

# 10039

Diagram No. 8502-2

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic .....  
Field No. .... FA-10-6-82 .....  
Office No..... H-10039 .....

### LOCALITY

State ..... Alaska .....  
General Locality .. Shelikof Strait .....  
Locality ..... Cape Iqvak to West Channel .....  
..... Island .....

1983

CHIEF OF PARTY  
CDR W.F. Forster, CAPT C. Andreasen .....

### LIBRARY & ARCHIVES

DATE ..... August 15, 1985 .....

☆U.S. GOV. PRINTING OFFICE: 1980-766-230

# 10039

Area 6  
CHTS

16570

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16580

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TO SIEN DE F SEG  
"RECORD OF APPLICATION"

HYDROGRAPHIC TITLE SHEET

H-10039

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.

FA 10-6-82

State Alaska

General locality Shelikof Strait

Locality Cape Igvak to West Channel Island

Scale 1:10,000 Date of survey 6 Aug-21 Aug (JD 218-233) 1982  
28 May-10 Aug (JD 148-222) 1983

Instructions dated 23 February 1982 Project No. OPR-P146-FA-82  
11 March 1983 OPR-P146-FA-83

Vessel FAIRWEATHER (2020), (2023), (2024), (2025), (2026)

Chief of party CDR Walter Forster/ CAPT Christian Andreasen

Surveyed by LT Baxter, LT Andreen, LT Ramsey, LT Rulon, LTJG Bailey, ENS Francis,  
ENS Migaiolo, ENS Steele, ENS Koch, ENS Tisch, CST Krick

Soundings taken by echo sounder, ~~and~~ lead, ~~and~~ Ross Fineline 5000

Graphic record scaled by FAIRWEATHER Personnel

Graphic record checked by FAIRWEATHER Personnel

Protracted by N/A Automated plot by PMC Xynetics Plotter

Verification by I. Almacen

Evaluation by A. Luceno  
Soundings in fathoms ~~last~~ at MHW MLLW

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

*Audio / Surf checks GMSM 4/8/86*

156 15 00

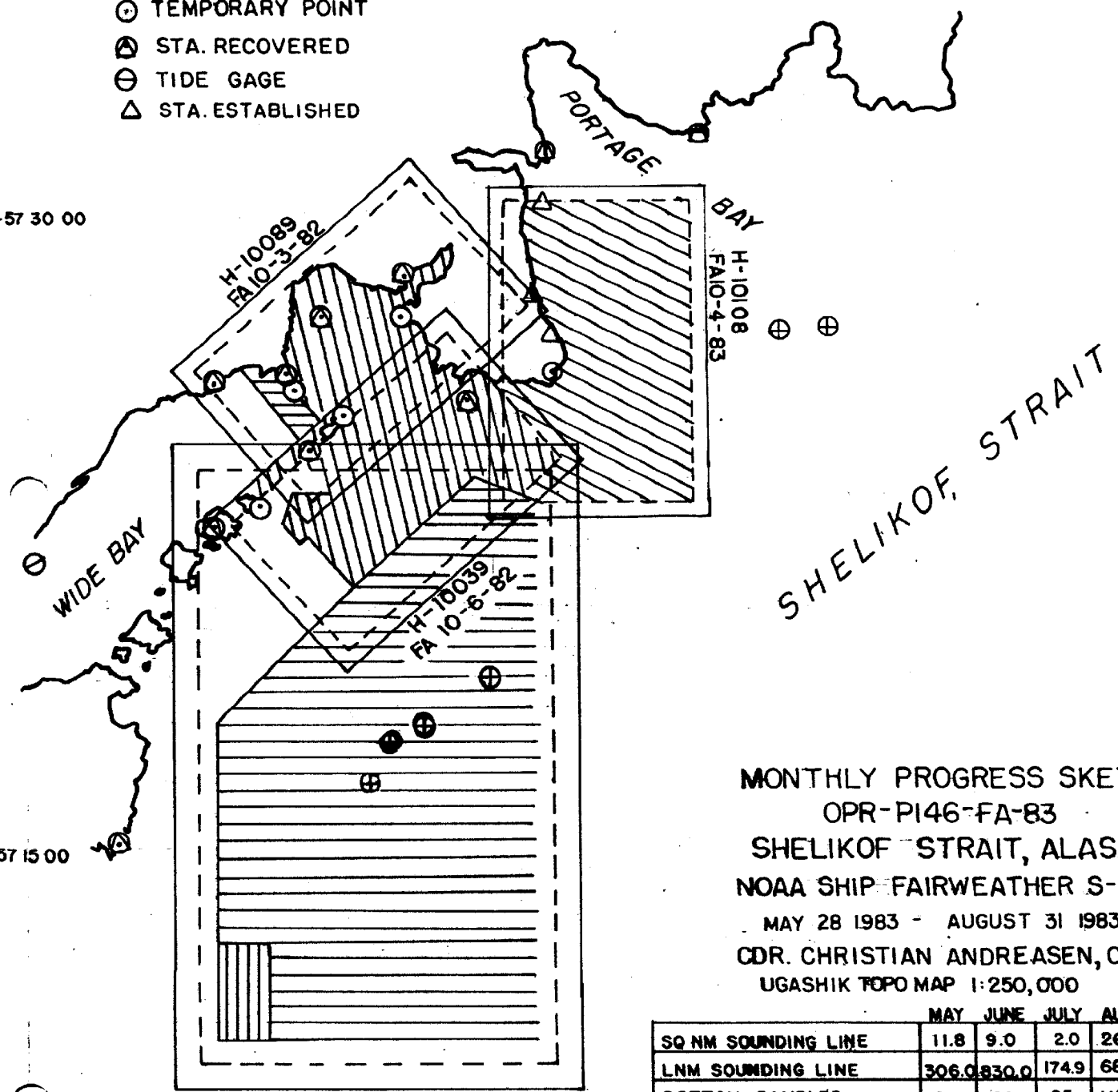
156 00 00

155 45 00

- ⊕ SV/D CAST / NANSEN CAST
- ⊙ TEMPORARY POINT
- ⊗ STA. RECOVERED
- ⊖ TIDE GAGE
- △ STA. ESTABLISHED

57 30 00

57 15 00



MONTHLY PROGRESS SKETCH  
 OPR-PI46-FA-83  
 SHELIKOF STRAIT, ALASKA  
 NOAA SHIP FAIRWEATHER S-220  
 MAY 28 1983 - AUGUST 31 1983  
 CDR. CHRISTIAN ANDREASEN, CMDG  
 UGASHIK TOPO MAP 1:250,000

	MAY	JUNE	JULY	AUG
SQ NM SOUNDING LINE	11.8	9.0	2.0	26
LNM SOUNDING LINE	306.0	830.0	174.9	682
BOTTOM SAMPLES	21	102	95	118
SV/D/NANSEN CAST	—	3	4	4
HYDRO CONTROL STATIONS	9	8	—	8
WATER SAMPLES ANALYZED	—	5	7	—
HYDROGRAPHY				
LNM SIDE SCAN SONAR	—	—	4.4	—

