS-1778 (1940) in the vicinity of Lat. $42^{\circ} 53' 07''$, Long. $78^{\circ} 54' 39''$. These rocks are the most offshore of a group of ^(eleven) 11 rocks that fall on the east side of a feature known as Middle Reefs. It is recommended that this area be charted as shown on the smooth sheet. *CONCUR*

With the addition of the rocks and soundings described above to supplement the present survey, the present survey is adequate to supersede the prior surveys in the common area. *CONCUR*

b. Wire Drag Surveys

LS-1215 (1911)

LS-1274 (1940)

While these are not wire drag surveys in the more modern sense they have swept areas that cover the present survey area. There were no apparent conflicts other than those previously mentioned and the ones created by cultural changes such as filling. *CONCUR*

7. COMPARISON WITH CHART # 14833 (314) 19th Edition, March 14, 1974 and 14822 (31) 22nd Edition, November 9, 1974.

a. Hydrography

The hydrography generally originates with the previously discussed prior surveys. The remaining soundings for which no source was available during verification are in good agreement (+ 0-1) with the exceptions listed in section K of the Descriptive Report. *concur*

There were five cribs located on the chart for which no source documents were available during verification but believed to have originated with Revisory Surveys of 1961-65-67.

(1) "Depth over Intake Crib 17 feet", in the vicinity of Lat. $42^{\circ} 51' 01''$, Long. $78^{\circ} 52' 15''$ (Revisory Survey 1967). The least depth in this area on the present survey is 17 feet. The field did not locate this crib (detached position) nor adequately search for least depth (leadline). Recommend retaining ^{crib as} on the charted. *(source of crib is unknown)*

(2) "Depth over ^{two} cribs 17 feet", in the vicinity of Lat. $42^{\circ} 48' 00''$, Long. $78^{\circ} 52' 20''$ (revisory surveys of 1961-1965). The least depth in this area is 15 feet on the present survey. The field did not adequately locate these cribs (detached position) nor adequately search for least depths (leadline) ^{or any other suitable method}. Recommend retaining as charted with possible revision of depth after consideration of source documents by the chart complier. *concur (source of cribs is unknown)*

(3) "Depth over crib 6 feet" in the vicinity of Lat $42^{\circ} 47' 11''$, Long. $78^{\circ} 51' 13''$ (revisory surveys of 1961-65). The least depth on the present survey is 11 feet the field did not locate this crib by a detached position nor was an adequate leadline least depth obtained. Recommend retaining the crib and least depth note as charted. *concur*

(4) "Depth over crib 8 feet, (sewer) in the vicinity of Lat. $42^{\circ} 46' 58''$, Long. $78^{\circ} 51' 47''$ (revisory survey 1961-65). The least depth on the present survey is 8 feet. The field did not adequately locate this crib with a detached position nor was an adequate (leadline) least depth obtained. Recommend retaining this item as charted. *CONCUR*

(5) There were numerous piles and dolphins on the chart that did not appear on the shoreline manuscript. Some of these piles and dolphins appear on the boatsheet, however, no positional information exists for these items. In that the shoreline for the boatsheet was taken from the chart and the statement by the hydrographer under section H of the Descriptive Report these items were not carried forward to the smooth sheet. These piles and dolphins are so numerous as to be impractical to list here. The greatest amount of these can be found in the feature known as the Buffalo River. There are other items that appear on the chart (rocks, finger piers, etc.) that haven't been addressed by the hydrographer nor do they appear on the shoreline manuscript. It is recommended that these items be retained unless subsequent information indicates otherwise. These items should be reviewed by the chart compiler. *CONCUR*

The present survey is adequate to supersede the charted information with the retention of items listed in this report and the Descriptive Report (section "L") and when attention is given to the charted items coming from sources not readily ascertainable at the time of verification. *CONCUR*

b. Controlling Depths

There are no controlling depth notes, at least not in the format generally ^{ac} accepted on charts of ^{harbor} ocean waters. There are random depths in the channel areas on

chart #14833 (314). A comparison was made of these depths and the present survey is from 1 to 3 feet deeper. The latest U.S. Army Corps of Engineers channel surveys should be consulted before charting present survey depths. *concur*

- c. Aids to Navigation *(p. 6617)*
Buoy No. 6 in lat. 42°53.80'N, long. 78°53.77'W was described as lighted by the hydrographer.
(p. 7788) Buoy #8 in lat. 42°53.76'N, long. 78°53.87'W - the hydrographer made no mention of a light.
These two aids are in conflict with light list.

