

8912

Diag. Ght. No. 6450-2

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. ... BO -10-3-66
Office No. ... H-8912

LOCALITY

State ... Washington
General Locality ... Admiralty Inlet
Locality ... Oak Bay to Double Bluff

1966

CHIEF OF PARTY
J. G. Grunwell

LIBRARY & ARCHIVES

DATE ... 5-29-69

8912
2168

U.S. GOVERNMENT PRINTING OFFICE: 1974-763-098

18461 applied fully
18464 applied
18441
18445 applied
18423 - E applied
18440

HYDROGRAPHIC TITLE SHEET

H-8912

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.

BO-10-3-66

State WASHINGTON

General locality Admiralty Inlet

~~PUGET SOUND~~

Locality Oak Bay to Double Bluff

~~ADMIRALTY INLET~~

Scale 1:10,000 Date of survey Oct 8 thru Nov 3, 1966

Instructions dated 11 January 1966 Project No. OPR-412

Vessel USC&GSS BOWIE (CSS-26)

Chief of party James G. Grunwell, LCDR, USESSA, CO, BOWIE

Surveyed by M.H. Fleming, LT, S.M. Hamilton, LTJG, M.N. Maki, ENS

Soundings taken by echo sounder, hand lead, pole Raytheon DE-723 Echo Sounding Fathometer

Graphic record scaled by Ship personnel

Graphic record checked by F.L. Rosario, N. Mayes

Protracted by _____ Automated plot by Pacific Marine Center

Gerber Digital Plotter

Soundings penciled by _____

Soundings in fathoms feet at MLW MLLW

REMARKS: _____

X.W.V. 6/17/91

DESCRIPTIVE REPORT TO ACCOMPANY HYDROGRAPHIC SURVEY H-8912

(FIELD NUMBER BO-10-3-66)

SCALE 1:10,000

1966

USC&GSS BOWIE (CSS-26)

JAMES G. GRUNWELL, LCDR, USESSA

A. PROJECT

Sheet H-8912 (BO-10-3-66) is sheet "F" of project instructions OPR-412, PORT TOWNSEND, ADMIRALTY INLET AND VICINITY, dated 11 January 1966. No supplemental instructions were issued affecting the project itself, other than those dated 15 June 1966.

B. AREA SURVEYED

The area covered by project H-8912 (BO-10-3-66) includes the portion of Admiralty Inlet south of latitude $48^{\circ} 00' 30''$ to approximately latitude $47^{\circ} 56' 30''$. It is bordered on the west by land and on the east by Whidbey Island and approximate longitude $122^{\circ} 32' 30''$. It includes Mutiny Bay and the southern portion of Oak Bay. This sheet makes junction with the following surveys:

| <u>SHEET NUMBER</u> | <u>SCALE</u> | <u>YEAR</u> |
|---------------------|--------------|-------------|
| H-1729 | 1:20,000 | 1885 |
| H-1482A | 1:10,000 | 1880 |
| H-4688 | 1:5,000 | 1927 |
| H-4711 | 1:10,000 | 1927 |

This sheet junctions on its northern limit with contemporary surveys H-8910 (BO-10-1-66) and H-8911 (BO-10-2-66). On the southern limit of the sheet it junctions with H-8914 (LJ-10-3-66) and H-8915 (LJ-10-4-66).

This survey began on October 8, 1966 and was completed on October 21, 1966. The work done on the fourteen fathom presurvey review item number one was done on November 3, 1966. *by Ship Bowie "K" day pos. 3424-3475. vol. 12*

C. SOUNDING VESSELS

Ship hydrography was done entirely by USC&GSS BOWIE. Bottom samples were taken by USC&GSS LESTER JONES. Launch hydrography was accomplished by BOWIE's launch #95 and by LESTER JONE's launch #1206. Shoreline work and verification was done by skiff. The vessels with their corresponding day letters are listed below:

| <u>VESSEL</u> | <u>DAY LETTER COLOR</u> |
|----------------------|-------------------------|
| USC&GSS BOWIE | RED |
| USC&GSS LESTER JONES | ORANGE |
| LAUNCH #95 | BLUE |
| SKIFF #1 | GREEN |
| SKIFF #2 | YELLOW |
| LAUNCH 1206 | RED |

D. SOUNDING EQUIPMENT

The entire survey was done with Raytheon DE-723 fathometers. The vessels and their fathometer serial numbers are listed below:

| <u>VESSEL</u> | <u>SERIAL NUMBER</u> |
|----------------------|----------------------|
| USC&GSS BOWIE | 553 |
| USC&GSS LESTER JONES | 545 |
| LAUNCH #95 | 936 |
| LAUNCH #1206 | 548 |

The operation of the echo sounding machines was based on 800 fathoms/second speed of sound. The fathometers functioned well throughout the survey.

Generally, the launch hydrography was performed in depths of less than 15 fathoms with lines perpendicular to the shore or as near perpendicular as conditions allowed. Ship hydrography was done in depths greater than 15 fathoms with lines generally perpendicular to the launch hydrography lines. Echo sounding corrections were determined from bar checks taken daily, and from one oceanographic station established in the project area in September 1966 (see abstract of correction to echo soundings in appendix).

E. SMOOTH SHEET

The boat sheet and the smooth sheet were projected by computer plotter at the Pacific Marine Center, Seattle, Washington (see copy of request form in appendix).

F. CONTROL

The horizontal control for hydrography includes triangulation, photogrammetric, and hydrographic stations. Standard methods of control establishment were used. All hydrographic positions were determined from visual control by the sextant 3-point fix. No electronic control was used.

The photogrammetric compilations used for the transfer of signals are listed below:

| | |
|---------|---------|
| T-12064 | T-12065 |
| T-12066 | T-12067 |
| T-12069 | T-11623 |
| T-11624 | T-11631 |

G. SHORELINE

All shoreline was obtained from the photogrammetric compilations listed above under paragraph "F" "Control". Sufficient soundings were taken near the shore to define the low water line. It should be noted that the rock quarry area south of triangulation signal BaSAlt has changed. Reference to 1965 photography may give additional information. The quarry is still in operation. Rock is being barged out to a jetty project in the ferry slip area of Kingston, Washington. *see Review p. 2.*

H. CROSSLINES

The percentage of crosslines was about 8%, which was sufficient for the area. Generally, the crosslines checked very well. A one fathom discrepancy was found, however, on a portion of two crosslines in the southern part of Oak Bay. This discrepancy may be due to the rounding-off to full fathoms (e.g. 13.7 = 13.0 and 13.8 = 14.0); or, it may be due to a discrepancy found in the location of the six hydrographic signals (THE to JUM) on the west shore of Oak Bay. A field party is currently determining positive positions of those signals. *Crossings adequate on S.S.*

I. JUNCTIONS

This survey agrees at its junction with the prior surveys listed in paragraph "B" "Area Surveyed". It also agrees at its junction with two contemporary surveys H-8910 (BO-10-1-66) and H-8911 (BO-10-2-66). Junction with contemporary surveys H-8914 (LT-10-3-66) and H-8915 (LJ-10-4-66) is not in complete agreement. Control was very difficult to obtain in the junction area. It is believed upon reduction of soundings to actual tides, the junction will be in complete agreement. *see Review p. 5.*

J. COMPARISON WITH PRIOR SURVEYS

Item number one of project OPR-412 presurvey review is a 14 fathom sounding (latitude 47 58.52, longitude 122 33.02) which falls in an area with general depths of 22 to 24 fathoms. An extensive and complete survey of that specific area positively determined that the 14 fathom sounding is in error. It is recommended that the 14 fathom sounding be deleted from the chart (see presurvey review in appendix). Items number two through 7 are not located in the survey area. *Smooth sheet junctions are adequate*
14-fm. sdy. has been deleted from chart.

The "good determination" items, in the inset of OPR-412 presurvey review, were located and verified with ~~some~~ exceptions. The one foot sounding 04757.2371224057 located during project H-4688 (1927) was searched for but was not located (approximately 0.3 mile WNW of Colvos Rock). For additional information see presurvey review in appendix. *1ft (0.2 fm) sdy carried forward*

The soundings of this survey generally agree with those of the prior surveys listed in paragraph "B" "Area Surveyed" *Review, p. 6*

K. COMPARISON WITH THE CHART

Charts 6405 and 6421 (1:20,000) partially cover area surveyed.
The largest scale chart of the area surveyed is C&GS 6450, scale 1:80,000 13th Edition, 9 August 1965. No significant sounding changes were found in the project area, with the exception of the presurvey review item number one (see paragraph "J" "Comparison with Prior Surveys").

The soundings at the southern portion of the area surveyed generally agree with C&GS Chart 6421, scale 1:20,000, 2nd Edition, dated 4 May 1964.

L. ADEQUACY OF SURVEY

The survey is complete insofar as soundings and shoreline are concerned (see approval sheet in appendix).

M. AIDS TO NAVIGATION

This survey has no aids to navigation not already located on present charts.

There are four floating aids to navigation, all of which agree with their charted positions.

The two fixed aids to navigation are Colvos Rock Light and Double Bluff Light. They are located as intersection triangulation stations. Colvos Rock Light is located on photogrammetric compilation T-12067, and Double Bluff Light is on photogrammetric compilation T-11631. Both check with the 1966 Light List.

N. STATISTICS

Launch #95 had a total of 1168 visual fixes and 162.2 miles of sounding lines. Launch #1206 had 98 visual fixes and 13.9 miles of sounding lines. ✓

Ship BOWIE had an additional 1441 visual fixes and 299.7 miles of sounding lines.

The two skiffs had a total of 278 fixes, all detached positions for rocks and shoreline. Ship LESTER JONES took 63 bottom samples in the area.

The survey covered 24.46 square nautical miles of water surface.

O. MISCELLANEOUS

No additional practical information resulted from this survey which has not been previously mentioned. The sharp ridges found in 20 to 55 fathoms approximately 0.5 to 2.0 miles NW of Double Bluff Light are of scientific interest, however. Judging from their shape they probably are a fairly recent development. They are located in latitude 47 58 00 to 47 59 00 and longitude 122 34 00 to 122 35 30 (for additional information, see ridge development in appendix). ✓

No new or different geographic names were found by the hydrographic party in the project area.

P. RECOMMENDATIONS

This survey is complete and needs no further investigation or survey.

Q. REFERENCES TO REPORTS

No reports were submitted which are not a part of the survey records.