156-30-00

156-15-00

156-00-00

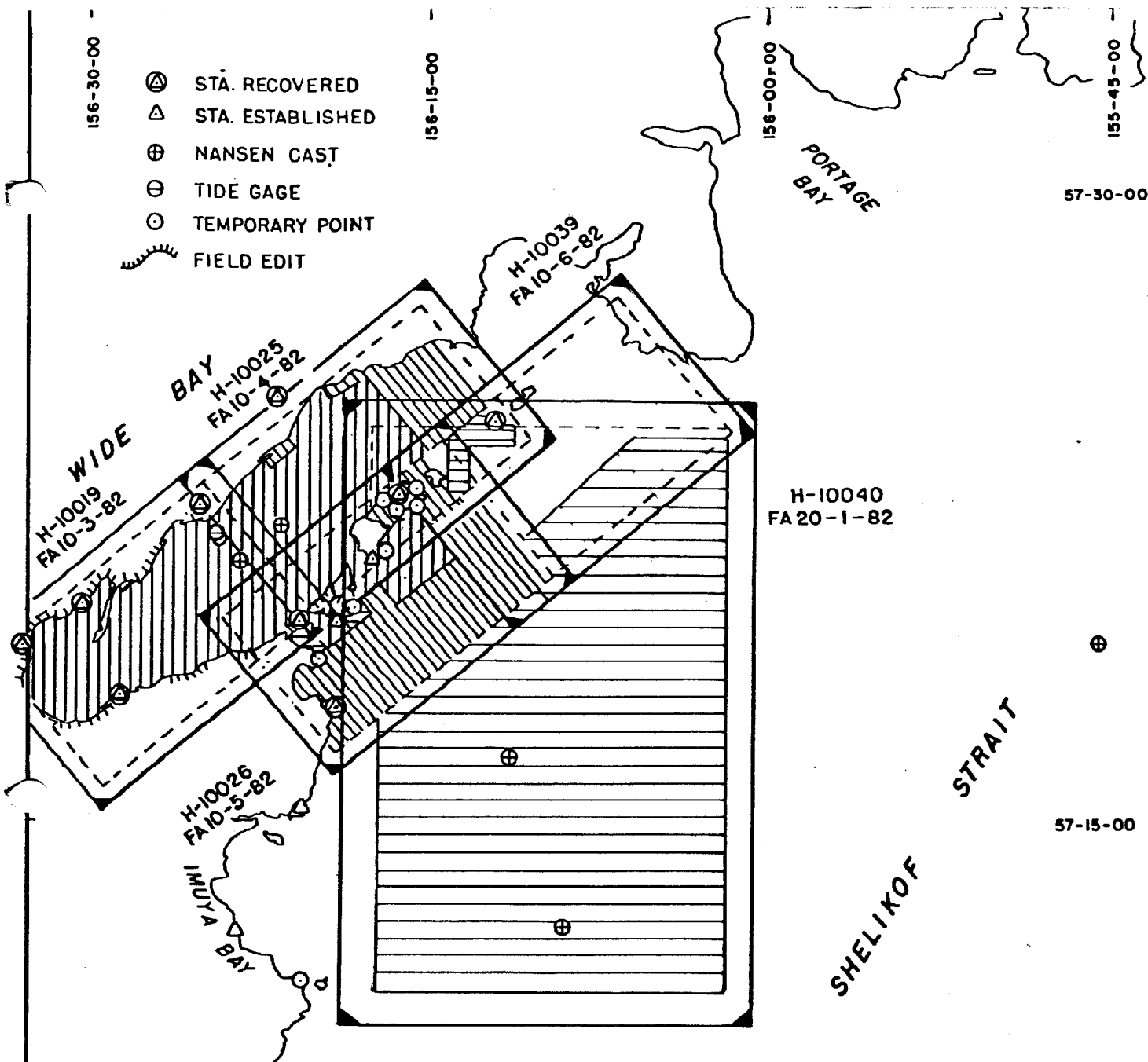
155-45-00

57-30-00

57-15-00

57-00-00

- ⊙ STA. RECOVERED
- △ STA. ESTABLISHED
- ⊕ NANSEN CAST
- ⊖ TIDE GAGE
- TEMPORARY POINT
- ~~~~~ FIELD EDIT



MONTHLY PROGRESS SKETCH  
 OPR-PI46-FA-82  
 SHELIKOF STRAIT, ALASKA  
 NOAA SHIP FAIRWEATHER (S-220)  
 CDR WALTER F. FORSTER, CMDG  
 UGASHIK TOPO MAP 1:250,000

	JUNE	JULY	AUG
SQ NM SOUNDING LINE	31.5	14.7	94.3
LNM SOUNDING LINE	729.7	272.6	888.2
BOTTOM SAMPLES	53	53	65
NANSEN CAST	2	2	2
HYDRO CONTROL STATIONS	13	6	4
WATER SAMPLES ANALYZED	20	19	20
HYDROGRAPHY			
LNM SIDE SCAN SONAR		6.6	

A. Project

This hydrographic survey was begun during the 1982 field season in accordance with Project Instructions OPR-P146-FA-82, Shelikof Strait, Alaska, dated 23 February 1982, with Change Number 1, dated ~~2 June~~ <sup>25 May</sup> 1982. In 1983 operations were conducted in accordance with Project Instructions, OPR-P146-FA-83, Shelikof Strait, Alaska, dated 11 March 1983 and Change Number 1, dated 15 April 1983. The PMC OPORDER, the Hydrographic Manual, (Fourth Edition), and the Data Requirements letter updated 14 April 1983 (Appendices Q & R) are also applicable. ✓

B. Area Surveyed

The area <sup>covers a portion of Shelikof Strait</sup> ~~of this survey is located at the northeast portion of Wide Bay~~ from Cape Igvak to West Channel Island on the westside of Shelikof Strait, Alaska. The survey includes the main entrance channels to Wide Bay.

The limits of this survey are roughly described by connecting the following points:

Cape Igvak	-	57°26'06"N	156°02'54"W
East	-	57°24'48"N	156°01'34"W
South	-	57°21'43"N	156°10'35"W
West	-	57°24'00"N	156°15'58"W
North	-	57°27'33"N	156°07'54"W

Hydrographic operations were conducted during the 1982 field season between 6 August (JD 218) and 21 August (JD 233). During the 1983 field season operations began on 28 May (JD 148) and were completed on 10 August (JD 222).

C. Sounding Vessels

Jensen survey launches FA-3 (2023), FA-4 (2024), FA-5 (2025) and FA-6 (2026) were used to collect all hydrographic data for this survey. The FAIRWEATHER (2020) was used to obtain all Nansen casts and SV/D data. No unusual sounding vessel configurations or problems were encountered. ✓

D. Sounding Equipment and Corrections to Echo Soundings

All survey launches used on this survey were equipped with Ross Fineline 5000 narrow beam echo sounders. In addition, FA-4 (2024) was equipped with a Klein Side Scan Sonar System, model 520-521 T, which was used to scan the entrance channels leading into Wide Bay. Table I, Sounding Equipment, lists sounding equipment used on each launch and inclusive dates. Depths on this survey ranged from -0.9 to 64 fathoms.

Table I  
Sounding Equipment

<u>Launch/Date</u>	<u>Instrument</u>	<u>Model</u>	<u>Recorder</u>	<u>Digitizer</u>	<u>Inverter</u>	<u>Tranceiver</u>
<u>1982</u>						
FA-3 (2023)						
JD232-233	Ross Finline	5000	1097	1047	1046	1047
FA-4 (2024)						
JD 218-219	Ross Finline	5000	1054	1046	1054	1046
<u>1983</u>						
FA-3 (2023)						
JD 148-165	Ross Finline	5000	1047	1047	1046	1046
JD 166-190	Ross Finline	5000	1046	1047	1046	1046
JD 191-216	Ross Finline	5000	1054	1047	1046	1046
FA-4 (2024)						
JD 148-161	Ross Finline	5000	1097	1046	1054	1048
JD 162	Ross Finline	5000	1036	1046	1054	1048
JD 163-222	Ross Finline	5000	1097	1046	1054	1048
JD 204-222	Kline 520-521T		248	(Side Scan Sonar)		
FA-5 (2025)						
JD 148-192	Ross Finline	5000	1036	1036	1103	1054 ✓
FA-6 (2026)						
JD 148-165	Ross Finline	5000	1046	1054	1053	1047
JD 166-172	Ross Finline	5000	None	1054	1053	1047
JD 173-190	Ross Finline	5000	1054	1054	1053	1047
JD 191-216	Ross Finline	5000	1046	1054	1053	1047

Belt tension and phase checks were performed daily and when paper was changed. Fathometer initials were monitored closely during operation and adjusted when necessary. All data was scanned at least twice to compare analog values to corresponding digitized values and to insert peaks and deeps between soundings.

The only problems that were encountered during this survey involving sounding equipment were as follows:

On JD 149 (1983), the belt drive in recorder (1046) on FA-6 broke during operations. The belt was immediately replaced and work continued. No data was lost as a result of this problem.

On JD 166 (1983), the recorder (1047) in FA-3 could not be calibrated along with it producing wavering event marks. Recorder (1047) was replaced by fathometer (1046) from FA-6. Recorder (1047) was returned to PMC for repairs. A new fathometer (1054) was received from PMC and was installed in FA-6. No data was lost.

On JD 191 (1983), the initial and analog trace on recorder (1046) in FA-3 was found to be out of adjustment and was replaced by recorder (1054) from FA-6. Upon completion of repairs onboard the FAIRWEATHER, fathometer (1046) was installed in FA-6. No data was lost due to this problem.

Settlement and Squat for all launches was determined on 30 July 1982 in Woman's Bay, Alaska and on 7 April 1983 in Shilshole Bay, Seattle. Calculations were performed in accordance with Section 4.9.4.2 of the Hydrographic Manual. Launches were tested at speeds from idle to 2700 RPM, in 200 RPM increments. A Zeiss Ni 2 level was used to read a stadia rod held over the transducer when the launch speed was attained. A tide staff was read simultaneously with the stadia level to correct for tidal influences. The test results were used to plot settlement and squat curves from each launch.

As explained in Section 4.9.2 of the Hydrographic Manual, restrictive speeds for all launches were determined using 0.1 fathom as a corrector. See Table II, Restricted Launch Speeds, for data collected in fathoms. Launches were operated at speeds less than the restricted RPM's listed in Table II thus eliminating the need to apply settlement and squat correctors.

Table II  
Restrictive Launch Speeds

<u>Launch</u>	<u>1982</u>	<u>Restrictive Speeds</u>
FA-3 (2023)		Above 2600
FA-4 (2024)		Above 2400
	<u>1983</u>	
FA-3 (2023)		None
FA-4 (2024)		Above 2650
FA-5 (2025)		Above 2530
FA-6 (2026)		None

Bar checks were performed twice daily, when possible. There were several days when only one check was made due to various reasons, i.e., weather and sea conditions, equipment failures, etc.

Bar check data when combined with velocity correctors determined launch TRA correctors. Bar check data confirms the 0.3 fathom TRA correctors for launches FA-3 and FA-4 during the 1982 field season. Data from 1983 confirmed the 0.3 corrector for launches FA-3 and FA-5 where as FA-4 was found to have a 0.4 fathom corrector. From JD 148 through JD 187 (1983), launch FA-6 had a TRA corrector of 0.4 fathoms and between JD 188 and JD 216 (1983) it had a TRA corrector of 0.3 fathoms.

All soundings obtained by the launches were plotted with a 0.3 fathom TRA on the final field sheets. Corrections have been made to the appropriate corrector tapes to reflect the applicable TRA correctors.

Weather conditions during this survey were variable, winds ranged from calm to 30 knots and seas from flat to 4 feet. Corrections for heave were applied during the scanning of the echograms when required, as per Section 4.9.8.2 of the Hydrographic Manual.

Leadlines were used to measure least depths over shoal areas. All leadlines and bar check lines were calibrated prior to and at the completion of the project each year. No corrections were applicable to soundings collected for this survey.

Velocity correctors were determined by using data from Nansen and SV/D casts in accordance with the Hydrographic Manual, Section 4.9.5.2. During the 1982 field season, velocity corrections were determined from three Nansen casts. Reversing thermometers and Beckman Salinometers (59435 and 4919) were calibrated by Northwest Regional Calibration Center (NRCC), Seattle, Washington in March, 1982. In 1983, five SV/D casts were conducted to determine velocity correctors. These casts were taken using a Plessy Model 9040 Environmental Profiling System calibrated by NRCC in April 1983. Three Nansen casts (which served as checks for the SV/D data) were also taken. These used reversing thermometers and a Beckman Salinometer (59435) calibrated by NRCC in March and April 1983, respectively. Table III, Nansen and SV/D Casts, list the date and geographic position of each cast taken during 1982 and 1983.

Table III  
Nansen and SV/D Casts

<u>1982</u>			
<u>Cast</u>	<u>Date</u>	<u>Latitude</u>	<u>Longitude</u>
I	15 July	57°19'24"N	155°45'36"W
II	11 August	57°12'18"N	156°08'54"W
III	19 August	57°16'18"N	156°11'12"W
<u>1983</u>			
I (SV/D)	1 June	57°19'12"N	156°00'24"W
II (SV/D)	22 June	57°18'00"N	156°07'30"W
III	22 June	57°18'00"N	156°07'30"W
IV	6 July	57°17'36"N	156°07'42"W
V (SV/D)	6 July	57°17'36"N	156°07'42"W
VI (SV/D)	27 July	57°16'30"N	156°09'18"W
VIII (SV/D)	10 August	57°17'30"N	156°07'54"W
IX	10 August	57°17'30"N	156°07'54"W

For more information, refer to the Corrections to Echo Soundings Reports, OPR-P146-FA-82 and OPR-P146-FA-83.



E. Hydrographic Sheets

All field sheets were plotted aboard FAIRWEATHER using the following PDP 8/e computers: 09524 and 01020 during 1982; 09524 and 12335 during 1983. Also, the following Complot plotters were utilized: 5557-5 and 5848-17 in 1982; 5557-5 and 6166-22 in 1983.