The aids to navigation were not adequately discussed nor located by the field unit. There were numerous lights that were never addressed by the field unit nor located by them. The hydrographer's location of aids to navigation can be found on page 77 thru 80 of the Descriptive Report. This list is compiled on form 567 (non floating aids or landmarks) and is not complete, nor does it provide a means to position, the ones located, on the smooth sheet. It is recommended that the chart compiler retain all fixed aids charted in the survey area unless subsequent information indicates otherwise. *Contact Coast Guard for information on charting all aids (floating and fixed) within the survey area.*

8. COMPLIANCE WITH INSTRUCTIONS

This survey complies with the Project Instructions with the exception of paragraph 4.4., a, b, 4.10; 4.11, and 4.12. These exceptions are all discussed in this report. *concur*

9. ADDITIONAL FIELD WORK

This is an adequate basic survey. Additional work is recommended only if it is desirable to resolve the topographic differences discussed in section 2 of this report and when consideration is given to the incomplete nature of the developments on shoal features, etc. *Do not concur - See Q.C. Report, Item # 4*

INSPECTION REPORT
H-9705

The completed survey has been inspected by the Hydrographic Inspection Team, who concur with the verifier's finding that the sheet did not comply with the Project Instructions in that development of a number of shoals was not carried out in accordance with the Hydrographic Manual. In addition, numerous prior survey soundings were not addressed. No record of the positional information for finding Aids to Navigation and landmarks was included with the survey. *concur*

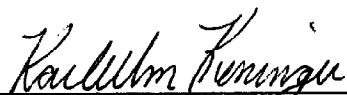
The hydrographer was not provided with photogrammetric support during the survey. The shoreline manuscripts were furnished after completion of the survey and have not been inspected or field edited. *concur*

(the planned field edit has been cancelled)

The survey was run at a scale of 1:10,000 without the use of any insets. The scale was in accordance with the Project Instructions. Soundings in the vicinity of wharves and docks should have been shown on subplans. *concur*

The Verification Report has presented the facts accurately and properly, and the recommendations are logical and justifiable. The survey does not comply with National Ocean Survey requirements as noted in the Verification Report. The Hydrographic Inspection Team concurs with the verifier's findings, actions, and recommendations.

Examined and Approved
Hydrographic Inspection Team
Date: September 11, 1980



Karl Wm. Kieninger, CDR, NOAA
Chief, Processing Division



R. D. Sanocki
Technical Assistant
Processing Division

Absent

Maureen R. Kenny, LT, NOAA
Chief, EDP Branch



Robert G. Roberson
Team Leader
Processing Division

Approved/Forwarded



Richard H. Houlder, RADM, NOAA
Director, Atlantic Marine Center



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

OA/C352:FPS

August 31, 1981

TO: Glen R. Schaefer *to*
Chief, Hydrographic Surveys Division

THRU: Chief, Quality Control Branch *Am*

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

SUBJECT: Quality Control Report for H-9705 (1977), New York, Lake Erie,
Buffalo Harbor

A quality control inspection of H-9705 was accomplished to monitor the survey for adequacy with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, shoreline transfer, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as stated in the Verifier's Report, the HIT Report, and as follows:

1. The shoreline shown on the present survey originates from an enlargement of Class III photogrammetric manuscript TP-00455 of 1978 and should be used for orientation purposes only.
2. Due to lack of space, several symbols for fixed aids and triangulation stations depicted on the smooth sheet are appended with lower-case letters which identify the name and, in some cases, describe the items in the legend. The compiler is cautioned not to mistake these lower-case letters for anything other than what they are.
3. Additional sounding lines should have been run in the vicinity of latitude $42^{\circ}51.45'N$, longitude $78^{\circ}51.20'W$ in order to ascertain the location of the channel and to furnish more complete hydrographic coverage of the area. The Buffalo River Channel is maintained by the Corps of Engineers.
4. The failure to ascertain least depths on several shoals with any suitable method such as a drag, drift soundings with a hand lead, or a diver investigation; the failure to locate prominent offshore features with detached positions; the failure to address numerous charted nearshore items



such as piers and piles; the failure to locate all fixed and floating aids and identify their specific purpose; and the failure to verify charted landmarks from seaward and furnish elevations for those deemed reliable result in a survey that is incomplete.