Malvin U. Maki
ENS. USESIA

Project No. OPR-412

Approved by J. G. Grunwell

N No. _____

SNP Dovic

Field No. 50-10-3-66

Date Acquired 76 Aug 66

GRID LIMITS

XKN (SP 5) Distance from CENTER to Plotter Origin 7846.0 - Meters

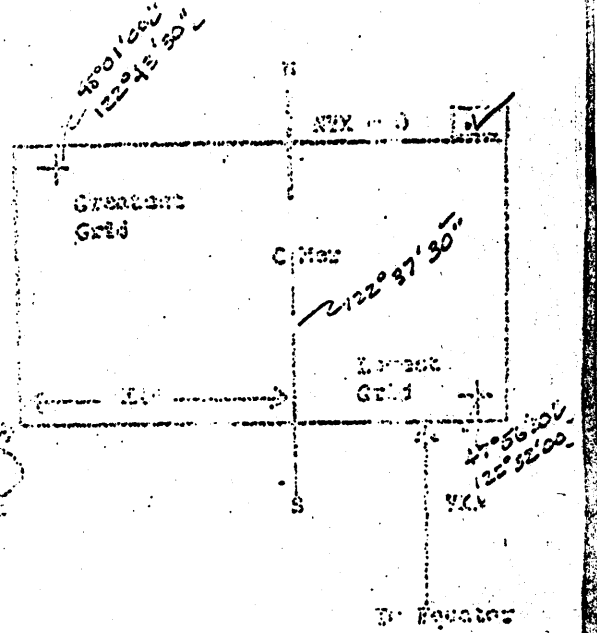
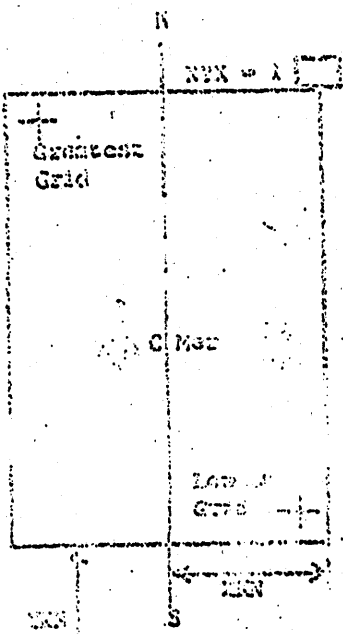
YKN (SP 241) Distance from Equator to Plotter Origin 5,310,950.427 Meters

Central Meridian 122° 37' 30"

Survey Scale 1:10,000

Size of Sheet (Check One) 36 x 60 42 x 60

Orientation of Sheet (Check One)



GRID LIMITS

Greatest Latitude 48° 01' 00" (Projection Limit)

Lowest Latitude 47° 56' 30" (Hydro Limit)

Difference 04° 30' 30"

Greatest Longitude 122° 43' 30"

Lowest Longitude 122° 32' 00"

Difference 11° 30' 30"

Triangulation Stations on Back

Comp: FSS CS SAN

2268

Triangulation Stations

| Station | Latitude | Longitude |
|--------------------|--|--|
| Abbins (USE) | 48° 00' 32.675" ^{577.15} _{1669.14} | 122° 41' 06.697" ^{506.67} _{136.70} |
| Alder | 47° 58' 46.705" ^{105.1} _{1412.56} | 122° 42' 23.492" ^{725.67} _{487.26} |
| Olele | 47° 58' 20.605" ^{427.21} _{151.41} | 122° 40' 55.533" ^{1772.17} _{1151.6} |
| Solvos Reck. Light | 47° 57' 08.080" ^{152.45} _{341.56} | 122° 40' 11.134" ^{343.89} _{731.62} |
| Foulweather 3 | 47° 56' 26.43" ^{545.55} _{816.35} | 122° 36' 11.512" ^{541.52} _{234.89} |
| Double Bluff Light | 47° 58' 03.678" ^{102.3} _{113.6} | 122° 32' 42.044" ^{1296.16} _{872.06} |
| Mutiny (USE) | 48° 00' 39.152" ^{41.8} _{1269.43} | 122° 34' 49.948" ^{1242.62} _{7025.11} |

SAH

SEARCH FOR PRE-SURVEY REVIEW ITEM NO. 1

USCGS BOWIE POSITIONS 1K TO 52K (pos. 3424-3475) Nov. 3, 66

59'00"

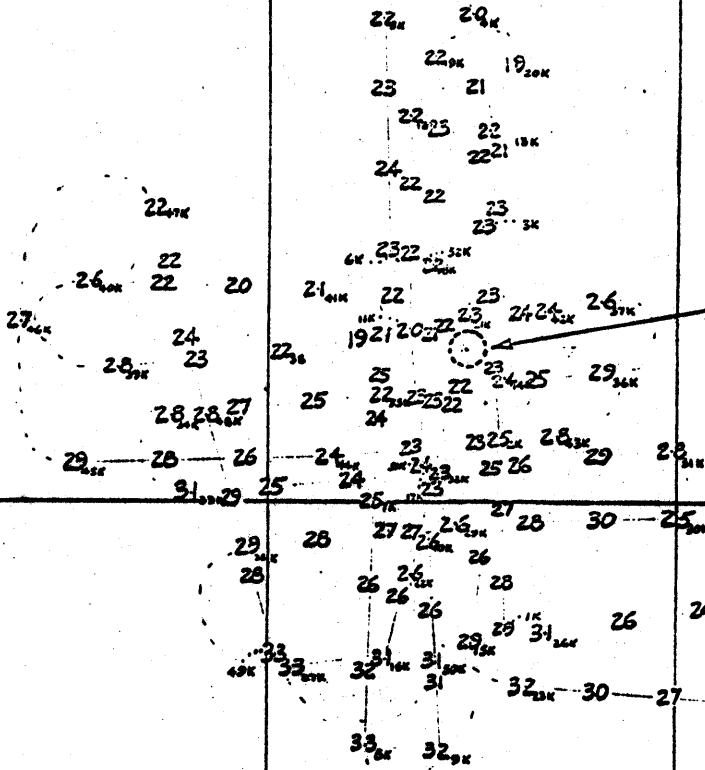
7°58'30"

°58'00"

122°34'00"

122°33'30"

PRE-SURVEY REVIEW
ITEM NO. 1, 14 FATHOM
SOUNDING from H-4711 (1927)



Memorandum

TO : Chief, Operations Division
Pacific Marine Center

DATE: 22 January 1967

FROM : Commanding Officer
USC&GSS BOWIE

In reply refer to:

67-6-2005

SUBJECT: Ridge Development Northwest of Double Bluff Light, Admiralty Inlet, Washington

REF : Project OPR-412, H-8912 (30-10-3-66) and Descriptive Report thereof

During the hydrographic survey of Admiralty Inlet this past year, unusual ridges were located between Latitude 47 58 00 and 47-59-00N and Longitude 122 34 00 and 122 35 30W at a depth ranging from 25 to 60 fathoms. The range between ridges and saddles varies from 1 to 9 fathoms. The slope of the bottom between ridge and saddle is about 1:5 in most cases. These ridges appear in an area of otherwise gradual rise. Bottom samples in this area revealed shells, pebbles and gravel.

Page 20-2 of referenced descriptive report is a general chart of the area. Soundings are reduced to predicted tides at Port Townsend, Washington. Pages 20-3 to 20-6 are examples of fathograms obtained in the area. Position numbers circled on page 20-2 correspond to those circled on the fathograms. The fathograms represent thirty-second soundings and usually there are ninety seconds between positions.

The location of these ridges may be of interest to other scientific research groups working in the Puget Sound area.

cc: JOHG, PMC

FOR *Michael H. Fleming*
Michael H. Fleming
Michael H. Fleming



TIDE NOTE

Two tide stations ^{North of} were used for the reduction of soundings. The survey area ~~south~~ to 48° latitude was controlled by the Bush Point tide station. The survey area south of 48° latitude was controlled by the Hansville tide station with a zero time correction and a 0.95 range ratio. (See p. 22-2)

The Bush Point tide station was located at a small pier N.E. of Bush Point light, Whidbey Island, Washington; latitude $48^{\circ} 02.02' N$, longitude $122^{\circ} 36.14' W$.

Not in survey area

The gauge was a pressure recording type. 3.7 feet on the marigram corresponded to MLLW. The staff was made of plastic scales attached to a pile and the 1.7 foot staff mark corresponded to MLLW. The time meridian used was $120^{\circ} W$ (Pacific Standard Time).

The Mansville tide station was located at the Standard Marine Products Wharf, Hansville, Washington. Latitude $47^{\circ} 55.0' N$, Longitude $122^{\circ} 32.7' W$.

Not in survey area

The gauge was a portable automatic type, with a wooden well attached to the wharf. The staff was made of vitrified scales and secured to the well. The 4.8 staff mark corresponded to MLLW. Hourly heights were furnished by the Washington office. The time meridian used was $105^{\circ} W$ (Pacific Daylight Time).

Memorandum ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

TO : The Commanding Officer
USC&GSS BOWIE

DATE: January 20, 1967

FROM : Chief, Datum Planes Section
Oceanography Division

In reply refer to:
C3311-9-CSSA

SUBJECT: Tide data, Project OPR 412

In reply to your memorandum dated January 5, 1967, listed below is the proposed tide station zoning for the above project:

| <u>Sheet No.</u> | <u>Tide Station</u> |
|---|--|
| BO 10-1-66 (Southward to Oak Bay) | Port Townsend |
| BO 10-1-66 (Oak Bay) <i>H-8910</i> | Bush Point |
| BO 10-2-66 <i>H-8911</i> | Marrowstone Island or Bush Point. Tide at Bush Point is $\frac{1}{2}$ hour later with no correction for range. |
| BO 10-3-66 <i>H-8912</i> (South to 48° Lat.) | → Bush Point |
| BO 10-3-66 <i>H-8912</i> (South of 48° Lat.) | Hansville Zero time correction 0.95 Range Ratio |

The hourly heights on hand from the respective gages should be used for obtaining tide reducers. Any missing tides that are necessary to process the hydrographic sheets may be requested from this Office.

For your convenience there are listed below the planes of reference on the tide staffs:

| <u>Location</u> | <u>MLLW on Staff</u> |
|-----------------------------|-------------------------|
| Port Townsend | 2.2 feet |
| Marrowstone Island | 3.2 " |
| Bush Point | { 1.7 " 3.7 " (Gage) |
| Hansville (<i>H-8912</i>) | 4.8 " |

L. C. Wharton
L. C. Wharton



ECHO SOUNDER CORRECTION REPORT

USC&GSS BOWIE
OPR-412

PORT TOWNSEND, KILISUT BAY, AND OAK BAY, WASHINGTON STATE
SHEETS H-8910, H-8911 AND H-8912

INTRODUCTION

This report states the methods used to determine the corrections for the echo soundings of the 1966 field season. Enclosed with this report are all field data, computations, and the abstract of corrections.

VESSELS AND EQUIPMENT

The latter part of the 1966 field season the BOWIE worked on project OPR-412, hydrography of Port Townsend, Kilisut Bay, Admiralty Inlet, and Oak Bay. This area is covered with three boat sheets: H-8910, H-8911, and H-8912. The distribution of work of the vessels per boat sheet is shown in the following table:

| <u>SHEET #</u> | <u>VESSEL</u> | <u>FATHOMETER#</u> | <u>DAYS OPERATED</u> |
|----------------|---------------|--------------------|----------------------|
| H-8910 | M.L. #95 | SN-936 | All days |
| H-8911 | BOWIE | SN-547 | "A" day |
| | BOWIE | SN-553 | "B" thru "M" day |
| | LESTER JONES | SN-545 | All days |
| | M.L. #95 | SN-936 | All days |
| H-8912 | BOWIE | SN-553 | All days |
| | LESTER JONES | SN-545 | All days |
| | M.L. #95 | SN-936 | All days |
| | M.L. #1206 | SN-548 | All days |

FIELD OBSERVATIONS FOR FATHOMETER CORRECTIONS PER VESSEL

The BOWIE took two, 10 August and 20 September, at oceanographic stations on the working grounds to depths of over one hundred fathoms. The first of these was observed using the STD instrument (salinity, temperature, and depth) of Pacific Oceanographic Laboratory. The station taken in September was by the usual Nansen bottle casts, reversing thermometers and hydrometer measurements. The data from these stations, the computations of velocity, and depth corrections are enclosed. Layer depths started with 1.3 fathoms, the depth of the Ship BOWIE's transducers. I plotted the computed corrections versus the true depth. From this graph I pulled correctors for even depths and replotted correction value versus the echo sounder depth. From this

graph I abstracted velocity correction per echo sounder depth. I'm not sure this double application of correctors is the normal method of determining velocity corrections.