Five final field sheets were developed for this survey. Three major sheets plotted on mylar comprise the hydrography completed while two paper sheets cover data consisting of side scan sonar data. Refer to Table IV, Field Sheets, for the dimensions of these sheets.

Table IV  
Field Sheets

<u>Sheet</u>	<u>Scale</u>	<u>Skew/Width/Length</u>	<u>Base</u>
FA-10-6N-82	1:10,000	40, 18, 54	Mylar
FA-10-6S-82	1:10,000	40, 20, 54	Mylar
1:5,000 Expansion Sheet	1:5,000	40, 21.5, 40	Mylar
Side Scan Position Plot	1:10,000	40, 18, 54	Paper
Side Scan Hydro Plot	1:10,000	40, 18, 54	Paper

In order to solve junctioning problems between the adjacent surveys caused when several sheets were skewed, the standard sheet limits of hydrography were exceeded on this survey. The limits were expanded to 82.5 cm wide and 126 cm long.

All hydrographic data for this survey will be forwarded to the Pacific Marine Center, N/MOP21, Seattle, Washington for verification and smooth plotting.

F. Control Stations

All horizontal control stations used during this survey were recovered or established by FAIRWEATHER personnel during both the 1982 and 1983 field seasons. All positions meet or exceed Third Order, Class I accuracies and are adequate for hydrographic purposes.

All geographic positions are based on the North American Datum (NAD) of 1927. Conventional traverse and triangulation methods were used throughout the project. No unconventional survey methods were used and no anomalies in closure occurred.

Station CAL POLE 1983 was a temporary offshore station that was used as an electronic positioning equipment calibration site which was removed at the completion of this project.

The following stations were used in support of this survey:

<u>Station Name</u>	<u>Signal Number</u>
+LEE 1944 r.m.	251
+COAL 1982 r.m.	252
*EAST CHANNEL 1923 r.m.	276
+*TERRACE 1923 r.m.	310

<u>Station Name</u>	<u>Signal Number</u>
+*GUANO 1982 r.m.	400
*SKIFF 1982 r.m.	402
*OTIME 1983 d.m.	406
*TP-12 1983 d.n.m.	408
+*CAL POLE 1983 n.d.n.m.	410
+TP-13 1983 d.n.m.	414
<i>SKIFF AZ MK, 1982</i>	404
+Stations outside survey limits	
*Offshore Control Station, i.e. on islands	
r=recovered    m=monumented or marked    d=described    n=not	

For additional information refer to Horizontal Control Reports, OPR-P146-FA-82 and OPR-P146-FA-83.

G. Hydrographic Position Control

Hydrographic positioning control was accomplished using the Motorola Mini-Ranger III system in the standard range-range and range-azimuth configurations. Table V, Mini-Ranger Vessel Equipment, is a listing of console and R/T pairs used in each sounding vessel. There were no Mini-Ranger equipment failures during the course of this survey.

Table V  
Mini-Ranger Vessel Equipment

<u>Vessel</u>	<u>Console-R/T Pair</u>
FA-3 (2023)	B0323/1649
FA-4 (2024)	703/1419
FA-5 (2025)	701/1538
FA-6 (2026)	506042/1398

Mini-Ranger baseline calibrations (BLC's) were conducted in accordance with Appendices M and S of the PMC OORDER. They were performed on a baseline measured to Third Order accuracy by a Hewlett-Packard 3808A EDM. Two BLC's were conducted in Kodiak, Alaska on 30 July (JD 211) and 12 August (JD 224) 1982 for the 1982 field work. The controlling BLC's for the 1983 field work were conducted on: JD 139 (console 703) in Washington Bay, Alaska; JD 140 (consoles B0323 and 701) and JD 143 (console 506042) in Juneau, Alaska; JD 196 (consoles B0323 and 703) and JD 199 (consoles 701 and 506042) in Kodiak, Alaska; with the final BLC's taking place on JD 251/252 for all consoles in Seattle, WA.

The final correctors for the Mini-Ranger positioning instruments were calculated by taking the mean value for the initial and final BLC's. Table VI, Mini-Ranger Final Corrector Determinations, summarizes how corrector values were determined from baseline calibration data.

Table VI  
Mini-Ranger Final Corrector Determinations

<u>JD</u>	<u>BLC Data Used</u>
218-233 (1982)	Average JD 211 and 224 (1982)
139-195 (1983)	Average JD 139 and 196/199 (1983)
199-251 (1983)	Average JD 196/199 and 251/252 (1983)

Critical system checks were generally conducted at least once each week (usually daily), and non-critical system checks were performed at least once daily. The methods used for system checks included: calibration pole, baseline crossings, launch to launch comparisons, and multi-range comparisons. Critical checks showed a mean variation of 1.6 meters with the maximum value of 5.3 meters from the baseline calibrations.

Range-azimuth positioning control was used to obtain a large portion of hydrography on this survey. After completion of the field work, it was discovered that one of the theodolites used for some to the range-azimuth work had a severe collimation error. The problem was noted when working on the adjacent survey, FA-10-4-83 (H-10108), as difficulties were encountered whenever T-1 #13063 was used in conjunction with critical calibrations for the Mini-Ranger equipment. These difficulties lead to the discovery that this instrument contained collimation errors that varied from 1 to 17 minutes of arc.

At some point during the field season theodolite #13063 was damaged such that the trunnion was bent along with the mounts for the horizontal plate. From that time on, as the plate and trunnion were clamped together at various positions, the distortion combined to produce repeatable collimation errors. As it is not known when the instrument was damaged, data collected using this T-1 from the beginning of this field season until the problem was found, it is questionable as to its accuracy.

*Refer to sect.  
2 of Eval  
Report*

On four separate occasions this theodolite was used for position control: JD 160 (position numbers 7010-7086); JD 164/165 (position numbers 8182-8358); JD 176/177 (position numbers 8478-8515); and JD 177 (position numbers 7328-7353). Table VII, Possible T-1 #13063 Induced Errors, lists positional errors that might affect the accuracy of the acquired hydrography if the theodolite was damaged. Maximum positional error (E) was determined by using the equation  $E = R \times \tan \theta$  where the range (R) and collimation correction ( $\theta$ ) produced the largest error for each particular day.

Table VII  
Possible T-1 #13063 Induced Errors

<u>JD</u>	<u>Range</u>	<u>Collimation Error</u>	<u>Positional Error</u>
160	6352 meters	01'07"	2.06 meters
164/165	1106 meters	10'42"	3.44 meters
176/177	1654 meters	03'08"	1.51 meters
177	5555 meters	15'04"	24.35 meters

Examining the possible positional errors, three days in which the theodolite was used are within acceptable limits for this survey, i.e., 10 meters. Thus, it is recommended that this data be accepted. *concur*

JD 177 (position numbers 7328-7353) exceeds the acceptable limits. The location of this data is just offshore control station OTIME and extends seaward 200 meters, consisting of 1.3 miles of hydrography. The soundings from this data junction well with adjacent sounding lines obtained by other positional methods. If the positional error was present, it had no apparent effect on the bottom profile as displayed by the depth curves, therefore, it is recommended that this data be accepted with no additional work necessary. *concur*

For further information concerning the difficulties experienced with this theodolite, refer to the Special Report Collimation Error in T-1 #13063 in the separates following the text.

No unusual weather conditions adversely affected positional accuracy on this survey. No hydrography was conducted with weak or less than minimum required control geometry. All signal strengths were recorded automatically or manually annotated on line to insure that all hydrography run with less than minimum required signal strengths was plotted using time and course methods. ✓

In all cases, the launch's Mini-Ranger R/T unit is located over the transducer thus eliminating the need for ANDIST correctors to be applied to the data.

The Abstract of Correctors to Electronic Position Control is included in the separates following the text.

For additional details, refer to the Electronic Control Reports, OPR-P146-FA-82 and OPR-P146-FA-83.

#### H. Shoreline

Shoreline was taken from three 1:10,000 scale enlargements of TP-00927, a 1:20,000 scale Class III registered shoreline manuscript. With the changes indicated on the final field sheet, the shoreline from this manuscript is adequate and should be used for charting purposes. *concur*

Field edit was performed on a portion of the shoreline near West Channel Island continuing north to East Channel Island during the 1982 field season and submitted with the Field Edit Report, OPR-P146-FA-82. Field edit was not performed on the remaining shoreline in 1983 since a registered manuscript was available. Shoreline verification by hydrographic means was accomplished in these areas.

All features from the manuscript are in black ink on the final field sheet with hydrographic changes indicated in red ink.

Comparing hydrography to the shoreline manuscript showed excellent agreement with the mean high water line whereas reef and ledge areas showed many discrepancies. In general, hydrography found the reef and ledge system to be less extensive than the manuscript indicated. This is especially apparent in the areas surrounding the islands. The most obvious discrepancies are listed in Table VIII, Major Manuscript Changes. *Refer to sect. 2 of Eval. Report*