For these reasons the field work on the present survey is considered inadequate. The need for a substantial amount of additional field work was obviated only by recommending the retention on the chart of numerous prior survey and other charted features the current validity of which cannot be ascertained. Any future survey of this area should definitely verify or disprove all such features.

cc:
OA/C351



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

JUL 13 1982

OA/C351:DJH

TO: OA/CAM - Richard H. Houlder

FROM: *for* OA/C3 - C. William Hayes *William Hayes*

SUBJECT: H-9705 (1977), OPR-300, New York, Lake Erie, Buffalo Harbor, Report of Compliance with Project Instructions

The smooth sheet and Descriptive Report for the subject survey have been examined. In addition to the Quality Control Report, dated August 31, 1981 (copy attached), and the Hydrographic Survey Inspection Team Report, dated September 11, 1980, the following is submitted:

Concern relative to the hydrographer's adjustment of the Raytheon DE-719B echo sounder and the steps taken to resolve the problem are detailed in the memorandum dated March 11, 1982, OA/C35x3 to OA/C35x1 (copy attached).

Except as noted, the survey is complete and adequate for the purposes intended and is in compliance with Project Instructions OPR-300-HFP-77, dated January 25, 1977.

Attachments

cc:
OA/C352 w/o att.





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

March 11, 1982

OA/C35x3:JLW

TO: OA/C35x1 - Dale E. Westbrook
FROM: OA/C35x3 - Jack L. Wallace *Jack L. Wallace*
SUBJECT: DE-719B Echo Sounder Operator Adjustments--Survey H-9705

As per our discussion concerning the subject survey, I have spoken with various people including the Officer in Charge of the survey and I conclude that there were no violations of standard practice.

The sentence of concern, taken from pages 5 and 6 of the Descriptive Report, is as follows: "The Raytheon DE-719B model was checked by adjusting the CAL ZERO control knob until the calibrate zero line fell directly on the chart paper zero line, and by adjusting the Potentiometer R210, along with the speed of sound knob until the second calibrate pulse fell on the chart paper 'calibrate' line."

The issue is whether non-ET field personnel would have the proper equipment to adjust Potentiometer R210 and, if they did, it should not be done at the same time as the speed of sound knob is adjusted. After examining a similar unit at PMC, Lt. Kathy Andreen, the Officer in Charge on survey H-9705, has indicated that considering its location R210 was not touched by field personnel. Further, she indicated that it was probably written in the Descriptive Report because it was done (hopefully) by EED personnel but not in the field. My personal feeling is that the Descriptive Report should only reflect field procedures.

I have discussed the subject of DE-719B field calibrations and procedures with Mr. Jeff Craig of the Acoustic and Instrumentation Branch, AMC/EED, and he concurs with my observation. I believe that this whole matter can be put to rest by ensuring that it is addressed in the AMC/PMC OORDER or a Hydrographic Survey Guideline.

CC:
OA/CAM11
OA/CAM103
OA/CAM611
OA/CPM11



79°30'