The following measurements were taken in order to determine transducer depth and instrument error:

Transducer to Deck: 13.3 feet
 Deck to Waterline: 5.4 feet
 Water Level to Transducer: 7.9 feet (1.3 fathoms)

Leadline Comparisons:

| <u>Port Frame 42</u> | <u>Starboard Frame 42</u> | <u>Projected Frame 42 Transducer</u> |
|--------------------------------------|---------------------------|--|
| 3.8 fms | 3.5 fms | 3.65 fms |
| Echo Sounder Depth (initial 1.3 fms) | | 3.8 fms |
| Velocity Correction (1.3 to 3.6 fms) | | <u>.04 fms</u> |
| Corrected Echo Sounder Depth | | 3.84 fms |
| Leadline Sounding | | <u>3.65 fms</u> |
| | Instrument Error | 0.19 fms |

No Phase Comparisons were taken in the field. Upon scanning fathograms there appears to be no major jump between scales (0.1 fathoms). Most of the time the bottom slope varies so greatly that phase error and change of depth can not be separated.

The Electronics Department made regular checks on stylus condition and adjustment and carried out a good preventive maintenance program. We did lose about three days of ship work due to transducer malfunctions. A great deal of work on the transducers and their electrical lines to the bridge resulted only in readable signals, not normal signal strength.

Motor launch #95 (M.L. #95) took bar checks two or three times a day and a few leadline comparisons to deeper depths. From the bar check observations we determined draft and instrument error, and velocity errors to about eight fathoms. The final graph of depth versus correction, which includes both bar check and oceanograph data, are drawn to a common curve.

LESTER JONES and M.L. #1206 velocity corrections were done by the LESTER JONES and are enclosed.

CONCLUSIONS

As a result of compiling this report, discussions and reviews of fathometer operations and corrections were held with PMC personnel this winter. After a review of these discussions, I proposed that a more comprehensive method of maintenance, adjustment and record-keeping regarding fathometers be initiated.

Oceanographic Station Field Data

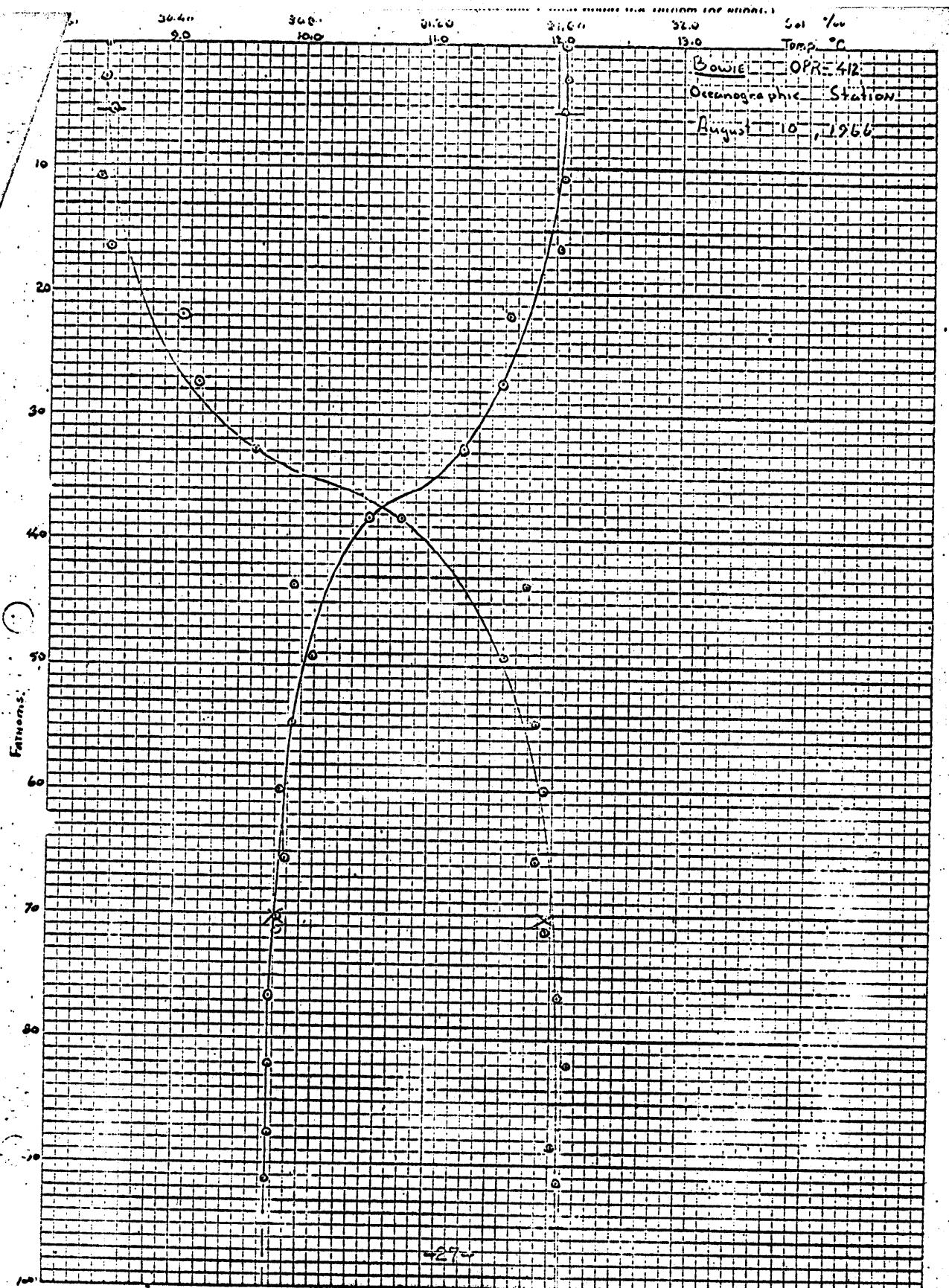
10 August 1966 This station was occupied in the deepest part part of Admiralty Inlet, between Marrowstone Point and Lagcon Point. All data, temperature salinity and depth was obtained by use of a STD instrument, operated by personel of the Pacific Oceanographic Laboratories.

| Depth Meters | Depth Fathoms | Temp. °C | Salinity /oo |
|-----------------|------------------|-------------|-----------------|
| 0 | 0.0 | 12.06 | 30.16 |
| 5 | 2.74 | 12.07 | 30.15 |
| 10 | 5.46 | 12.04 | 30.18 |
| 20 | 10.9 | 12.06 | 30.15 |
| 30 | 16.4 | 12.03 | 30.18 |
| 40 | 21.9 | 11.63 | 30.42 |
| 50 | 27.3 | 11.58 | 30.47 |
| 60 | 32.8 | 11.29 | 30.65 |
| 70 | 38.2 | 10.52 | 31.12 |
| 80 | 43.7 | 9.94 | 31.51 |
| 90 | 49.1 | 10.09 | 31.44 |
| 100 | 54.7 | 9.94 | 31.54 |
| 110 | 60.0 | 9.82 | 31.57 |
| 120 | 65.6 | 9.89 | 31.54 |
| 130 | 71.1 | 9.82 | 31.58 |
| 140 | 76.6 | 9.77 | 31.63 |
| 150 | 82.0 | 9.76 | 31.65 |
| 160 | 87.5 | 9.76 | 31.61 |
| 167 | 91.3 | 9.75 | 31.63 |

mhf

On the next page, these values are plotted and temperature and salinity are interpolated for selected mid layer depths.

| Layer (fms)Depth | Mid Depth | Temp. °C | Salinity /oo | Layer Velocity | Corr. Factor | Layer Corr. | Depth Corr. (fms) |
|---------------------|--------------|-------------|-----------------|-------------------|-----------------|----------------|----------------------|
| 1.3-10 | 5.6 | 12.05 | 30.16 | 1488.3 | .01729 | .1504 | 0.15 |
| 10-20 | 15 | 12.03 | 30.18 | 1488.7 | .01757 | .1757 | 0.33 |
| 20-30 | 25 | 11.72 | 30.39 | 1488.2 | .01723 | .1723 | 0.50 |
| 30-40 | 35 | 10.76 | 30.84 | 1485.4 | .01531 | .1531 | 0.65 |
| 40-50 | 45 | 10.22 | 31.39 | 1484.8 | .01490 | .1490 | 0.80 |
| 50-60 | 55 | 9.96 | 31.53 | 1484.1 | .01442 | .1442 | 0.94 |
| 60-70 | 65 | 9.83 | 31.59 | 1484.1 | .01442 | .1442 | 1.09 |
| 70-80 | 75 | 9.77 | 31.62 | 1484.2 | .01448 | .1448 | 1.23 |
| 80-90 | 85 | 9.75 | 31.63 | 1484.5 | .01470 | .1470 | 1.38 |
| 90-100 | 95 | 9.75 | 31.63 | 1484.9 | .01497 | .1497 | 1.53 |
| 100-110 | 105 | 9.75 | 31.64 | 1485.3 | .01518 | .1518 | 1.68 |
| 110-120 | 115 | 9.75 | 31.64 | 1485.5 | .01538 | .1538 | 1.84 |