Not all rocks shown on the manuscript were verified by hydrography, a few were missed in areas foul with rocks and kelp. In these cases, the rocks were carried forward from the manuscript to the final field sheet since they were located by photogrammetry and not disproven by hydrography. *Refer to sections 2, 4 & 7 of Eval. Report.*

Table VIII  
Major Manuscript Changes

<u>Manuscript</u>			
<u>Latitude</u>	<u>Longitude</u>	<u>Manuscript</u>	<u>H-10039</u>
57°24'50"N	156°10'15"W	One large reef area	Two small reefs on a large shoal
57°24'30"N	156°10'40"W	Small reef	Shoal
57°23'53"N	156°11'50"W to 156°12'45"W	A line of five reefs	Four shoal areas; one reef
57°23'34"N	156°11'20"W	Small reef	Rock awash; four shoal areas
57°23'42"N	156°12'54"W	Rock awash	Revised position (#2253)
57°23'45"N	156°12'10"W	Rock awash	Revised position (#2255)
57°23'44"N	156°12'00"W	Rock awash	Revised position (#2256)
57°26'20"N	156°06'23"W	Small reef	Rock (#4859)

It is recommended that the hydrographic data supercede any discrepancy with the shoreline manuscript. *concur*

For a listing of control stations located seaward of the main shoreline of the Alaskan Peninsula refer to Section F of this report.

I. Crosslines

Crosslines were run at least 45° to the main scheme sounding lines covering 54.5 nautical miles or 11.3% of the principle hydrography on this survey. Crossline soundings had excellent agreement to that of main scheme soundings, meeting the requirements of 0.5<sup>4</sup> fathoms for depths less than 20 fathoms and ~~1.5 fathoms~~ <sup>3% of depth</sup> in areas up to 110 fathoms.

J. Junctions

This survey junctions with five contemporary survey: H-10025 (FA-10-4-82), H-10026 (FA-10-5-82), H-10089 (FA-10-3-83), H-10108 (FA-10-4-83) all of which are at the scale of 1:10,000; and H-10040 (FA-30-1-82), scale 1:20,000. All junction soundings are in excellent agreement, meeting or exceeding the requirements in Section 1.1.2, Part B, of the Hydrographic Manual.

K. Comparison with Prior Surveys

Two items #50273 and #50275 contained in the AWOIS listing (dated 13 April 1983) for the Wide Bay project area were within the limits of *Refer to sect. 6 of Eval. Report*

this survey.

AWOIS item #50273 identifies a 15 fathom sounding in the deep water passage between Channel Rock and West Channel Island. Source of the sounding located 1/2 nautical mile at bearing 040 degrees from West Channel Island (latitude 57°23'52"N, longitude 156°13'46"W) is the prior survey H-4295 completed in 1923. The survey requirements were to perform an initial development of 100% bottom coverage with side scan sonar.

Item #50275 concerns the deep water passage between East Channel Island and Channel Rock, requiring a 100% bottom coverage development with side scan sonar in the area of interest extending through the passage on a bearing of 290 degrees.

For both passages (#50273 and 50275) a 200% bottom coverage side scan investigation was performed. The orientation of the side scan developments were approximately parallel to the axis of the channels. Additional coverage normal to the initial investigation was not possible to perform due to the narrowness of the channel and the limited area outside the channel limits. The side scan coverage track plot and side scan hydro plot sheets are submitted with the hydrographic data for this survey.

No evidence was found of the 15 fathom shoal (#50273) in either the side scan sonar data nor the survey's hydrographic data. The entrance channel to Wide Bay between West Channel Island and Channel Rock as indicated by the data was found clear of obstructions with the exceptions of two shoals located on the Shelikof Strait end: 7.3<sup>5</sup> fathoms at latitude 57°22'58"N, longitude 156°13'24"W and 7.4 fathoms at latitude 57°23'11"N, longitude 156°13'24"W.

*Refer to Sect. 6  
of Eval. Report*

Side scan sonar and hydrographic data shows the channel between East Channel Island and Channel Rock (#50275) to be free of obstructions or hazards to navigation. Also, bottom characteristics were found to be of softer sediments in the more protected areas of the channel with coarser materials found nearer to Shelikof Strait. No "hard" bottom characteristics were found via a "Shipek bottom sampler" in waters deeper than 10 fathoms.

*Concur. chart  
according to this  
survey. Refer to  
Sect. 6 of Eval.  
Report*

For the area covered by this survey, comparisons were performed between soundings from H-10039 and 1:10,000 enlargements of four prior surveys: H-4295, year 1923, scale 1:20,000; H-4296, year 1923, scale 1:20,000; H-4384, year 1924, scale 1:20,000; and H-4385, year 1924, scale 1:20,000.

All soundings which did not meet the general trend noted in the comparisons were indicated on the 1:10,000 scale enlargements of the prior surveys instead of spending needless hours itemizing each by latitude and longitude. Those soundings indicated in green were found to be shallower than the contemporary survey H-10039 while those circled in purple were deeper than H-10039.

*Refer to  
Sect. 6 of  
Eval. Report*

H-4295

Comparison between the prior survey H-4295 and survey H-10039 showed 90% agreement between soundings to within two fathoms. The 10% not meeting this criteria were randomly located. (Refer to the H-4295 enlargement for soundings locations.) One sounding, a 15 fathom shoal was discussed earlier as AWOIS item #50273.

Besides the few depth discrepancies, it was also noted that the ledge area on the north side of West Channel Island was found to be more extensive on the current survey H-10039 than indicated on the prior survey H-4295.

H-4296

In order to perform a comparison between the prior survey H-4296 and the survey H-10039, the North American Datum of 1927 adjustment was transferred from the prior survey H-4295 since it was not indicated on the ship's copy of H-4296. Using this revised grid, 98% of the soundings between H-4296 and H-10039 agreed to within 2 fathoms, with 90% agreeing within 1 fathom. The soundings which fell outside this trend were generally found along the prior survey's depth curves which were only supported by a small number of soundings thus introducing erroneous interpretation. Also, except in one case, all soundings from survey H-4296 which do not agree with H-10039 were deeper than the contemporary soundings.

Areas of major disagreements are as follows:

1) The reef area northwest of East Channel Island (latitude 57°24'45"N, longitude 156°12'21"W) has been re-defined by the hydrographic data of H-10039. This was an area in which the prior survey soundings were both shoaler and deeper than the current survey.

2) Several groups of rocks indicated on the prior survey were either not found or not positioned correctly. These were mostly located in foul areas with reefs nearby.

<u>H-4296</u>	<u>Latitude</u>	<u>Longitude</u>	<u>H-10039</u>
3 rocks	57°24'40"N	156°10'43"W	3.2-6.7 fathoms not existing
4 rocks	57°24'52"N	156°10'03"W	0.1-0.5 fathoms part of submerged reef
4 rocks	57°24'57"N	156°09'47"W 45"	1.4-3.4 fathoms not existing
2 rocks	57°26'02"N	156°05'51"W	1.3-3.1 fathoms not existing
10 rocks	57°25'50"N	156°05'45"W	0.4-10.3 fathoms not existing

3) Two dangerous shoals were located where the survey H-4296 showed fairly deep water. The current survey H-10039 located a 1.3<sup>5</sup> fathom shoal where H-4296 indicated 6 2/6 fathoms (latitude 57°26'32"N, longitude 156°10'07"W) and a 1.4<sup>6</sup> fathom shoal which the survey H-4296 charted as 4 2/6 fathoms (latitude 57°26'05"N, longitude 156°08'53"W.) *Dangers to Nav. letter submitted to Seventeenth Coast Guard District.*

H-4384

When comparing the survey H-4384 to the contemporary survey H-10039, 95% of the soundings within their common areas agreed to within 2 fathoms. The soundings outside of this range were randomly scattered throughout the area indicating possible errors in the prior survey depths rather than a trend in bottom change. These soundings are indicated on the

prior survey H-4384 enlargement.

Major discrepancies between the two surveys include the 10 fathom curve around West Channel Island, the reef area along the shoreline of West Channel Island, and the foul area located at latitude 57°23'24"N, longitude 156°13'14"W. H-10039 investigated these areas in much greater detail than prior survey H-4384, and H-10039 should supercede the prior survey depiction.

CONCUR

#### H-4385

Comparing H-4385 with H-10039 showed 98% agreement between the soundings within their common areas to within 2 fathoms. The soundings failing to meet this trend are indicated on the enlargement of H-4385.

Only two areas showed extreme disagreement between the two surveys. The first is the ledge and reef system surrounding the islands located approximately at latitude 57°25'47"N, longitude 156°05'00"W. Survey H-4385 indicates this as one island with a large finger ledge extending west from the island. The contemporary survey H-10039 has two islands at this location with a more extensive ledge area except for the western extending finger where H-10039 shows depths up to 9.5 fathoms.

The second area showing discrepancies is located east of longitude 156°02'30"W where 50% of the prior survey soundings ranged from one to seven fathoms deeper than survey H-10039.