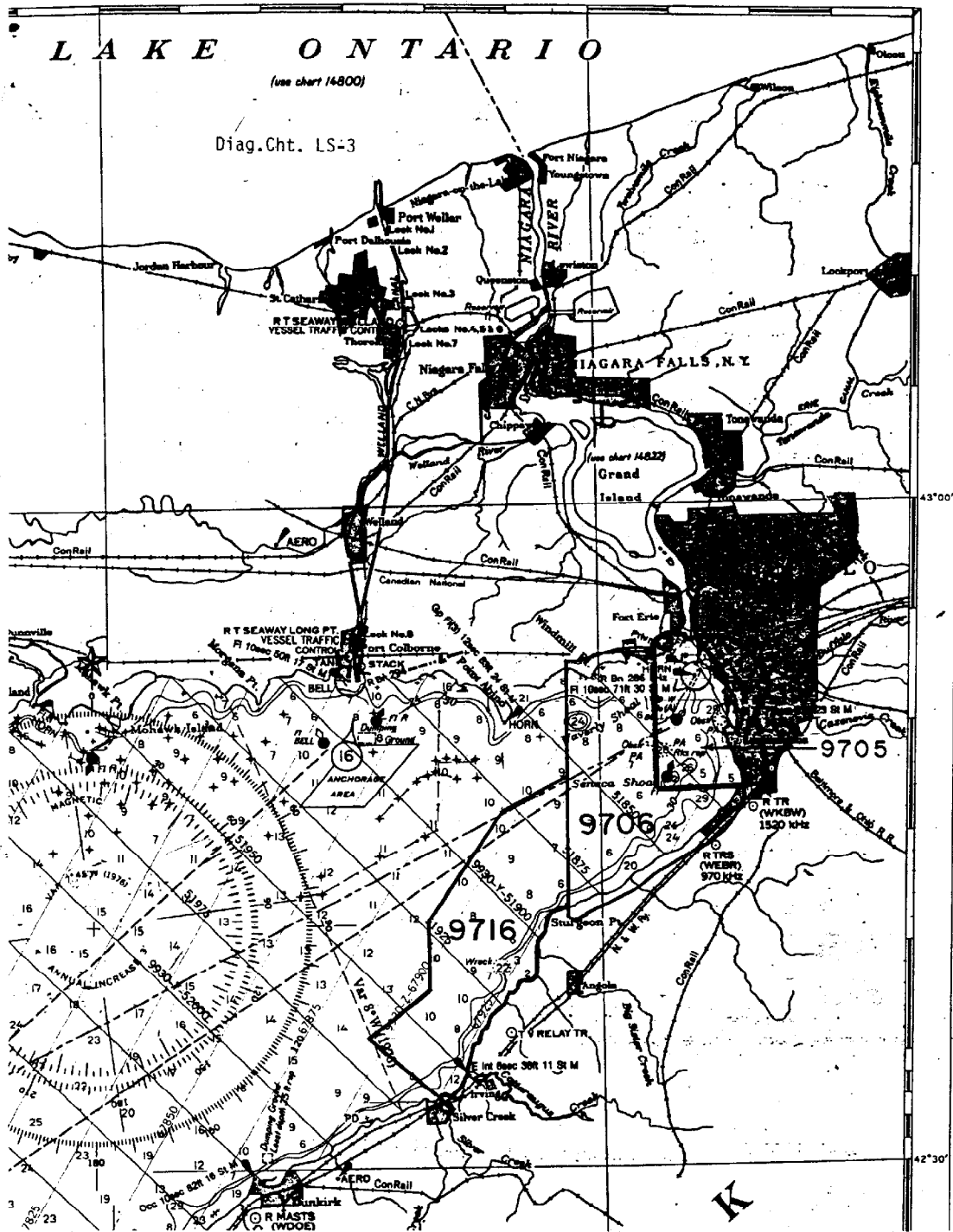
(JOINS CHART 14800) (formerly LS 2)

79°00'

LAKE ONTARIO

(use chart 14800)

Diag. Cht. LS-3



RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. 9705

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
14820	1-19-83	Ralph B. Rose <i>LR</i>	Full Part Before After Verification Review Inspection Signed Via Drawing No. 5 <i>applied Critical Corrections only</i>
14822	4/16/83	CK Howard <i>LR</i>	Full Part Before After Verification Review Inspection Signed Via Drawing No. #4 <i>applied Critical corr's only</i>
14823M	1/30/84	Peane Hunt	Full Part Before After Verification Review Inspection Signed Via Drawing No. 1 <i>Applied in Full</i>
14833	1-15-84	Angus B. Davis	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3 <i>Applied in full</i>
14832	1-23-84	Angus B. Davis	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3 <i>Applied in full</i>
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