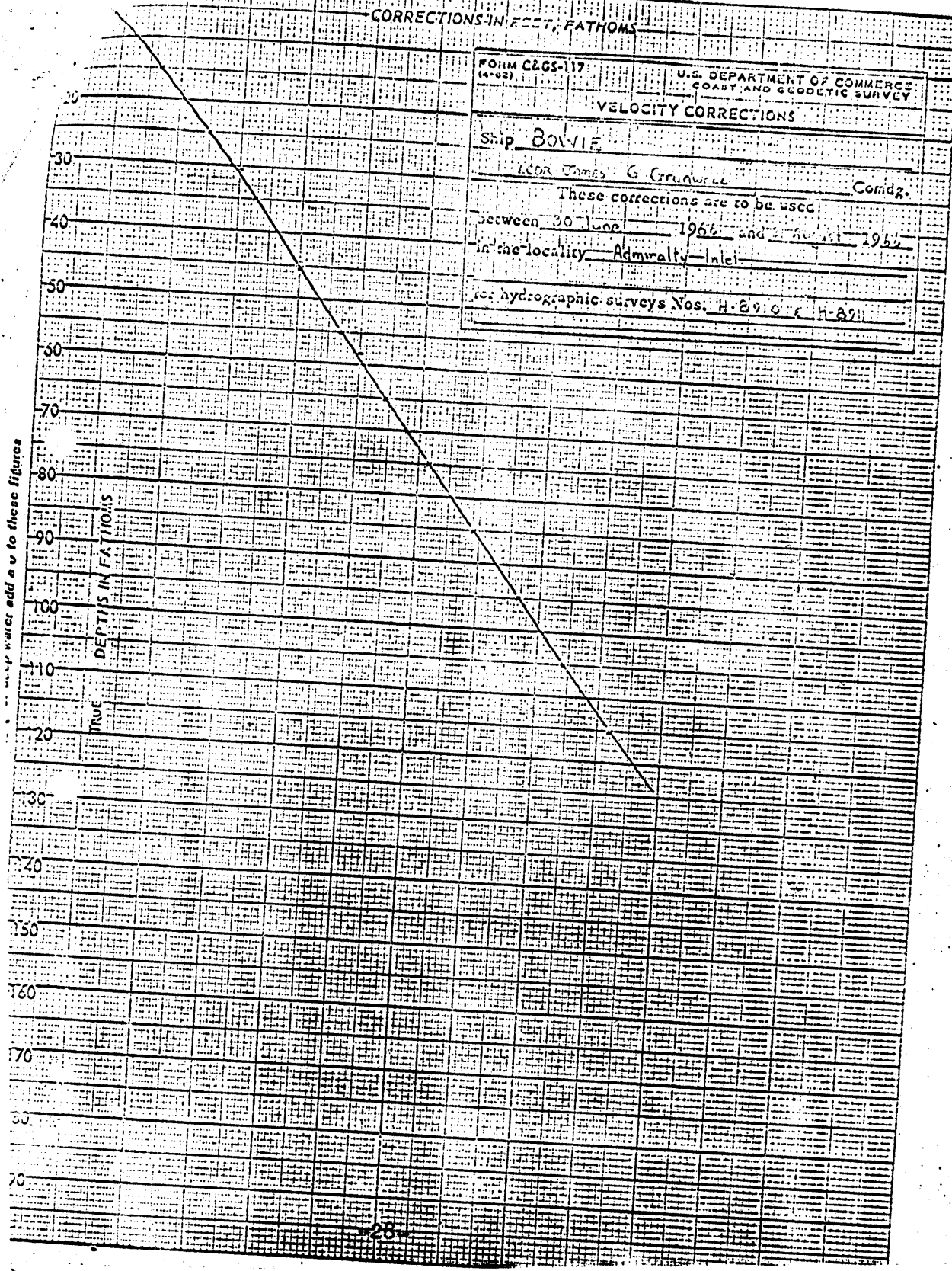
0.2
0.8
1.2
1.6
2.0

CORRECTIONS IN FEET, FATHOMS

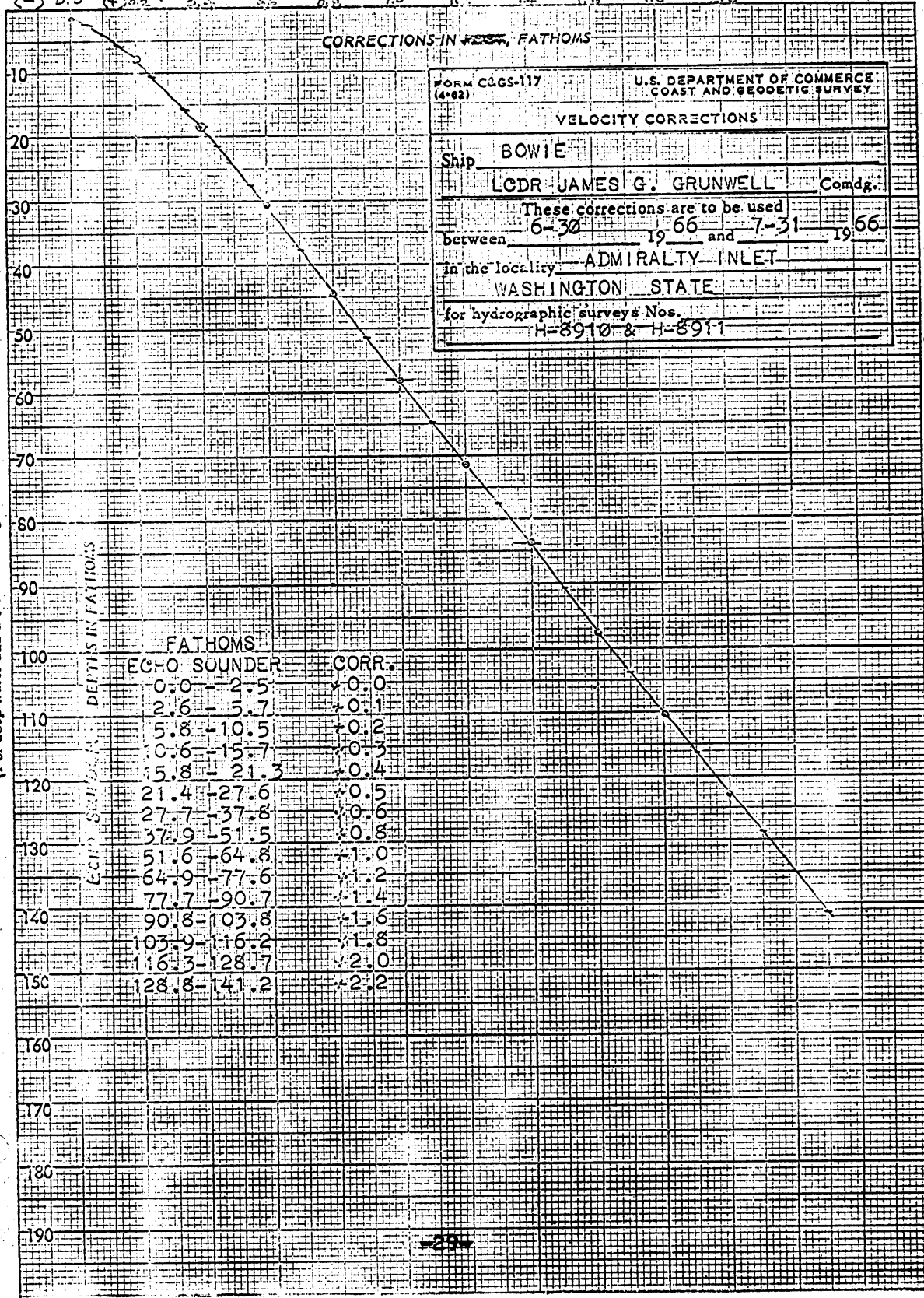
| | |
|--|--|
| FORM CGGS-117 (4-65) | U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY |
| VELOCITY CORRECTIONS | |
| Ship <u>BOVIE</u> | |
| Comd. <u>Lt. James G. Grunwell</u> | |
| These corrections are to be used | |
| between <u>30 June</u> 19 <u>66</u> and <u>August</u> 19 <u>66</u> | |
| in the locality <u>Admiralty Inlet</u> | |
| for hydrographic surveys Nos. <u>H-8910 & H-8911</u> | |

In deep water, add a v to these figures

DEPTH IN FATHOMS
TRUE



(-) 0.0 (+) 0.2 (Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)



| | | |
|----------------------------------|--|----------------------|
| FORM C&GS-117 (4-62) | U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY | |
| VELOCITY CORRECTIONS | | |
| Ship | BOWIE | |
| | LCDR JAMES G. GRUNWELL | Comdg. |
| These corrections are to be used | | |
| between | 6-30 | 19 66 and 7-31 19 66 |
| in the locality: ADMIRALTY INLET | | |
| WASHINGTON STATE | | |
| for hydrographic surveys Nos. | | |
| H-8910 & H-8911 | | |

| DEPTH IN FATHOMS | FATHOMS | EC-0 SOUNDER | CORR. |
|------------------|---------|---------------|-------|
| 100 | | 0.0 - 2.5 | +0.0 |
| 110 | | 2.6 - 5.7 | +0.1 |
| | | 5.8 - 10.5 | +0.2 |
| | | 10.6 - 15.7 | +0.3 |
| | | 15.8 - 21.3 | +0.4 |
| 120 | | 21.4 - 27.6 | +0.5 |
| | | 27.7 - 37.8 | +0.6 |
| | | 37.9 - 51.5 | +0.8 |
| 130 | | 51.6 - 64.8 | +1.0 |
| | | 64.9 - 77.6 | +1.2 |
| | | 77.7 - 90.7 | +1.4 |
| 140 | | 90.8 - 103.8 | +1.6 |
| | | 103.9 - 116.2 | +1.8 |
| | | 116.3 - 128.7 | +2.0 |
| 150 | | 128.8 - 141.2 | +2.2 |

For deep water add a 0.0 to these figures

MADE IN U.S.A.
KEUFFEL & ESSER CO.

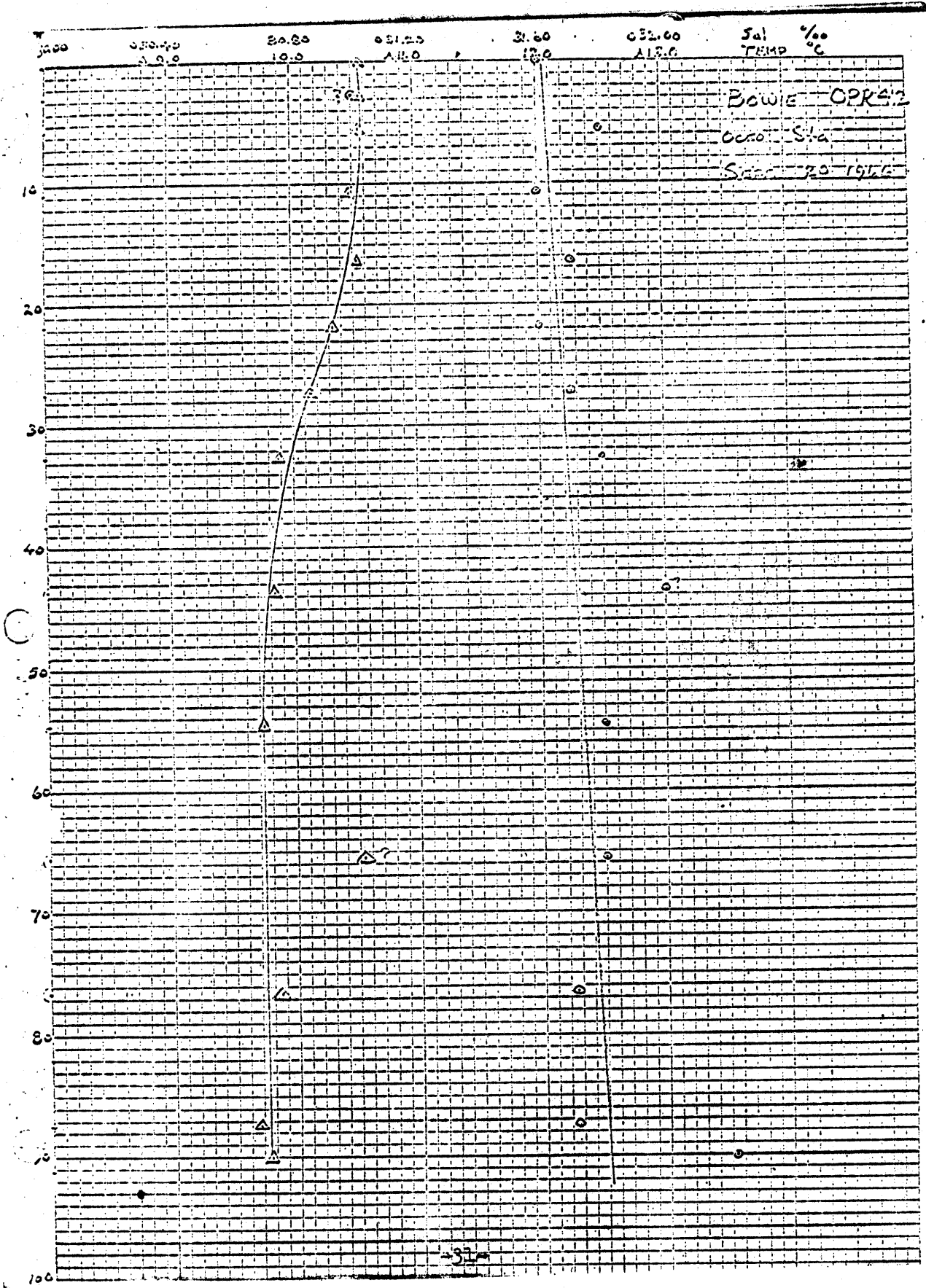
20 September 1966 This station was occupied between Lagoon point and Marrowstone Point, in Admiralty Inlet. The station was observed the standard way using Nansen bottles and reversing thermometers. Specific Gravity was measured with hydrometers.