In all cases mentioned in these comparisons between the four prior surveys and survey H-10039 where discrepancies were found, it is recommended that the contemporary survey H-10039 supercede the prior surveys.

CONCUR

#### L. Comparison with the Chart

This survey was compared to a 1:10,000 enlargement of the chart 16570, scale 1:50,000, 8th edition dated February 18, 1978. Approximately 98% of the soundings and features on this chart are directly from the four prior surveys addressed in Section K of this report. Discrepancies that were noted in that section will not be duplicated here.

In general, most discrepancies between the chart and survey H-10039 fall in foul areas or ledge and reef systems. These items consist of rock locations or least depths, and are indicated in blue on the chart enlargement. Rock locations on the chart differ from current survey positions from 60 to 130 meters in the foul area centered at latitude 57°23'45"N, longitude 156°12'45"W. Most of the rocks indicated on the chart southeast of the unnamed island at latitude 57°25'07"N, longitude 156°10'45"W, were either not found or were found to be submerged reefs. It is recommended that these rocks be removed from the chart.

As mentioned in the prior survey H-4296 comparison, it is also recommended that the 1.2 fathom shoal located at latitude 57°26'32"N, longitude 156°10'07"W and the 1.4 fathom shoal at latitude 57°26'05"N, longitude 156°08'53"W discovered while performing the survey H-10039 be charted since they are dangers to navigation.

CONCUR



The Table IX is a listing for all diver investigations on shoals located within the limits of this survey. (No other type of diver investigation was performed.) Diver determined least depths were obtained by performing a circle search with two divers locating the shoalest point and then measuring the least depth with a leadline. The circle search method employed is the type described in the NOAA Dive Manual, Section 7.11, page 7-2. In a few cases, the least depth was determined by the fathometer as currents would introduce a bias in the diver's leadline measurement making it deeper than the echogram trace.

Table IX  
Diver Investigations

<u>Latitude (North)</u>	<u>Longitude (West)</u>	<u>Depth (Fathoms)</u>	<u>Position Number</u>
57°23'11"	156°13'23"	7.4 <sup>8</sup>	5442
57°22'57"	156°13'24"	7.5 <sup>6</sup>	5443
57°23'13"	156°12'49"	4.7 <sup>8</sup>	5444
57°23'06"	156°13'12"	0.7	5445
57°23'23"	156°11'11"	4.5	5446
57°23'46"	156°13'09"	4.5	5447
57°23'06"	156°13'01"	2.4 <sup>2</sup>	5567 8394+04
57°22'48"	156°12'29"	4.1 <sup>2.9</sup>	5562
57°23'21"	156°11'39"	0.8	8516
57°23'21"	156°11'38"	0.9 <sup>8</sup>	8517
57°23'24"	156°11'32"	1.2 <sup>1</sup>	8518
57°22'57"	156°12'13"	4.2 <sup>8</sup>	8519
57°22'42"	156°12'35"	5.2 <sup>1</sup>	8576
57°23'31"	156°12'09"	4.8 <sup>7</sup>	8577
57°23'52"	156°11'42"	3.2 <sup>0</sup>	8578
57°23'37"	156°11'07"	2.0 <sup>5</sup>	8579
57°24'04"	156°12'24"	3.7 <sup>3</sup> 2.9	8580 5375+02
57°23'56"	156°13'12"	1.6 <sup>2</sup>	8581
57°26'05"	156°08'53"	1.4 <sup>6</sup>	7354
57°26'32"	156°10'07" <sup>8</sup>	1.3 <sup>5</sup>	7355

Copies of all reports of chart corrections or dangers to navigation to the U.S. Coast Guard are included in the separates following the text.

M. Adequacy

This survey is complete and fully adequate to super<sup>s</sup>ede all prior surveys within their common areas. No additional field work is necessary. *concur*

N. Aids to Navigation

There are no aids to navigation located within the limits of this survey.

0. Statistics

<u>Vessel</u>	<u>1982</u>			
	<u>2020</u>	<u>2023</u>	<u>2024</u>	<u>Total</u>
Positions	--	252	188	440
Nautical Miles	--	27.8	24.8	52.6
Square Miles	--	1.1	1.0	2.1
Velocity Casts	3	--	--	3

<u>Vessel</u>	<u>1983</u>					
	<u>2020</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>Total</u>
Positions	--	<del>2280</del> 2368	<del>1472</del> 1327	<del>373</del> 284	<del>1300</del> 1357	<del>5425</del> 5336
Nautical Miles	--	255.3	183.8	8.3	144.1	591.25
Square Miles	--	9.4	5.9	0.3	5.3	20.9
Velocity Casts	8	--	--	--	--	8
Bottom Samples	--	--	--	160	--	160

<u>Total Statistics</u>						
<u>Vessel</u>	<u>2020</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>Total</u>
Positions	--	<del>2532</del> 2620	<del>1660</del> 1515	<del>373</del> 284	<del>1300</del> 1357	<del>65</del> 5876
Nautical Miles	--	283.1	208.6	8.3	144.1	644.1
Square Miles	--	10.5	6.9	0.3	5.3	23.0
Velocity Casts	11	--	--	--	--	11
Bottom Samples	--	--	--	160	--	160

One tide gauge, #945-8461 Wide Bay, supported hydrographic operations for this survey but it was not located within its limits. Refer to the Field Tide Notes in the appendices. <sup>sheet</sup>

No current or magnetic stations were taken in the area covered by H-10039. However, five magnetic stations were observed within the limits of junctioning surveys. For additional information see the Magnetics Report, OPR-P146-FA-83.

P. Miscellaneous

During survey operations, currents were noticed within the limits of this survey. In the entrance channels into Wide Bay between West Channel Island, Channel Rock and East Channel Island, divers estimated a maximum current of 2 knots.

Q. Recommendations

None.

R. Automated Data Processing

All range-range and range-azimuth hydrography was processed in accordance with the Hydrographic Data Requirements Letter (Appendix Q), Change No. 2, dated April 14, 1983. For range-range hydro, all peaks, deeps, and sounding corrections were placed on the corrector tape. With

range-azimuth data, all peaks and deeps that were inserted on arcs were edited onto the master tape with an interpolated range assigned to them. For range-azimuth inserts that were not located on arcs, the inserts were put on the corrector tape and positioned by time and course.

The following is a list of the Hydroplot programs used for data acquisition and processing during this survey.

<u>Number</u>	<u>Program Name</u>	<u>Version Date</u>
FALOGN. BN.	R/R & R/AZ Hydrologger	04/08/83
RK 112	R/R Real Time Plot	03/19/81
RK 112	R/R Real Time Plot	08/04/81
RK 201	Grid, Signal and Lattice Plot	04/18/75
RK 211	R/R Non-real Time Plot	02/02/81
RK 212	Visual Station Load and Plot	04/01/74
RK 216	R/AZ Non-Real Time Plot	02/09/81
RK 300	Utility Package	10/21/81
RK 330	Data Reformat and Check	05/04/76
PM 360	Electronic Corrector Abstract	02/02/76
RK 407	Geodetic Inverse/Direct Computations	09/25/78
AM 500	Predicted Tide Generator	11/10/72
RK 530	Layer Corrections for Velocity	05/10/76
RK 561	H/R Geodetic Calibration	02/19/75
RK 561	H/R Geodetic Calibration	12/01/82
AM 602	Elinore	05/21/75
AM 602	Elinore	12/08/82

S. Referral to Reports

The following separate reports contain additional information about OPR-P146-FA, Shelikof Strait, for the 1982 and 1983 field seasons.

<u>1982</u>	<u>OPR-P146-FA-82</u>	<u>Date submitted to PMC</u>
	Horizontal Control Report	AUG 82
	Electronic Control Report	SEP 82
	Field Edit Report	SEP 82
	Corrections to Echo Soundings Report	SEP 82
	Geographic Names Report	SEP 82
	Field Tide Note	SEP 82
	Coast Pilot Report	SEP 82
<u>1983</u>	<u>OPR-P146-FA-83</u>	<u>Date submitted to PMC</u>
	Horizontal Control Report	NOV 83
	Electronic Control Report	JAN 84
	Corrections to Echo Soundings Report	NOV 83
	Field Tide Note	NOV 83
	Magnetics Report	FEB 84



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SURVEY  
NOAA Ship FAIRWEATHER S220  
Fleet Post Office  
Seattle, Washington 98799

26 August 1982

Commander  
17th Coast Guard District  
P.O. Box 3-5000  
Juneau, Alaska 99802

Dear Sir:

The NOAA Ship FAIRWEATHER has recently completed hydrographic surveys of NW Wide Bay to West Channel Island and offshore surveys between Imuya Bay to Cape Igvak on the south Alaska peninsula.

The following hazards to navigation were found at the entrance to Imuya Bay to be uncharted:

1. A 0.7 fathom shoal in a charted area of 14 fathoms at Lat. 57°12'01"N, ✓  
Long. 156°17'00.3"W.
2. A 1.9 fathom shoal in 14 fathoms of charted water at Lat. 57°11'58.9"N, ✓  
Long. 156°17'07.5"W.
3. A 3.0 fathom shoal in 10 fathoms of charted water at Lat. 57°12'31.0"N, ✓  
Long. 156°15'12.9"W.
4. A 5.7 fathom shoal in 16 fathoms of charted water at Lat. 57°11'56"N, ✓  
Long. 156°16'03"W.

Mariners are to exercise caution when entering Imuya Bay. Imuya Bay may have additional rocks or shoals that are not charted. Surveys in Imuya Bay will continue in 1983. Charts affected are 16568 and 16013.

The following hazards to navigation were discovered between Cape Kayakliut to East Channel Island and are uncharted:

5. Two rocks at 57°19'57"N, 156°20'09"W and 57°19'58"N, 156°20'09.5"W, ✓  
located on the edge of the shallow draft passage between Titcliff and Slaughter Islands. The passage between Slaughter and Titcliff Island at the northern portion has a controlling depth of 2.3 fathoms and is restricted to a channel width of 40 yards.
6. A 1.7 fathom shoal located at the western edge of a reef at 57°19'57.5"N, ✓  
156°20'00"W.
7. A 4.5 fathom shoal in 8 fathoms of charted water at 57°21'05.0"N, ✓  
156°17'35.5"W.
8. A 5.0 fathom shoal in 6 fathoms of charted water at 57°21'04.6"N, ✓  
156°17'30.1"W.