| Bottle# | Depth meters | Temp. °C* | Specific Gravity | Salinity ‰ | *Temperatures are corrected to insitu |
|---------|--------------|-----------|------------------|------------|---------------------------------------|
| B | 0.0 | 10.56 | 1.0218 | 31.6 | |
| B | 5.0 | 10.56 | 1.0212 | 30.8 | |
| B | 10 | 10.56 | 1.0218 | 31.8 | |
| B | 20 | 10.48 | 1.0218 | 31.6 | |
| B | 30 | 10.52 | 1.0219 | 31.7 | |
| B | 40 | 10.34 | 1.0218 | 31.6 | |
| B | 50 | 10.15 | 1.0221 | 31.7 | |
| B | 60 | 9.88 | 1.0220 | 31.8 | |
| B | 80 | 9.83 | 1.0222 | 32.0 | |
| B | 100 | 9.74 | 1.0220 | 31.8 | |
| B | 120 | 10.54 | 1.0217 | 31.8 | |
| B | 140 | 9.87 | 1.0221 | 31.7 | |
| B | 160 | 9.79 | 1.0218 | 31.7 | |
| B | 165 | 9.76 | 1.0220 | 32.2 | |

Values for velocity computations are abstracted from the graph on the following page.

| Layer Depth fms | Mid Depth | Temp C | Salinity ‰ | Layer Velocity | Corr. Factor | Layer Corr. | Depth Corr. fms |
|-----------------|-----------|--------|------------|----------------|--------------|-------------|-----------------|
| 1.3-5 | 3.7 | 10.7 | 31.8 | 1485.6 | .01545 | .0572 | 0.06 |
| 5-10 | 7.5 | 10.6 | 31.8 | 1485.3 | .01524 | .0762 | 0.13 |
| 10-20 | 15 | 10.5 | 31.8 | 1485.2 | .01518 | .1518 | 0.28 |
| 20-30 | 25 | 10.3 | 31.8 | 1484.8 | .01490 | .1490 | 0.43 |
| 30-40 | 35 | 9.8 | 31.7 | 1483.6 | .01408 | .1408 | 0.58 |
| 40-50 | 45 | 9.7 | 31.7 | 1483.0 | .01367 | .1367 | 0.71 |
| 50-60 | 55 | 9.8 | 31.7 | 1483.8 | .01421 | .1421 | 0.85 |
| 60-70 | 65 | 9.8 | 31.7 | 1484.1 | .01442 | .1442 | 0.998 |
| 70-80 | 75 | 9.8 | 31.6 | 1484.4 | .01463 | .1463 | 1.14 |
| 80-90 | 85 | 9.8 | 31.6 | 1484.7 | .01483 | .1463 | 1.29 |
| 90-100 | 95 | 9.6 | 31.5 | 1484.1 | .01442 | .1442 | 1.44 |

mhf



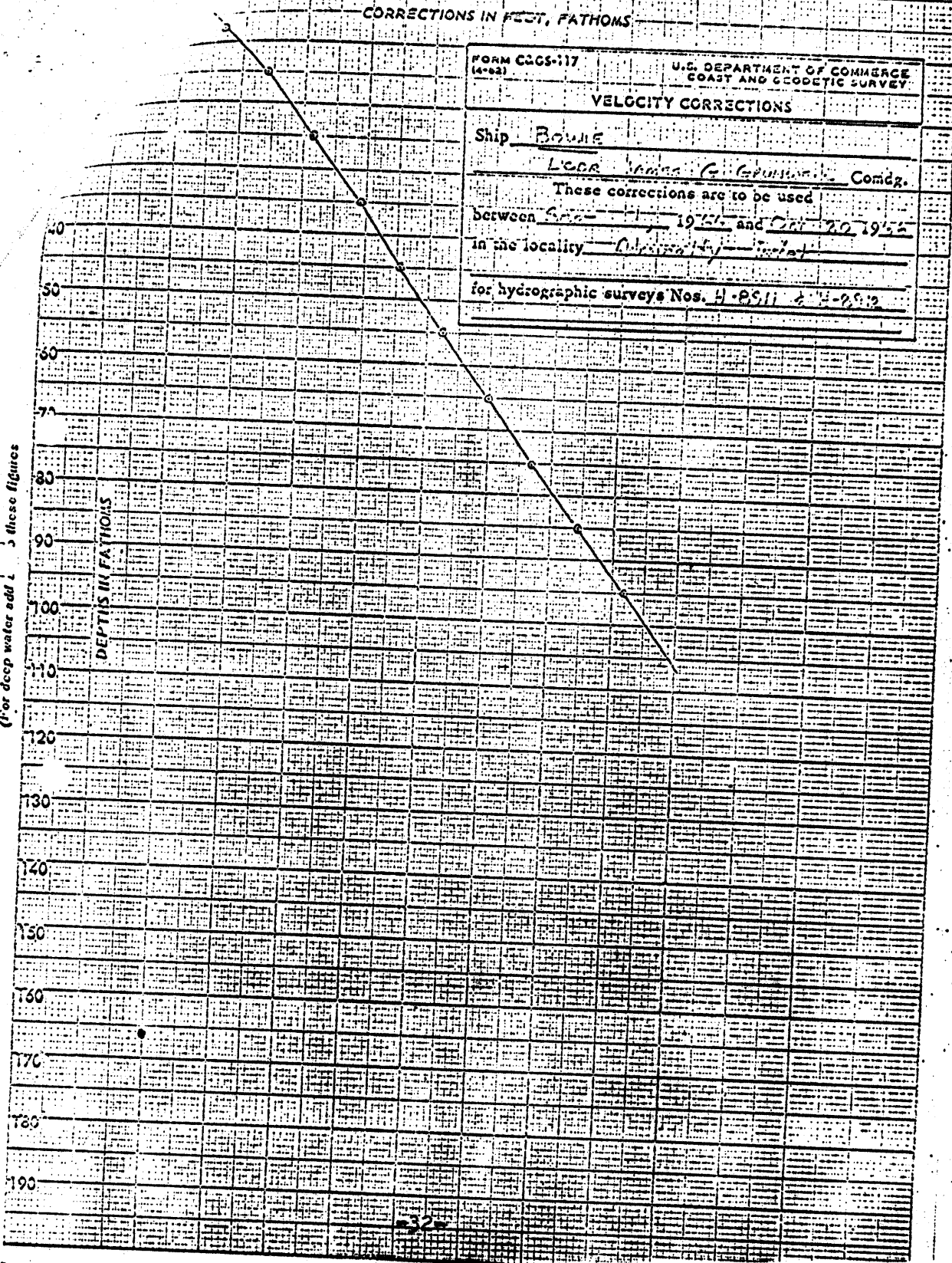
1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.

CORRECTIONS IN FEET, FATHOMS

| | |
|---|--|
| FORM CGCS-117 (4-62) | U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY |
| VELOCITY CORRECTIONS | |
| Ship <u>BOWIE</u> | |
| LCDR <u>James G. Caplan</u> Comdg. | |
| These corrections are to be used between <u>Apr 1, 1954</u> and <u>Oct 20, 1954</u> in the locality <u>Off Cape Cod</u> | |
| for hydrographic surveys Nos. <u>H-2511 & H-2512</u> | |

If or deep water add 1 to these figures

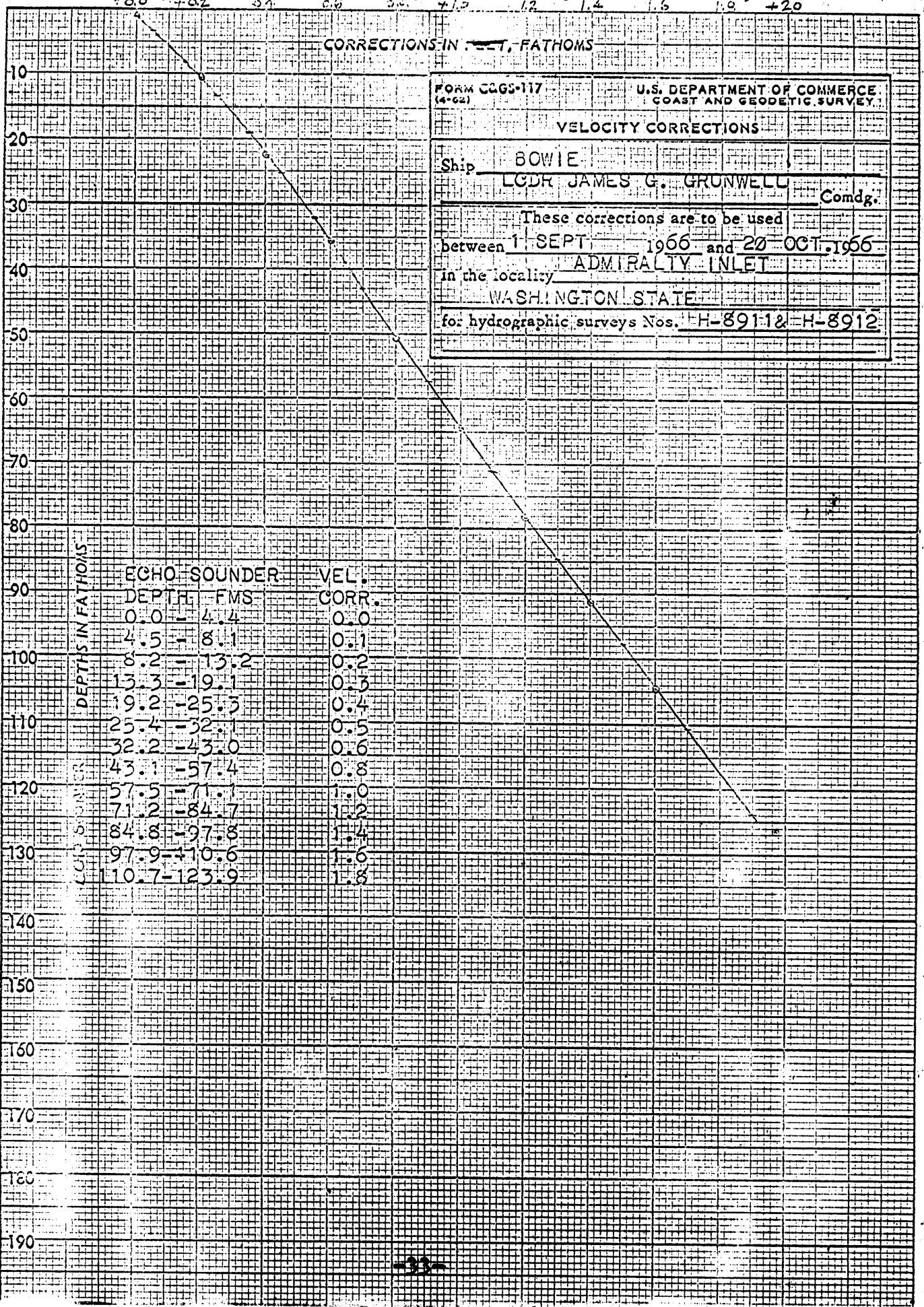
DEPTH IN FATHOMS



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

0.0 +0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 +2.0

CORRECTIONS IN FEET, FATHOMS



| | | |
|---|--|--|
| FORM CGS-117 (4-62) | U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY | |
| VELOCITY CORRECTIONS | | |
| Ship | BOWIE | |
| | LCDR JAMES G. GRUNWELL | |
| | Comdg. | |
| These corrections are to be used | | |
| between 1 SEPT 1966 and 20 OCT 1966 | | |
| in the locality ADMIRALTY INLET | | |
| WASHINGTON STATE | | |
| for hydrographic surveys Nos. H-8911 & H-8912 | | |