Mariners are to note items 7 and 8 constitute the controlling least depths for the shallow draft passage between Slaughter and Hartman Island.

~~9. An 0.6 fathom isolated sounding in 20 fathoms charted depth at 57°23'37.6"N, 156°13'21.2"W between West Channel Island and Channel Rock leading to Wide Bay. Refer to letter dated Nov. 12, 1982~~

10. A 7.3 fathom sounding in 9 fathoms of charted water at 57°22'57"N, 156°13'24.5"W. ✓

11. A 2.2 fathom sounding on a charted 5 fathom curve at 57°23'14.5"N, 156°15'28.0"W between Terrace and West Channel Island. ✓

12. A 0.9 fathom sounding on a 5.5 fathom charted sounding at 57°19'51.5"N, 156°17'52.5"W. ✓

13. A 9.7 fathom sounding on a 20 fathom charted depth at 57°22'15"N, 156°12'47"W. ✓

14. A 2.4 fathom sounding near a charted 6.5 fathom depth at 57°18'41.4"N, 156°17'56.5"W. ✓

15. A 4.6 fathom sounding on a charted 8 fathom depth at 57°19'08.5"N, 156°18'09.5"W. ✓

Charts affected are 16568, 16570, and 16013.

The following hazards to navigation were found on a reconnaissance survey line running to Aniakchak Bay or reported to the FAIRWEATHER by fishing vessels.

16. A 7.5 fathom shoal at position approximate 56°41.9'N, 157°20.25'W at the entrance to Aniakchak Bay. ✓

17. The fishing vessel, WESTERN DAWN, reported a rock awash 3.3 miles south by east of Cape Kunmik at position approximate Lat. 56°43.18'N, Long. 157°08.70'W. ✓

18. The fishing vessel, EAGLE, reported a shoal 4.8 miles SSE of Cape Kunmik at position approximate Lat. 56°41.78'N, Long. 157°07.17'W. ✓

Charts affected are 16568 and 16013.

Sincerely,



Cdr. Walter F. Forster, NOAA  
Commanding Officer  
NOAA Ship FAIRWEATHER

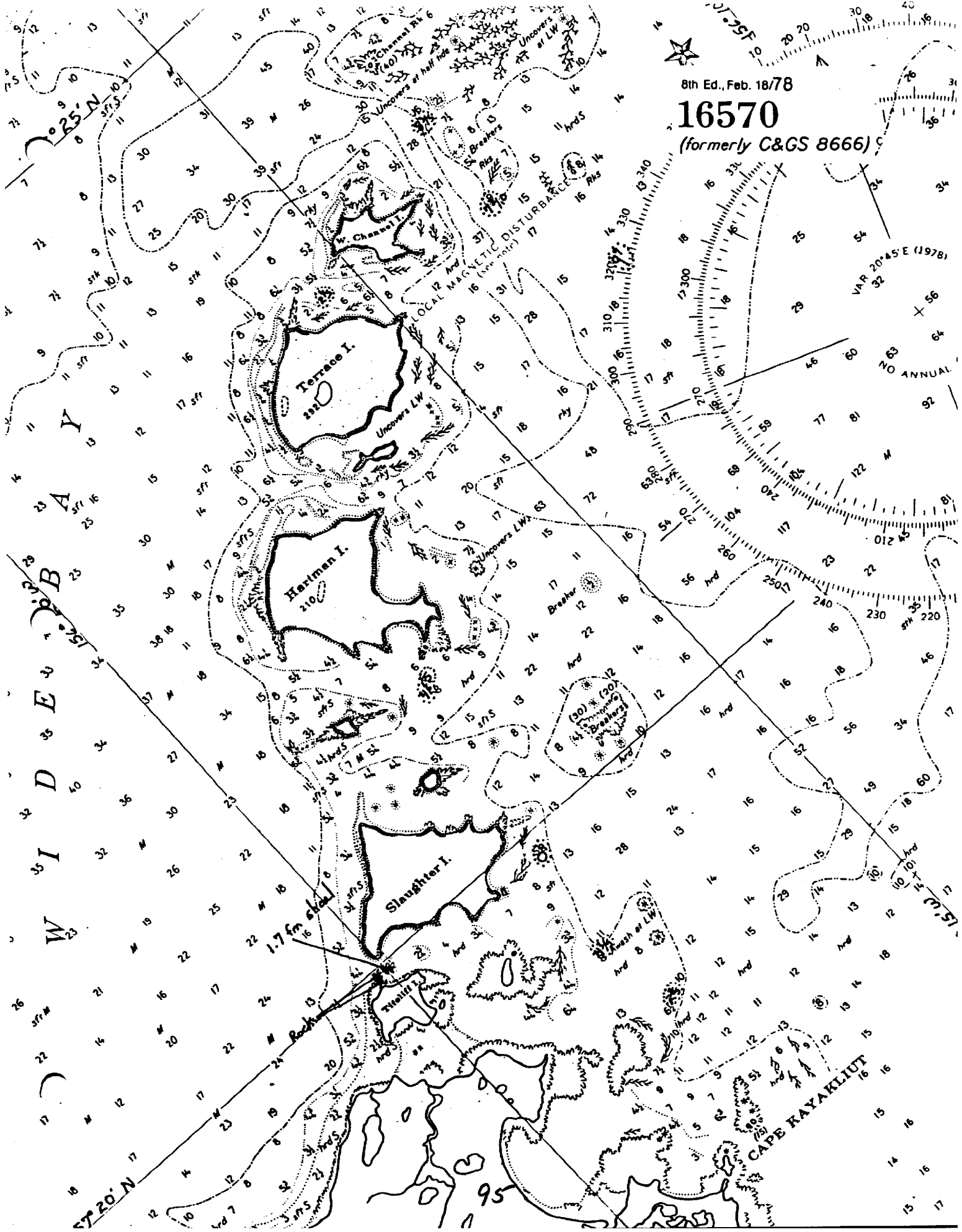
Attachments

cc: Director; Pacific Marine Center  
C351, Chief, Requirements Branch

8th Ed., Feb. 1878

16570

(formerly C&GS 8666)



W I D E A Y

95

CAPE KAYAKLIUT

IMUYA BAY

Waterfall

High flat topped island with vertical shore

Small 8 fm shoal probably shoaler

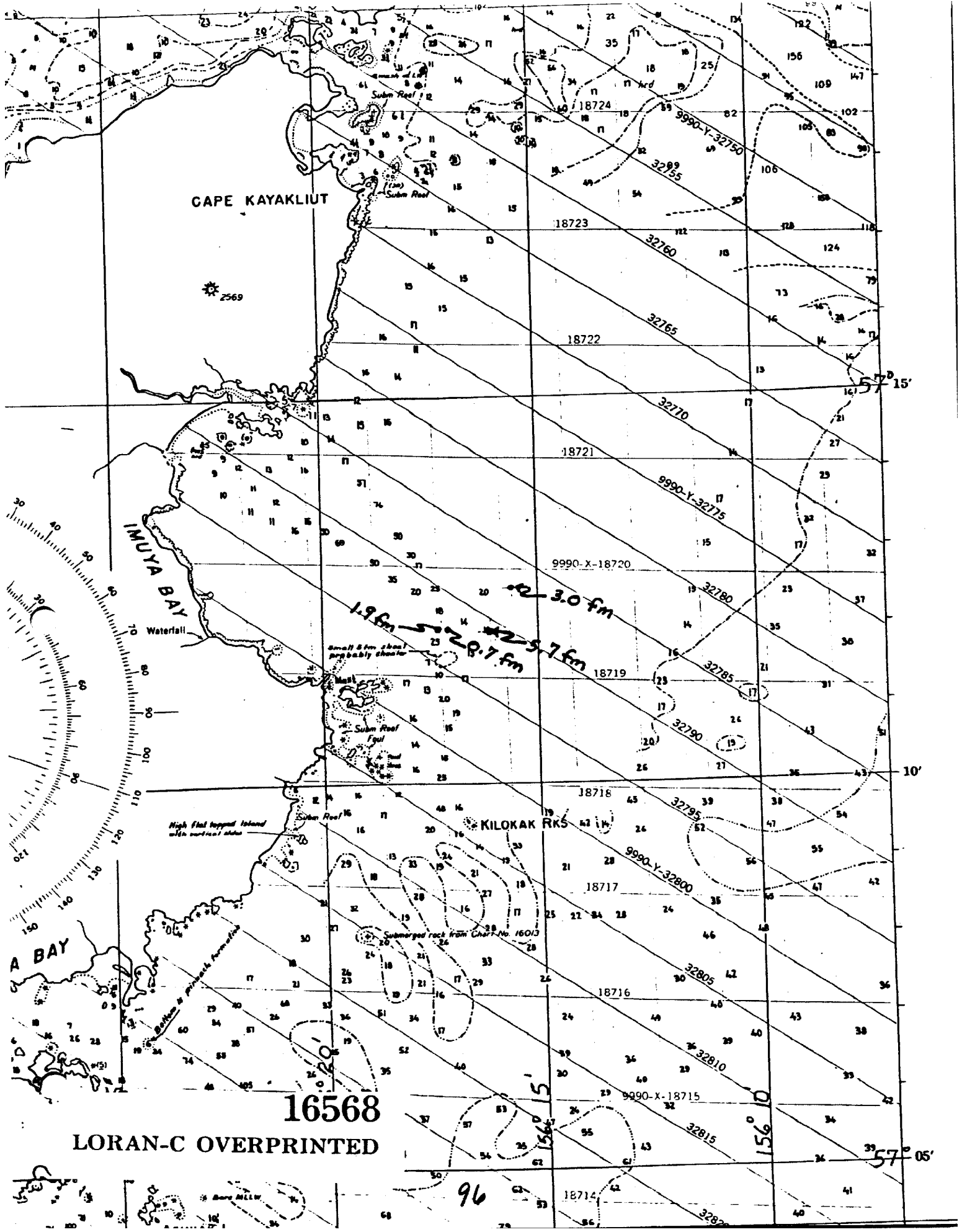
KILOKAK RKS

16568

LORAN-C OVERPRINTED

Handwritten depth notes: 1.9 fm, 2.9 fm, 3.0 fm, 5.7 fm

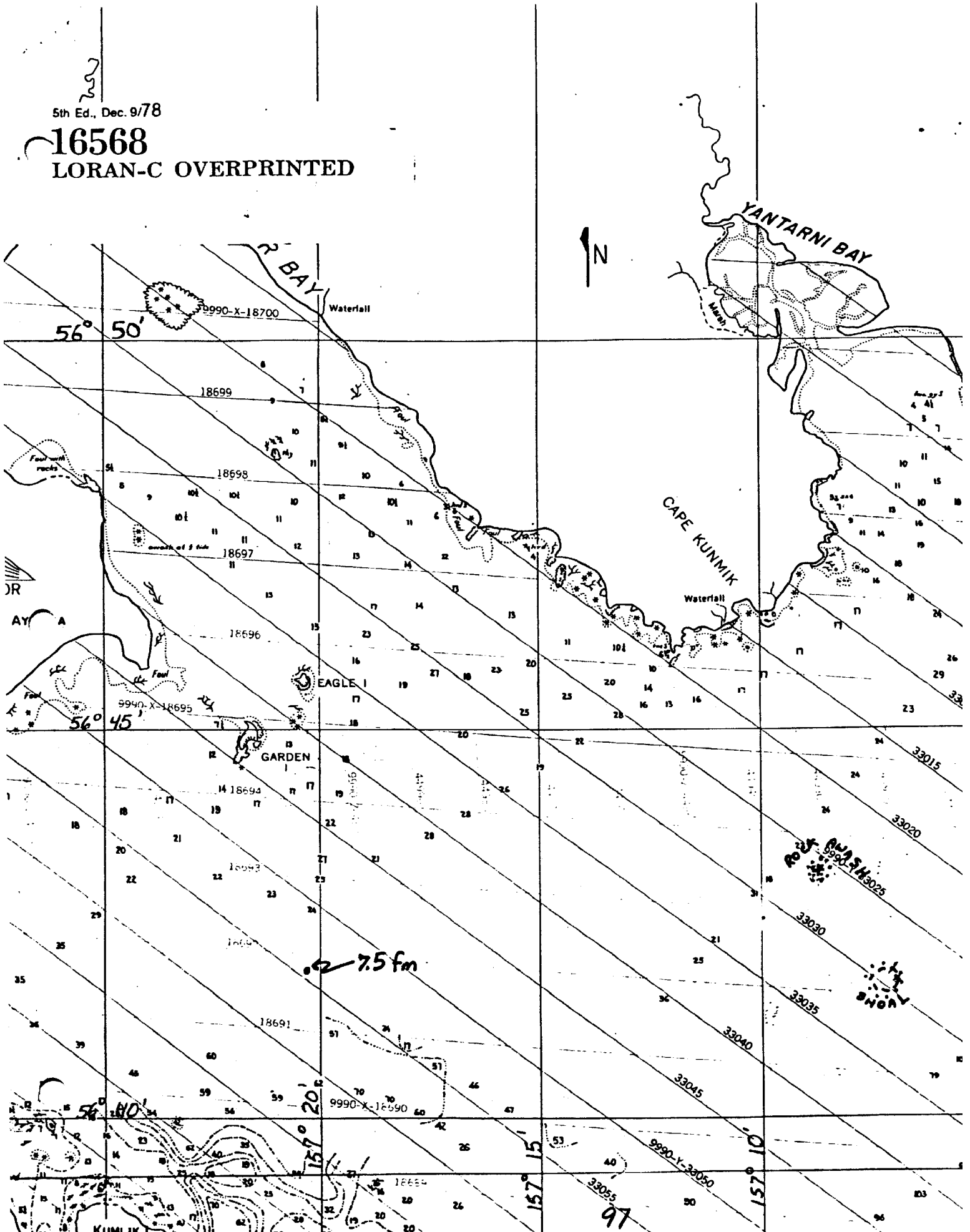
Handwritten number: 96



5th Ed., Dec. 9/78

# 16568

## LORAN-C OVERPRINTED





2 2410000  
R 241000Z AUG 82  
FM NOAA'S FAIRWEATHER  
TO CGC05EVENEEN JUNEAU AK  
INFO NOAAOPM SEATTLE WA  
NOAACOMO WASHINGTON DC  
CY GRNC

NMC 700  
242121Z AUG 82  
M' 6996

BT

UNCLAS

NOAACOMO WASHINGTON DC PASS TO C351  
NOTICE TO MARINERS

THE NOAA SHIP FAIRWEATHER HAS RECENTLY COMPLETED HYDROGRAPHIC SURVEYS OF NW WIDE BAY TO WEST CHANNEL ISLAND AND OFFSHORE SURVEYS BETWEEN IMUYA BAY TO CAPE IGVAK ON THE SOUTH ALASKA PENINSULA.

THE FOLLOWING HAZARDS TO NAVIGATION WERE FOUND AT THE ENTRANCE TO IMUYA BAY TO BE UNCHARTED:

1. A 0.7 FATHOM SHOAL IN A CHARTED AREA OF 14 FATHOMS AT  
LAT 57-12-01 N LONG 156-17-00.3 W
2. A 1.0 FATHOM SHOAL IN 14 FATHOMS OF CHARTED WATER AT  
LAT 57-11-58.9 N LONG 156-17-07.5 W
3. A 3.0 FATHOM SHOAL IN 10 FATHOMS OF CHARTED WATER AT  
LAT 57-12-31.0 N LONG 156-15-12.0 W
4. A 5.7 FATHOM SHOAL IN 16 FATHOMS OF CHARTED WATER AT  
LAT 57-11-56 N LONG 156-16-03 W

MARINERS ARE TO EXERCISE CAUTION WHEN ENTERING IMUYA BAY. IMUYA BAY MAY HAVE ADDITIONAL ROCKS OR SHOALS THAT ARE NOT CHARTED. SURVEYS IN IMUYA BAY WILL CONTINUE IN 1983. CHARTS AFFECTED 16568, 16013.

THE FOLLOWING HAZARDS TO NAVIGATION WERE DISCOVERED BETWEEN CAPE KAYAKLIUT TO EAST CHANNEL ISLAND AND ARE UNCHARTED:

5. TWO ROCKS AT 57-19-57 N, 156-20-00 W AND 57-19-58 N  
156-20-00.5 W, LOCATED ON THE EDGE OF THE SHALLOW DRAFT  
PASSAGE BETWEEN TITCLIFF AND SLAUGHTER ISLANDS.  
THE PASSAGE BETWEEN SLAUGHTER AND TITCLIFF ISLAND AT THE  
NORTHERN PORTION HAS A CONTROLLING DEPTH OF 2.3 FATHOMS  
AND IS RESTRICTED TO A CHANNEL WIDTH OF 40 YARDS.
6. A 1.7 FATHOM SHOAL LOCATED AT THE WESTERN EDGE OF A REEF  
AT 57-19-57.5 N, 156-20-00 W.
7. A 4.5 FATHOM SHOAL IN 8 FATHOMS OF CHARTED WATER AT  
57-21-05.0 N, 156-17-35.5 W.
8. A 5.0 FATHOM SHOAL IN 6 FATHOMS OF CHARTED WATER AT  
57-21-34.6 N, 156-17-30.1 W.

MARINERS ARE TO NOTE ITEMS 7 AND 8 CONSTITUTE THE CONTROLLING LEAST DEPTHS FOR THE SHALLOW DRAFT PASSAGE BETWEEN SLAUGHTER AND HARTMAN ISLAND.

9. AN 8.6 FATHOM ISOLATED SOUNDING IN 20 FATHOMS CHARTED  
DEPTH AT 57-23-37.6 N, 156-13-21.2 W BETWEEN WEST CHANNEL  
ISLAND AND CHANNEL ROCK LEADING TO WIDE BAY.
10. A 7.3 FATHOM SOUNDING IN 9 FATHOMS OF CHARTED WATER AT  
57-22-57 N, 156-13-24.5 W.
11. A 2.2 FATHOM SOUNDING ON A CHARTED 5 FATHOM CURVE AT  
57-23-14.5 N, 156-15-28.0 W BETWEEN TERRACE AND WEST CHANNEL  
ISLAND.
12. A 0.0 FATHOM SOUNDING ON A 5.5 FATHOM CHARTED SOUNDING AT  
57-19-51.5 N, 156-17-52.5 W.
13. A 0.7 FATHOM SOUNDING ON A 23 FATHOM CHARTED DEPTH AT  
57-22-15 N, 156-12-47 W.
14. A 2.4 FATHOM SOUNDING NEAR A CHARTED 6.5 FATHOM DEPTH AT  
57-18-41.4 N, 156-17-56.5 W.
15. A 4.6 FATHOM SOUNDING ON A CHARTED 8 FATHOM DEPTH AT  
57-19-08.5 N, 156-18-00.5 W.

CHARTS AFFECTED 16568, 16570, 16013.

THE FOLLOWING HAZARDS TO NAVIGATION WERE FOUND ON A RECONNAISSANCE



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SURVEY

NOAA Ship FAIRWEATHER S220  
1801 Fairview Ave. East  
Seattle, WA 98102

24 July 83

Commander  
Seventeenth Coast Guard District  
P.O. Box 3-5000  
Juneau, AK 99802

Dear Sir:

The following dangers to navigation have been discovered by the NOAA Ship FAIRWEATHER during hydrographic survey operations in the Wide Bay vicinity of Shelikof Strait.

1. Shoal, covered by 3.3 fathoms at Mean Lower Low Water (MLLW); Chart No. 16570 and 16568; latitude  $57^{\circ}27'27''N$ ; longitude  $156^{\circ}09'14''W$ ; distance 2.17 nautical miles (nm), bearing  $060^{\circ}T$  from Coal Point.

2. Shoal, covered by 4.8 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}27'10''N$ , longitude  $156^{\circ}10'13''W$ ; distance 1.63 nm, bearing  $060^{\circ}T$  from Coal Point.

3. Shoal, covered by 3.1 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}26'56''N$ , longitude  $156^{\circ}10'31''W$ ; distance 1.3 nm, bearing  $064^{\circ}T$  from Coal Point.

4. Shoal, covered by 1.8 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}26'33''N$ , longitude  $156^{\circ}10'08''W$ ; distance 1.4 nm, bearing  $081^{\circ}T$  from Coal Point. *Revised 1.3 fathoms (diver's least depth) 57/26/32 156/10/07*

5. Shoal, covered by 1.9 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}26'04''N$ , longitude  $156^{\circ}08'54''W$ ; distance 2.08 nm, bearing  $097^{\circ}T$  from Coal Point. *Revised BY HYAKO + DIVERS - 1.4 fathoms 57/26/05 156/08/53*

6. Shoal, covered by 1.7 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}26'42''N$ , longitude  $156^{\circ}08'07''W$ ; distance 2.5 nm, bearing  $082^{\circ}T$  from Coal Point.

7. Shoal, covered by 3.3 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}24'04''N$ , longitude  $156^{\circ}12'28''W$ ; distance 0.5 nm, bearing  $088^{\circ}T$  from Channel Rock.

8. Shoal, covered by  $2.0^5$  fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}23'37''N$ , longitude  $156^{\circ}11'07''W$ ; distance 1.29 nm, bearing  $110^{\circ}T$  from Channel Rock.

9. Shoal, covered by  $7.8^8$  fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}23'11''N$ , longitude  $156^{\circ}13'23''W$ ; distance 0.88 nm, bearing  $181^{\circ}T$  from Channel Rock.

10. Shoal, covered by  $1.9^{0.7}$  fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}23'06''N$ , longitude  $156^{\circ}13'12''W$ ; distance 0.95 nm, bearing  $175^{\circ}T$  from Channel Rock.

11. Shoal, covered by  $7.8^6$  fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}22'58''N$ , longitude  $156^{\circ}13'24''W$ ; distance 1.1 nm, bearing  $181^{\circ}T$  from Channel Rock.

12. Shoal, covered by  $3.7^{2.9}$  fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}22'48''N$ , longitude  $156^{\circ}12'29''W$ ; distance 1.34 nm, bearing  $159^{\circ}T$  from Channel Rock.

13. Shoal, covered by 9.5 fathoms at MLLW; Chart No. 16570 and 16568; latitude  $57^{\circ}23'22''N$ , longitude  $156^{\circ}08'54''W$ ; distance 2.5 nm, bearing  $106^{\circ}T$  from Channel Rock.

Sincerely,

*Christian Andreasen*

Christian Andreasen  
Commander, NOAA  
Commanding Officer

cc: N/MOP - Director, Pacific Marine Center  
N/CG22 - Chart Information Section



NOJ DE WTEB

T

RTTUZYUW RUHPTEB0092 2080030-UUUU--RUHPSUU.

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FM NOAA FAIRWEATHER

TO CCGDSEVENTEEN JUNEAU AK

INFO NOAA MOP SEATTLE WA

DMAHTC WASHINGTON DC/NVS/7

ACCT CM-VCAA

BT

UNCLAS

NOAAMOP SEATTLE WA PASS TO CHART INFORMATION SECTION N/CG222

CO  
LD  
FOO

THE FOLLOWING DANGERS TO NAVIGATION HAVE BEEN DISCOVERED BY THE NOAA SHIP FAIRWEATHER DURING HYDROGRAPHIC SURVEY OPERATIONS IN THE WIDE BAY VICINITY OF SHELKOF STRAIT.

1. SHOAL, COVERED BY 3.3 FATHOMS AT MEAN LOWER LOW WATER (MLLW): CHART NO. 16570 AND 16568: LATITUDE 57 DEG 27 MIN 27 SEC N, LONGITUDE 156 DEG 09 MIN 14 SEC W: DISTANCE 2.17 NAUTICAL MILES (NM), BEARING 060 DEG T FROM COAL POINT.

2. SHOAL, COVERED BY 4.8 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 27 MIN 10 SEC N, LONGITUDE 156 DEG 10 MIN 13 SEC W: DISTANCE 1.63 NM, BEARING 060 DEG T FROM COAL POINT.

3. SHOAL, COVERED BY 3.1 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 26 MIN 56 SEC N, LONGITUDE 156 DEG 10 MIN 31 SEC W: DISTANCE 1.3 NM, BEARING 064 DEG T FROM COAL POINT.