| DEPTH IN FATHOMS | ECHO SOUNDER | | VEL. |
|------------------|--------------|-------|-------|
| | DEPTH | FMS | CORR. |
| 90 | 0.0 | 4.4 | 0.0 |
| | 4.5 | 8.1 | 0.1 |
| 100 | 8.2 | 13.2 | 0.2 |
| | 13.3 | 19.1 | 0.3 |
| 110 | 19.2 | 25.3 | 0.4 |
| | 25.4 | 32.1 | 0.5 |
| | 32.2 | 43.0 | 0.6 |
| | 43.1 | 57.4 | 0.8 |
| 120 | 57.5 | 71.1 | 1.0 |
| | 71.2 | 84.7 | 1.2 |
| | 84.8 | 97.8 | 1.4 |
| 130 | 97.9 | 110.6 | 1.6 |
| | 110.7 | 123.9 | 1.8 |

(For deep water add a 0 to these figures)

K&E 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

MOTOR LAUNCH #95

From an abstract of the season's bar checks, the sounding error was obtained. This error is the draft error, velocity error, and instrument error for the system. The trend of the error per test depth was used, not the daily values. Also, we used the deeper values, for if the bar is off to one side during the bar check, this will be displayed as a shoaler depth.

00 10 20

Launch #95 Vert Core
October 1966 Bo-10-3-06

10
20
30
40
50
60
70
80

| DEPTH | | CORRECTION |
|-------|----|------------|
| 0.0 | to | 2.1 |
| 2.2 | to | 6.7 |
| 6.0 | to | 12.3 |
| 12.4 | to | 18.4 |
| 18.5 | to | 23.7 |
| 28.8 | to | 31.8 |
| 31.9 | to | 42.6 |
| 42.7 | to | 56.9 |
| 57.0 | to | 71.2 |
| 71.3 | to | 87.0 |

MADE IN U.S.A.
KEUFFEL & ESSER CO.

LESTER JONES LAUNCH
Echo Sounder 545
548?

Velocity Corrections

| Depth Fathoms | Corr. |
|---------------|-------|
| 0.0 - 2.5 | +0.0 |
| 2.6 - 7.5 | +0.1 |
| 7.6 - 12.5 | +0.2 |
| 12.6 - 20. | +0.3 |
| 20.1 - 30. | +0.5 |
| 30.1 - 42.5 | +0.7 |
| 42.6 - 57.5 | +0.9 |
| 57.6 - 72.5 | +1.2 |

Phase Corrections

A scale 0.0 fms
B scale +0.3 fms
C scale +0.6 fms

Draft Correction

+0.2 fms

All correction values taken from Correction Report of LESTER JON ES 1966

LIST OF STATIONS H-8912 (BO-10-3-66)

048 ALT T-12067 (not shown on Boat Sheet
056 ANO T-11631
075 ARN T-12066
078 ART T-12064
007 BAR T-11631
008 BAS T T-12067 *See Note on memorandum by J.B.H.*
062 BOE T-12067, LESTER JONES, Hydrographic Station
076 BRO Volume, 6, Page 29
080 BUB T-12066
084 BUL T-11623
088 BUT T-12064
102 CAF Volume 6, Page 17 pos. 4251 not shown on Boat Sheet $\Delta 47^{\circ}57.11' 2122^{\circ}41.12'$
105 CAN T-11631
186 CUP T-12067
127 DER ○ ALDER, 1934
233 EGG T-11631
244 ELL T-12069
292 EYE Volume 6, pp 56, 57, 58, 59 & 60 of H-8911 (BO-10-2-66)
258 ENT T-12064
201 FAD T-11631
235 FIN T-12067
269 FOX Volume 6, page 29
276 FRO T-12067
335 GIN T-12067
327 HER ○ FOULWEATHER 3, 1954
331 HID Volume 6, pp 56, 57, 58 & 59 - H-8911 (BO-10-2-66) This sta. not on Smooth Sheet
368 HOT T-11631
369 HOW T-12066
365 ION T-11631
405 JAM T-11624
485 JUM Volume 6, page 29
466 KOP T-11624
426 LEO T-12067
436 LIP Volume 9, page 52 - H-8911 (BO-10-2-66) This sta. off limits of Smooth Sheet
482 LUF ○ DOUBLE BLUFF LIGHT, 1960
487 IUS T-12069 (same as BLU on manuscript)
508 MAT T-12067
588 MUT ○ MUTINY (U.S.E.), 1920
503 NAG T-11623
504 NAK T-12067 *Position on H-8912 does not agree with rock on T-12067, but agrees with Δ on T-4283 (1927)*
528 NET T-12067
642 OLE ○ OLELE, 1934
695 OWN Volume 6, page 29
634 PIL T-11624
644 POL T-12066
686 PUP T-12067
721 RED DREDGE, 1934 (used for T-2 intersection of hydrographic signals only)
760 ROB ROBBINS (U.S.E.), 1920

| | |
|------------------------|---|
| 769 ROY | T-12066 |
| 764 SAL | BASALT, 1921 |
| 731 SID | T-12069 |
| 805 TAN | T-12066 |
| 822 THE TEE | Volume 6, page 29 * See Note in memorandum by J.B.W. |
| 831 TIC | Volume 6, page 23 |
| 809 TOW | T-12065 |
| 888 TUT | T-12066 |
| 804 VAL | T-12064 |
| 823 VEG | T-12066 |
| 832 VIE | T-11631 |
| 867 VOS | o COLVOS ROCK LIGHT, 1934 |
| 922 WEE | T-12069 |
| 934 WIK | Volume 6, page 29. |
| 935 WIN | T-11631 |
| 905 YAM | T-12067 |
| 906 ZAP | T-12067 |

APPROVAL SHEET

This survey, with associated records, is approved through 28 November 1966.

The survey is considered complete and adequate; no additional field work is indicated as of this date.

Personal supervision of the survey work was very close, and the boat sheet and sounding records were examined by me daily.


James G. Grunwell
LCDR, USESSA

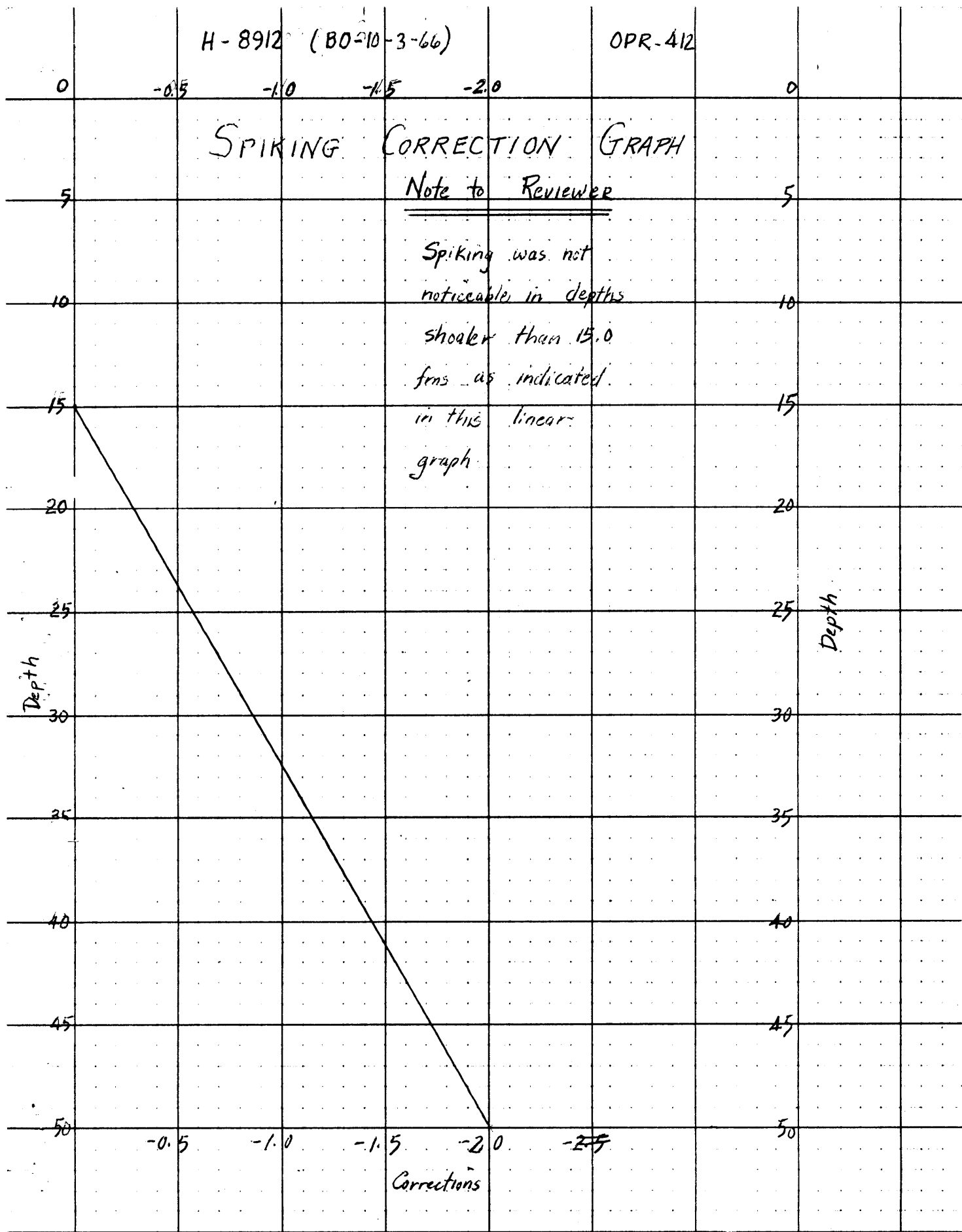
H-8912 (80-10-3-66)

OPR-412

SPIKING CORRECTION GRAPH

Note to Reviewer


Spiking was not noticeable in depths shallower than 15.0 fms as indicated in this linear graph.