4. SHOAL, COVERED BY 1.8<sup>5</sup> FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 26 MIN 32<sup>2</sup> SEC N, LONGITUDE 156 DEG 10 MIN 04<sup>0</sup> SEC W: DISTANCE 1.4 NM, BEARING 081 DEG T FROM COAL POINT.

5. SHOAL, COVERED BY 1.9<sup>6</sup> FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 26 MIN 04<sup>5</sup> SEC N, LONGITUDE 156 DEG 08 MIN 51<sup>3</sup> SEC W: DISTANCE 2.08 NM, BEARING 097 DEG T FROM COAL POINT.

6. SHOAL, COVERED BY 1.7<sup>4</sup> FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 26 MIN 42<sup>4</sup> SEC, LONGITUDE 156 DEG 08 MIN 07<sup>6</sup> SEC W: DISTANCE 2.5 NM, BEARING 082 DEG T FROM COAL POINT.

7. SHOAL, COVERED BY <sup>2.4</sup>3.3 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 24 MIN 04 SEC N, LONGITUDE 156 DEG 12 MIN 28<sup>4</sup> SEC W: DISTANCE 0.5 NM, BEARING 088 DEG T FROM CHANNEL ROCK.
8. SHOAL, COVERED BY <sup>5</sup>2.8 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 23 MIN 37 SEC N, LONGITUDE 156 DEG 11 MIN 07 SEC W: DISTANCE 1.29 NM, BEARING 110 DEG T FROM CHANNEL ROCK.
9. SHOAL, COVERED BY <sup>8</sup>7.3 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 23 MIN 11 SEC N, LONGITUDE 156 DEG 13 MIN 23 SEC W: DISTANCE 0.88 NM, BEARING 181 DEG T FROM CHANNEL ROCK.
10. SHOAL, COVERED BY <sup>0.7</sup>1.9 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 23 MIN 06 SEC N, LONGITUDE 156 DEG 13 MIN 12 SEC W: DISTANCE 0.95 NM, BEARING 175 DEG T FROM CHANNEL ROCK.
11. SHOAL, COVERED BY <sup>6</sup>7.3 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 22 MIN 50<sup>7</sup> SEC N, LONGITUDE 156 DEG 13 MIN 24 SEC W: DISTANCE 1.1 NM, BEARING 181 DEG T FROM CHANNEL ROCK.
12. SHOAL, COVERED BY <sup>2.9</sup>3.7 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 22 MIN 48 SEC N, LONGITUDE 156 DEG 12 MIN 29 SEC W: DISTANCE 1.34 NM, BEARING 159 DEG T FROM CHANNEL ROCK.
13. SHOAL, COVERED BY 9.5 FATHOMS AT MLLW: CHART NO. 16570 AND 16568: LATITUDE 57 DEG 23 MIN 22 SEC N, LONGITUDE 156 DEG 08 MIN 54 SEC W: DISTANCE 2.5 NM, BEARING 106 DEG T FROM CHANNEL ROCK.
- BT  
#0092

NNNN .

Attachment A

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

MAR 26 1984

Commander (OAN)  
Seventeenth Coast Guard District  
P. O. Box 3-5000  
Juneau, Alaska 99802

Dear Sir:

During preliminary office review of hydrographic survey H-10039, Cape Igvak to West Channel Island, Shelikof Strait, Alaska, six shoals were noted and are considered dangers to navigation. Questions concerning the survey may be directed to Lt. Cdr. David W. Yeager, Chief, Nautical Chart Branch, telephone (206) 527-6835.

The following statements are recommended for inclusion in the Local Notice to Mariners:

"An uncharted shoal covered by 1.3 fathoms (MLLW based on predicted tides) is at latitude 57°25'53"N, longitude 156°04'24"W, bearing 96 degrees true, 4.5 nautical miles from Coal Pt. (Charts 16570 and 16568).

"An uncharted shoal covered by 9.8 fathoms (MLLW based on predicted tides) is at latitude 57°26'06"N, longitude 156°06'49"W, bearing 95 degrees true, 3.2 nautical miles from Coal Pt. (Charts 16570 and 16568).

"An uncharted reef uncovered 0.3 fathom at MLLW (based on predicted tides) is at latitude 57°25'40"N, longitude 156°09'44"W, bearing 113 degrees true, 1.75 nautical miles from Coal Pt. (Charts 16570 and 16568).

"An uncharted shoal covered by 4.9 fathoms (MLLW based on predicted tides) is at latitude 57°23'24"N, longitude 156°11'10"W, bearing 120 degrees true, 1.4 nautical miles from Channel Rk (Charts 16570 and 16568).

"An uncharted shoal covered by 4.8 fathoms (MLLW based on predicted tides) is at latitude 57°22'57"N, longitude 156°12'13"W, bearing 151 degrees true, 1.3 nautical miles from Channel Rk (Charts 16570 and 16568).

"An uncharted shoal covered by 0.1 fathom (MLLW based on predicted tides) is at latitude 57°23'52"N, longitude 156°11'49"W, bearing 104 degrees true, 0.9 nautical miles from Channel Rk (Charts 16570 and 16568)."

Review of the dangers to navigation radio message dated R270030Z Jul 83 and letter dated July 24, 1983, for NOAA Chart 16570 (Portage and Wide Bays) and 16568 (Wide Bay to Cape Kumlik) submitted by the NOAA Ship FAIRWEATHER, indicated revision of the following item:

Item 10: Least depth confirmed by divers on the shoal is 0.7 fathom (MLLW based on predicted tides).

Sincerely,

Charles K. Townsend  
Rear Admiral, NOAA  
Director, Pacific Marine Center

bc: N/CG222 (w/attachment)

Retyped for format only/kt/MOP2/3-26-84

FILE COPY

CODE	SURNAME	DATE	CODE	SURNAME	DATE
PREVIOUS CONCURRENCES ARE VALID					
MOP2	Mordock	5/26	MOP	Townsend	
MOPx1	Sandquist				





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

**Pacific Marine Center  
1801 Fairview Avenue East  
Seattle, Washington 98102**

NOV 12 1982

R. Adm. Richard Knapp  
Commander  
Seventeenth Coast Guard District  
P. O. Box 3-5000  
Juneau, Alaska 99803

Dear Admiral Knapp:

A preliminary office review of survey data revises information about dangers to navigation on NOAA Chart 16570, Cape Igvak to West Channel Island, Shelikof Strait, Alaska submitted by the NOAA Ship FAIRWEATHER (Radio Message R2419007 AUG 82) as follows:

Delete (Item 9) 8.6 fathom sounding at 57°23'37.6"N, 156°13'21.2"W between West Channel Island and Channel Rock leading to Wide Bay.

Any questions regarding the above item can be directed to Cdr. Ned C. Austin, Chief, Marine Surveys Division, telephone (206) 442-4764.

Sincerely,

Charles K. Townsend  
Rear Admiral, NOAA  
Director, Pacific Marine Center



SPECIAL REPORT  
COLLIMATION ERROR  
IN T-1 # 13063

NOAA Ship FAIRWEATHER  
Capt. Christian Andreasen, Cmdg.

October 1983

## INTRODUCTION

During the 1983 field season, T-1 #13063 was used for range-azimuth hydrography and critical calibration of launch Mini-Ranger units for field operations by the NOAA Ship FAIRWEATHER. Upon completion of Alaska surveys, it was determined that this instrument has an extreme collimation error (up to 17 minutes of arc) which varies according to plate setting. If the collimation error were constant at all plate settings, i.e., all pointings being high by a fixed number of minutes of arc, a correct angular measurement would result. Unfortunately, this is not the case. This instrument is off by over 15' arc at 000°, 13' arc at 090°, 01' arc at 180° and 03' arc at 270°. Thus, if direct and reverse pointings to offset the collimation error are not made, which is true of both range-azimuth hydrography and theodolite critical calibrations, the measured angles will be off by the difference between collimation error at the initial and that at the pointing to the launch Mini-Ranger antenna.

T-1 #13063 has at some point in time been damaged, probably by being jarred/dropped during field operations where such instruments are naturally exposed to significant hazards. Unfortunately no one recalls when this might have occurred. The collimation error in this instrument is not a simple problem of crosshair alignment correctable through rotation of the reticle. In all likelihood this instrument has been dropped while in its case where it is constrained by its base. The mass of the instrument, cantilevered by its base, then acts to bend the trunnion or horizontal axis out of alignment causing the plane of the horizontal circle to no longer be perpendicular to the spindle (vertical axis of rotation). In doing so it also caused the horizontal plate mounting to be bent. Thus, as the plate and trunnion are clamped together at various positions the distortions combine to create collimation errors which are repeatable at any one position setting but variable around the circle. Because the error is repeatable rather than random, it is possible to determine correctors for application to various pointings and the amount

of error introduced into launch positioning at various ranges along each pointing.

#### BACKGROUND

In early August 1983, FAIRWEATHER completed inshore surveys of Wide Bay in Shelikof Strait, Alaska. Operations then shifted to Portage Bay, the next bay northeast of Wide Bay with about two weeks of project time remaining before termination of Alaskan operations. Reconnaissance of near shore triangulation in Portage Bay revealed that only three existing stations were recoverable, one of which (KELP, 1920) was suspect because the rock was above ground and small enough to have been moved. Because of this, azimuth was carried to a fourth station in the Jute Bay area. Traverse/triangulation to re-establish control throughout the area was tied to station KELP and indicated a shift of about 17 meters. However, the top of the hill where KELP is located is small making it unlikely that the station could physically have moved such a distance. This raised the question of whether there might be an adjustment problem with triangulation in the area, whether the published position is in error (type-0 of 0.1 second), or if the original "no check" position was erroneous. This situation raised some concern as to whether FAIRWEATHER might be encountering triangulation problems. However, the traverse from CAPE, 1923 using an initial on ISLAND, 1923 (the station in Jute Bay) closed on the position of LAGOON, 1923 to 1:13,078. The azimuth check at CAPE from ISLAND to LAGOON is off by 21". Traverse down to the west side of Portage Bay was carried as far south as necessary to support hydrographic operations; however, a high sheer rocky outcrop which juts out from the shoreline with bald eagles nesting on top prevents a horizontal control tie to the control carried from Wide Bay to the south end of Cape Igvak. *(See enclosed Triangulation sketches)* To make additional control ties to verify if horizontal control problems exist would require connection to stations in the mountains or northeastward along