Approval Sheet

The smooth sheet has been inspected, is complete, and meets the requirements of the General Instructions for automated surveys and Hydrographic Manual. (Note: All exceptions are listed in the verifier,s report).

Examined and approved.


William M. Martin
Supervisory Carto. Tech.

Approved and Forwarded.


John R. Plaggmier CDR. USESSA
Acting Chief Processing Division, PMC

TIDE NOTE FOR HYDROGRAPHIC SHEET

May 16, 1967

~~National Ocean Division~~ Pacific Marine Center

Plane of reference approved ~~in~~ for

HYDROGRAPHIC SHEET 8912

Locality: Admiralty Inlet, Washington

Chief of Party: J. G. Grunwell } 1966
H. E. McCall }

Plane of reference is mean lower low water

Tide Station Used (Form C&GS-681):

Bush Point, Washington
Hansville, Washington

Height of Mean High Water above Plane of Reference is as follows:

| | | |
|------------|----------|-----------------------------|
| Bush Point | 8.2 feet | used for area North of 48° |
| Hansville | 9.5 feet | " " " south of 48° (H-8912) |

Remarks

Plus and minus signs have been revised in red and verified for most of the positions.

J. M. Symonds
Chief, Tides and Currents Branch

GEOGRAPHIC NAMES

Survey No. H-8912

| Name on Survey | <div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">On Chart No.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">On previous survey No.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">On U. S. Quadrangle Maps</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">From local information</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">On local Maps</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">P. O. Guide or Map</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Rand McNally Atlas</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">U. S. Light List</div> </div> | | | | | | | | | | |
|-------------------|--|---|---|---|---|---|---|---|---|--|----|
| | A | B | C | D | E | F | G | H | K | | |
| Admiralty Inlet | ✓ | | | | | | | | | | 1 |
| Austin | ✓ | | | | | | | | | | 2 |
| Basalt Point | ✓ | | | | | | | | | | 3 |
| Calvas Rocks | ✓ | | | | | | | | | | 4 |
| Double Bluff | ✓ | | | | | | | | | | 5 |
| Foulweather Bluff | ✓ | | | | | | | | | | 6 |
| Kinney Point | ✓ | | | | | | | | | | 7 |
| Klas Rock | ✓ | | | | | | | | | | 8 |
| Mat Mats | | | | | | | | | | | 9 |
| Mats Mats Bay | | | | | | | | | | | 10 |
| Mutiny Bay | ✓ | | | | | | | | | | 11 |
| Olele Point | | | | | | | | | | | 12 |
| Snake Rock | ✓ | | | | | | | | | | 13 |
| Whidbey Island | ✓ | | | | | | | | | | 14 |
| Oak Bay | ✓ | | | | | | | | | | 15 |
| Hood Canal | | | | | | | | | | | 16 |
| Puget Sound | | | | | | | | | | | 17 |
| | | | | | | | | | | | 18 |
| | | | | | | | | | | | 19 |
| | | | | | | | | | | | 20 |
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| | | | | | | | | | | | 25 |
| | | | | | | | | | | | 26 |
| | | | | | | | | | | | 27 |

PREPARED BY

Frank W. Fickett

CARTOGRAPHIC TECHNICIAN

APPROVED BY

A. J. Wroughton

CHIEF GEOGRAPHER

C. E. Harrington

11-14-74

Reg. No. _____

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:

OFFICE OF MARINE SURVEYS AND MAPS

MARINE CHART DIVISION

HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-8912

PROJECT NO.: OPR-412

Washington, Admiralty Inlet, Oak Bay to Double Bluff

SURVEYED: October 8 - November 3, 1966

SCALE: 1:10,000

FIELD NO. BO-10-3-66

SOUNDINGS: DE-723 Echo Sounder

CONTROL: Sextant Fixes on
Shore Signals

Chief of Party J. G. Grunwell
Surveyed by M. H. Fleming
..... S. M. Hamilton
..... M. N. Maki
Automated Plot by Gerber Digital Plotter
Verified and Inked by F. L. Rosario (Seattle)
Reviewed by J. T. Gallahan
Date: 8-23-74
Inspected by D. R. Engle

1. Description of the Area

This survey covers the southern part of Admiralty Inlet from Kinney Point south to the entrance of Hood Canal and from Muting Bay west to Oak Bay.

The bottom slopes steeply from the shoreline to the 10-fathom curve, they gradually deepens to depths greater than 60 fathoms in the deeper part of Admiralty Inlet. A narrow ridge covered by 20 to 30 fathoms of water extends northward from Foulweather Bluff a distance of nearly 2½ miles. Off-shore of Basalt Pt. numerous rocky reefs exist. The bottom characteristics are generally sand, shell, and mud.

2. Control and Shoreline

The origin of control is adequately covered in Part F of the Descriptive Report.

The shoreline originates with reviewed photogrammetric manuscripts T-11623, T-11624, T-11631 of 1960, T-12064, T-12055 of 1960-62, and T-12066, T-12067, T-12069 of 1960-61.

The HWL shown in red on the present survey at lat. $47^{\circ}57.40'$, long. $122^{\circ}40.54'$ reflects the change indicated by 1965 photography and shown on the boat sheet. The marine railway on T-11631 in lat. $47^{\circ}59.52'$, long. $122^{\circ}32.42'$ has been moved to the new position shown on the present survey.

3. Hydrography

A. Depths at crossings are in good agreement.

B. The usual depth curves were adequately delineated.

C. The development of the bottom configuration and the investigation of least depths are considered adequate except as follows:

(1) In some inshore areas the sounding line spacing is excessive.

(2) Several shoal soundings charted from prior surveys were not investigated on the present survey.

(3) The passage into Mats Mats Bay was not adequately surveyed.

D. Incorrect stylus arm length, undetected by the hydrographer, resulted in erroneous reduced soundings. The verifier computed and applied stylus arm correctors to six days of hydrography.

4. Condition of the Survey

The sounding records, smooth plotting, Descriptive Report, and printouts are adequate and conform to the requirements of the Hydrographic Manual and the Instruction Manual-Automated Hydrographic Surveys except as follows:

- A. The tide reducers submitted in the Descriptive Report were not those used to reduce the soundings in the automated system.
- B. Soundings as originally scanned were too widely spaced necessitating rescanning by the verifier and the use of intermediate soundings.
- C. Required stamps in sounding volumes were incomplete.
- D. The nonstandard method of recording information regarding rocks awash and inshore details resulted in considerable ambiguity in interpretation.
- E. Rock information on the smooth sheet prior to review was frequently incorrect and/or incomplete.
- F. Several piles and piers had not been added to the smooth sheet prior to review.
- G. Hydrographic stations CAF and TIC were incorrectly shown as topographic stations and were revised during review.
- H. The completed junctions between the present survey and H-8911 and H-8914 required extensive revision during review to bring these junctions into agreement.
- I. The position overlay furnished was dim and illegible.
- J. Numerous mooring buoys located by the hydrographer in the northeastern section of the survey were neither entered into the automated system nor plotted on the smooth sheet prior to review.
- K. The machine plot of soundings following the ends of lines was frequently faulty. The pseudo fixes determined for the machine plot of these soundings failed to locate the soundings in realistic positions and displaced the curves and soundings excessively.
- L. Fathograms in shoal areas where there was grass on the bottom were incorrectly scanned and were rescanned during review.

5. Junctions

Adequate junctions were effected with H-8910 (1966) on the northwest, H-8911 (1966) on the north, H-8914 (1966-67) on the southeast and H-8915 (1966) on the south. Rock information was transferred in the common area from the present survey to H-8911 and H-8914.

6. Comparison with Prior Surveys

A. H-333 (1852) 1:214,240

This small scale reconnaissance survey lacks sufficient reliable information for an adequate comparison of any cartographic value with the present survey.

B. H-508 (1855) 1:10,000 H-1338a (1875) 1:40,000 H-1482a (1880) 1:10,000 H-1729 (1885-86) 1:20,000

These prior surveys taken together cover the area of the present survey. A comparison between these prior surveys and the present survey reveals variable differences of as much as 2 fms. throughout the survey area, except in the area adjacent to Double Bluff where variable differences of 1 to 5 fathoms are noted. These prior surveys are sparsely developed. The present survey is adequate to supersede the prior surveys in the common area.

C. H-4688 (1927) 1:5,000 H-4711 (1927) 1:10,000 H-7613 (1948) 1:5,000 F.E. No. 1 (1947) 1:5000

A comparison between these prior surveys and the present survey reveals minor shoaling in the areas of Mats Mats Bay and its entrance, Klas Rock, Colvos Rocks and in the deep channel areas of Admiralty Inlet. In the area of Foulweather Bluff minor deepening has occurred. Several rocks, piles, and shoal soundings, which were not disproved, together with supplementary bottom characteristics, were carried forward to the present survey.

Attention is called to the row of five piles charted at lat. 47°57.15', long. 122°41.09' from H-4711 (1927) which was not investigated on the present survey. Although these piles apparently are not above the water surface, there may be submerged remains. They have been carried forward to the present survey accordingly.

With the addition of the above information, the present survey is adequate to supersede the prior surveys in the common area.

D. H-4714 (1927) W.D. 1:5,000

No conflicts exist between the present depths and the effective drag depths. Several shoal depths from the prior survey, not disproved by the present survey, were carried forward to the present survey.

7. Comparison with Chart 6405 (latest print date March 17, 1973)
 Chart 6421 (latest print date July 28, 1973)
Chart 6450 (latest print date Oct. 14, 1972)

A. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration, supplemented by the partial application of information from the boat sheet and verified smooth sheet of the present survey and surveys by the Corps of Engineers. The charted hydrography in Mats Mats Bay entrance originates with 1973 Corps of Engineers (Bp 86062) surveys which supersedes the present survey in the common area.

The following items, charted from the boat sheet or smooth sheet prior to review, should be revised to agree with the final smooth sheet:

- (1) The extension of the finger pier at lat. 47°57.05', long. 122°41.16'.
- (2) The rock charted at lat. 47°58.38', long. 122°41.37', the position of which was moved approximately 250 meters ESE to lat. 47°58.35', long. 122°41.17'.

(3) The rock charted erroneously in lat. $47^{\circ}58.69'$, long. $122^{\circ}33.03'$, which is actually a pile and falls about 35 meters southeast of the above position.

(4) The charted shoreline at lat. $47^{\circ}57.40'$, long. $122^{\circ}40.54'$ originates with 1968 photography (Bp 98582) and reflects the cultural change subsequent to the present survey.

(5) The pier charted at lat. $47^{\circ}57.06'$, long. $122^{\circ}41.09'$, which is considerably shorter than that on the smooth sheet, is from subsequent 1968 photography.

Except as noted above, the present survey is adequate to supersede the charted hydrography within the common area.

B. Aids to Navigation

Several aids to navigation have been established or relocated subsequent to the date of the present survey.

The aids presently charted adequately mark the features intended.


8. Compliance with Instructions

This survey adequately complies with the Project Instructions, except as noted in items 3 and 4.

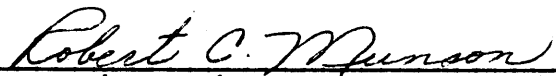
9. Additional Field Work

This is a good basic survey of the area and no additional field work is recommended.

Examined and Approved:



Chief
Marine Chart Division



Associate Director
Office of Marine Surveys and Maps

H-8912

Items for Future Presurvey Reviews

Any future survey in this area should verify or disprove the following items which were neither verified nor disproved on the present survey:

1. The row of five submerged piles centrally located at lat. 47°57.15', long. 122°41.09' discussed in paragraph 6C.
2. The charted rock baring 3 ft. at MLLW located at lat. 47°58.25', long. 122°40.75' from H-4711 (1927).
3. The charted rock awash at MLLW located at lat. 47°56.53', long. 122°36.67' from H-4711 (1927).
4. A shoal of 1 fathom at lat. 47°56.54', long. 122°36.78' from H-4711 (1927).
5. The charted shoal of 0² fathoms at lat. 47°57.23', long. 122°40.57' from H-4688 (1927).
6. Two rocks charted at lat. 47°57.48', long. 122°40.50' originating as reef symbols on T-1304 (1872) and supported by hydro on H-4688 (1927).

A closer hydrographic development in the areas of Snake Rk, Klas Rk. and Colvos Rks would be desirable on any future survey of the area.

Resurvey Cycle Information

| <u>Position Index</u> | | <u>Bottom Change</u> | <u>Use</u> | <u>Resurvey</u> |
|-----------------------|--------------|----------------------|--------------|-----------------|
| <u>Lat.</u> | <u>Long.</u> | <u>Index</u> | <u>Index</u> | <u>Cycle</u> |
| 475 | 1225 | 2 | 2 | 50 Years |
| 475 | 1224 | 3 | 6 | 25 Years |
| 480 | 1224 | 2 | 6 | 25 Years |
| 480 | 1225 | 2 | 6 | 25 Years |

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-8912

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

| RECORD DESCRIPTION | | AMOUNT | RECORD DESCRIPTION | | AMOUNT | |
|--------------------|---------------|----------------------|--------------------|------------|---------------|----------------------------|
| SMOOTH SHEET | | 1 | BOAT SHEETS | | 1 | |
| DESCRIPTIVE REPORT | | 1 | OVERLAYS | | 6 | |
| DESCRIPTION | DEPTH RECORDS | HORIZ. CONT. RECORDS | PRINTOUTS | TAPE ROLLS | PUNCHED CARDS | ABSTRACTS/SOURCE DOCUMENTS |
| ENVELOPES | | | 1 | | | |
| CAHIERS | 1 | | | | | |
| VOLUMES | 13 | | | | | |
| BOXES | | | 2 & Tapes | | | |

T-SHEET PRINTS (List)
T-11631, -12064, -12065, -12066, -12067, -12069, -11623, -11624

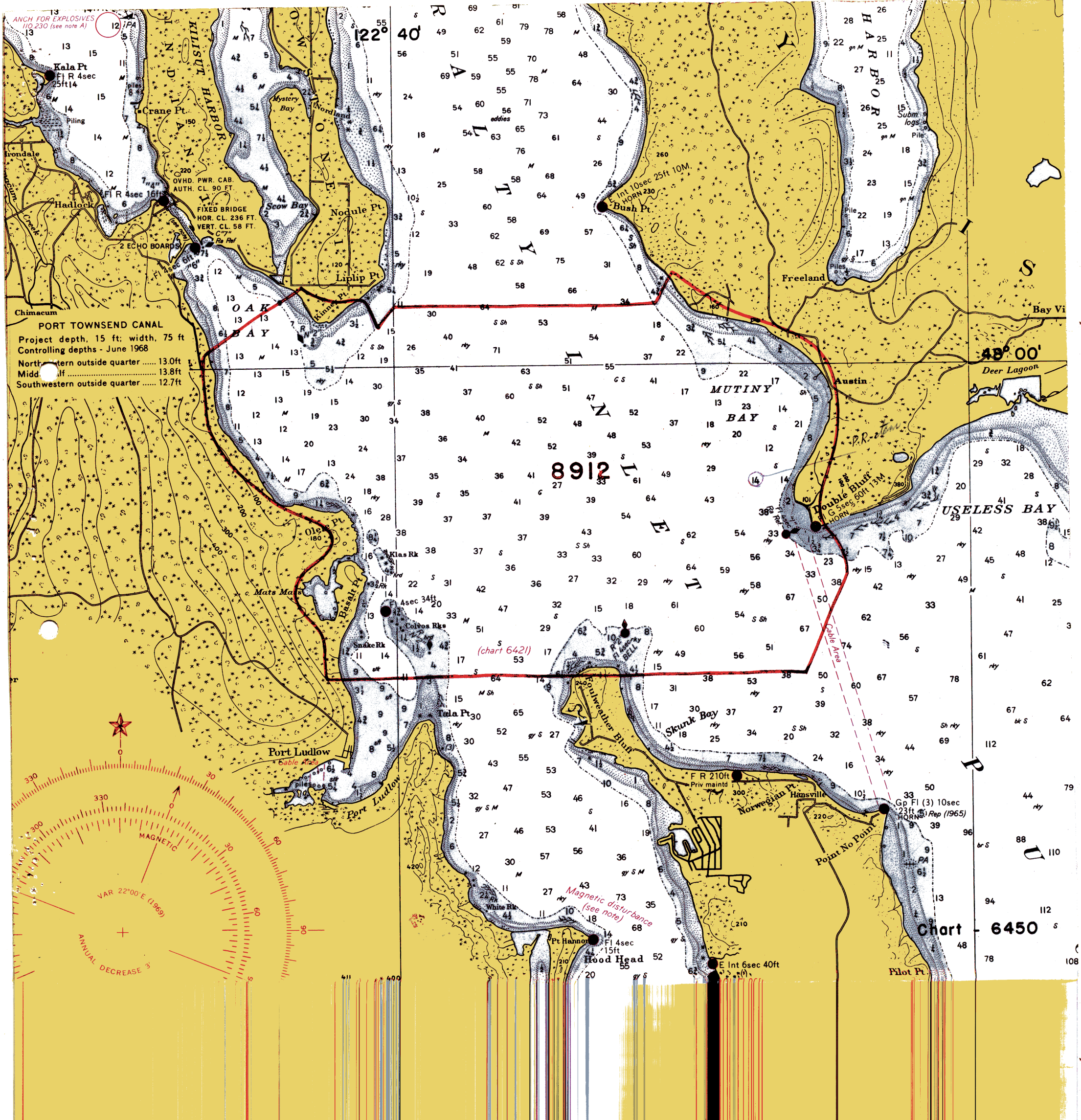
SPECIAL REPORTS (List) *Xeroxed copies of fathograms and tracings from Boat Sheet filed in cashier.*

OFFICE PROCESSING ACTIVITIES

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

| PROCESSING ACTIVITY | AMOUNTS | | | |
|--|------------------|--------------|---------------------|--------|
| | PRE-VERIFICATION | VERIFICATION | REVIEW | TOTALS |
| POSITIONS ON SHEET | | | | 3446 |
| POSITIONS CHECKED | | 3446 | | |
| POSITIONS REVISED | | 46 | | |
| DEPTH SOUNDINGS REVISED | | 160 | | |
| DEPTH SOUNDINGS ERRONEOUSLY SPACED | | - | | |
| SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED | | | | |
| | TIME (MANHOURS) | | | |
| TOPOGRAPHIC DETAILS | | - | | |
| JUNCTIONS | | 74 | 20 | |
| VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS | | 52 | 20 | |
| SPECIAL ADJUSTMENTS | | 76 | 40 | |
| ALL OTHER WORK | | 830 | 295 | |
| TOTALS | | 1032 | 375 | |
| PRE-VERIFICATION BY | BEGINNING DATE | | ENDING DATE | |
| VERIFICATION BY <i>Felipe L. Rosario</i> | 9-25-67 | | 11-22-68 | |
| REVIEW BY <i>John T. Gallahan</i> | 12-05-73 | | 11-30-74 8-20-74 | |

*Inspection by D.R. Engle 66 hrs
Earl Stevens 78 hrs 11/13/74*



ANCH FOR EXPLOSIVES
110 230 (see note A)

PORT TOWNSEND CANAL
Project depth, 15 ft; width, 75 ft
Controlling depths - June 1968
North eastern outside quarter 13.0ft
Middle 13.8ft
Southwestern outside quarter 12.7ft

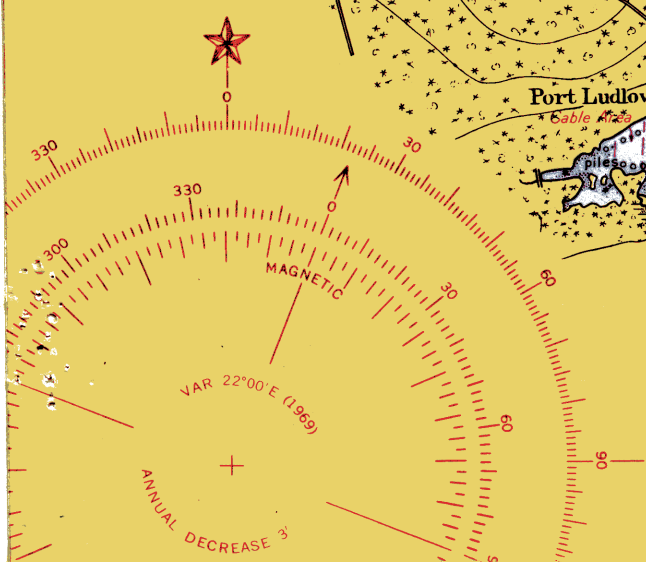


Chart 6450

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RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-8912

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 |
|--------------------|----------|------------------------|---|
| 6421 | 8/2/69 | Jeffrey Stuart | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>Examined for critical corrections</i> |
| 6450 | 11/19/69 | J. McMillan | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>38 From Descriptive Report recommendations</i> |
| 185-SC (18445) | 11-21-69 | Leda R. Everett | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>App'd thru chrt 6450 dwg # 38</i> |
| 6401 | 6-15-70 | B. Fernandez | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>before</i> |
| 6405 | 10-22-70 | W. Wambach | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>Examined Applied for critical corrections</i> |
| 184-SC | 11-27-70 | J. Bailey | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>11 Exam. for critical corr. Revised one (1) sdg.</i> |
| 18461 (6421) | 3-28-79 | Hamilton | Full Part Before After Verification Review Inspection Signed Via Drawing No. |
| 18464 (6405) | 6-19-79 | Norris 12-12-80 ROS | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>22</i> |
| 18423 (18450) E | 12-10-80 | LARSON 12-12-80 ROS | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>21</i> |
| 18445 5:00 A | 12/10/80 | Condit | Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>17</i> |
| 18441 | 5-13-81 | R. A. Lillis | Fully Applied after verification Rev. E. Dwg #50 |
| 18440 | 5-14-81 | R. A. Lillis | Fully Applied after Inspection Dwg #33 |
| 18477 | 10/4/82 | J. A. Graham | Fully applied hydro to new chart N-1 (18477) after inspection. |
| 18471 | 4/8/83 | J. A. Graham | Full after input Dwg 1 |
| 18473 | 4/15/83 | J. A. Graham | Full after input Dwg 1 |