the coast. Not only was there insufficient time for additional ties but it was not yet evident that there was any serious horizontal control problem beyond that of the no check position of KERP.

As critical calibration problems were experienced with calibration of Mini-Ranger electronic control systems in the Portage Bay area, a lengthy and rather frustrating investigation of the problem took place. No problems were experienced with critical calibration of the electronic equipment using the calibration pole in Wide Bay, thus it was believed that the problem was not electronic. Launch to launch non-critical calibrations were in general quite good.

Because of our concerns about triangulation in the area, we queried the office as to whether new adjustment data might exist. None did.

During the first critical calibration in Portage Bay, a sudden wind and rain storm occurred raising the possibility of mispointing and/or misidentification of launch since several were being calibrated. Thus, the critical calibration was rescheduled, since two of the three launch calibrations did not work.

The rescheduled critical calibration was attempted off Cape Igvak because theodolites were in place supporting range-azimuth hydrography in the area at that time. When the calibration did not work, we concluded that an azimuth problem existed between the triangulation extending eastward from Wide Bay and the traverse carried southward along the west shore of Portage Bay. One theodolite observer had set up and obtained azimuth within the Wide Bay triangulation scheme whereas the other observer set up and obtained azimuth from triangulation in Portage Bay. We then made additional horizontal control measurements and recomputed the 1983 FAIRWEATHER traverse loop in that area. No problem was found so it was decided that we would conduct a massive calibration, calibrating all equipment at Cape Igvak, to the north again off the mouth of Portage Bay, and at the calibration pole in Wide Bay. Also, launch baseline crossings were conducted in the Portage Bay area. Again we could not con-

sistently calibrate using the theodolite intersection method, but obtained excellent calibration at the calibration pole. Also, the baseline crossings checked. All triangulation computations were then rechecked and theodolite collimation error was checked. No problem was found.

At this point, a graphic plot of individual theodolite -intersection calibrations (Graph I) was made by plotting the "fix" of observed Mini-Ranger rates and the lines of position from each of the theodolite pointings. This showed a reasonable fix was being obtained from the Mini-Ranger rates and the pointing from station CAROL, but that the pointing from station BIRD was off. This indicated that either the instrument or the observer at BIRD was at fault. Since the observer is a long term Survey Technician and it is difficult for a T-1 to be misread, the investigation concentrated on the instrument, even though it had already been checked for collimation error.

#### METHOD

The instrument was set up, carefully levelled, and pointings (direct and reverse) were made on four sharply defined distant objects at approximately 000°, 090°, 180°, and 270°. Four plate settings were observed (Table I). From the D/R readings the collimation error was computed.

Collimation <sup>corrector</sup> ~~error~~ =  $1/2 (180 - \text{Difference between D/R readings})$ . The computed collimation errors were then plotted graphically on a circle at the location where the telescope was in the "direct" position (Graph II). As is evident, this shows with reasonable consistency that the collimation error varies depending upon plate setting. It is interesting to note that a direct pointing at a plate setting of 000° combined with reversal to 180° results in about 15' error while a direct pointing at a plate setting of 180° combined with reversal to 000° results in almost no

error. We believe this is attributable to a bent trunnion (vertical axis spindle) being combined with a bent plate <sup>mounting</sup> which <sup>when</sup> rotated from 000° to 180° causes the shift in collimation error. When the FAIRWEATHER Survey Department checked the instrument for collimation error, it was done at one position, 180° which happened to be an area of the plate that would check out correctly.

Upon determining that T-1 #13063 had a variable collimation error, it was decided that the error distribution could be determined as related to direct position of the telescope. The instrument was again set up carefully, but this time pointings (D/R) were taken on a single distinct object. D/R readings were taken at 5° intervals around the plate, i.e., the plate was shifted by 5° after each D/R pointing. Because of the number of pointings, the observations were made using two different set-ups. Exact agreement occurred between the 000° pointing of the first set-up and the close out pointing at 360° from the second set-up. Table II lists collimation error as a function of direct position pointing.

From this known error distribution around the plate, one can determine the error at the initial pointing and that at any pointing at a launch antenna. The difference gives an approximation of the angular error, (See formula with Table II). The resulting error in hydrographic position is merely  $R \tan \theta$  where R is the distance from the theodolite to the launch and  $\theta$  is the angular error resulting from collimation error in the theodolite.

By knowing the recorded initial pointing for each range-azimuth survey, the upper and lower limits of arc over which pointings were made, and the range of distances over which pointings were made, one can determine the error in position, i.e., whether the error is significant. See Table III. In the case of the 10-4-83 sheet in Portage Bay, theodolite intersection problems occurred prior to use of T-1 #13063 on range-azimuth hydrography. In this instance, for distant observations,

correctors can be determined such that the range-azimuth hydrography at Cape Igvak can be brought within accuracy tolerance. Unfortunately, unless recorded direct and reverse pointings for this instrument (at other than the 180° direct position) or a known check angle comparison observed with this instrument can be found in the records, work done with T-1 #13063 since the instrument was at the NGS Instrument and Equipment Section in Corbin, VA. during the 1982-83 winter checkout (presumably NGS would have caught this) remains in question and may require resurvey.

#### RECOMMENDATIONS

- \* Send T-1 #13063 and this report to NGS, Corbin, VA for verification.
- \* Disseminate this information to field units so personnel understand that simple D/R observations at a single plate setting may not be verification that an instrument is in proper collimation.
- \* Re-emphasize that any time an instrument is jarred or dropped that it must be reported and the instrument must be checked out.
- \* Require D/R pointings on the initial before and after range-azimuth hydrography and theodolite critical calibration of electronic systems. D/R pointings to a second station whenever possible would aid the monitoring of theodolites and prove that the instrument is over the cited mark.
- \* Collimation check-out procedures for instruments used for range-azimuth hydrography should require four plate settings.
- \* Consider requiring collimation check-out of instruments used for range-azimuth hydrography before and after each survey. (Any instrument used for horizontal control operations is in effect automatically checked-out whenever used on triangulation/traverse, i.e., 4 D/R plate settings)
- \* Review FAIRWEATHER's Rowan and Washington Bay surveys for use of T-1 #13063.
- \* Accept 10-4-83 survey on the basis of calibration pole critical calibrations and adjusted theodolite critical calibrations in Portage Bay (Not all theodolite calibrations in Portage Bay are recoverable in that occasionally a launch collected enough bad rates to think it had calibrated properly when in reality the rates were "out" at the time were the correct rates to have been taken and recorded. Correctors can be applied to range-azimuth hydrography (one area off Cape Igvak) on this survey since the theodolite calibration problem arose prior to the survey of that area.

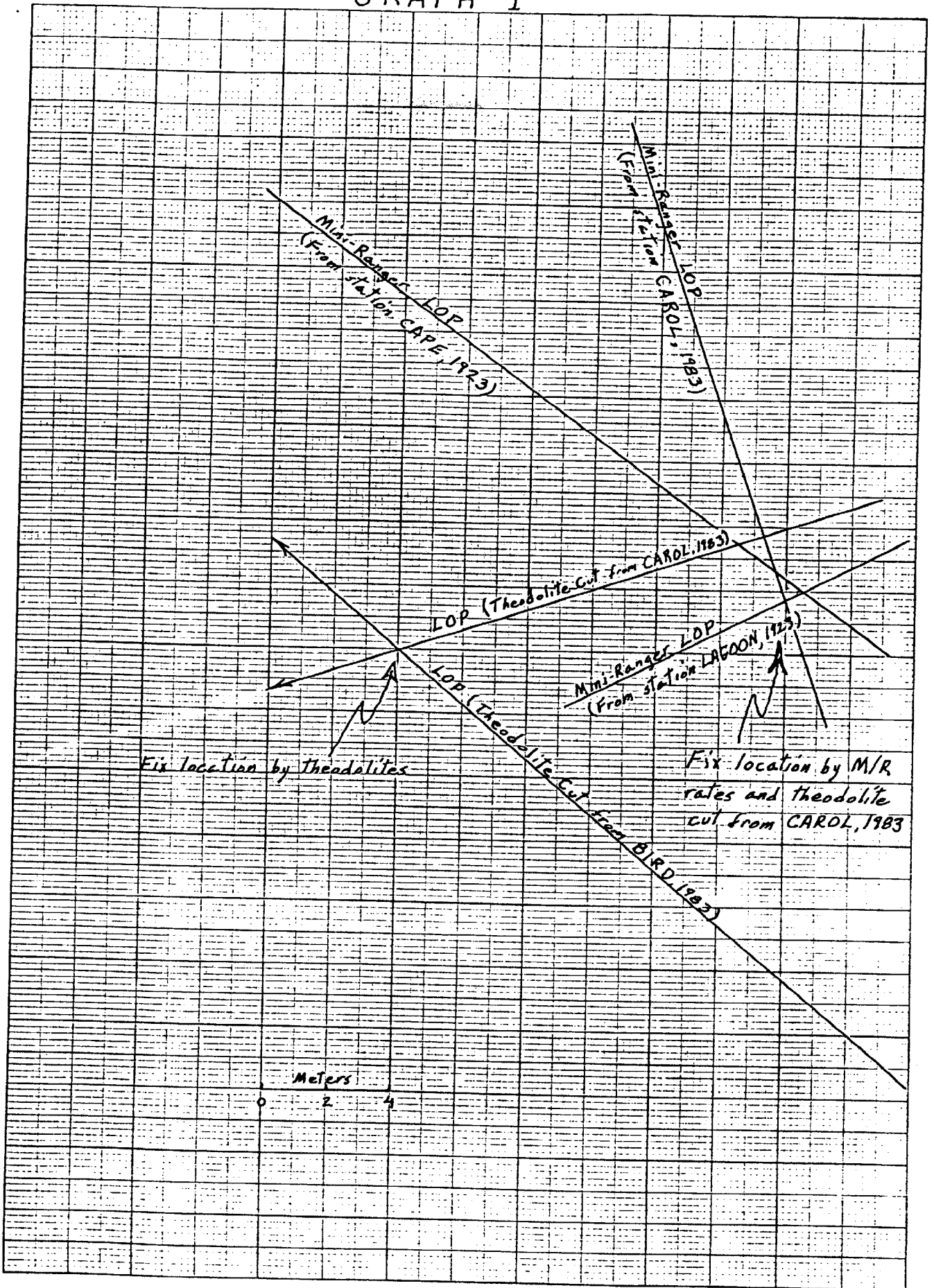


\* Request that NGS review horizontal control in the Portage Bay area and suggest what, if any, ties should be made. FAIRWEATHER will tie from Cape Igvak (stations SKIFF 1982 and SKIFF AZ 1982) to the Jute Bay area and then traverse back to stations CAPE 1923 and LAGOON 1923 during the summer of 1984.

Respectfully submitted,

*Christian Andreasen*  
Capt. Christian Andreasen  
Commanding Officer

# GRAPH I

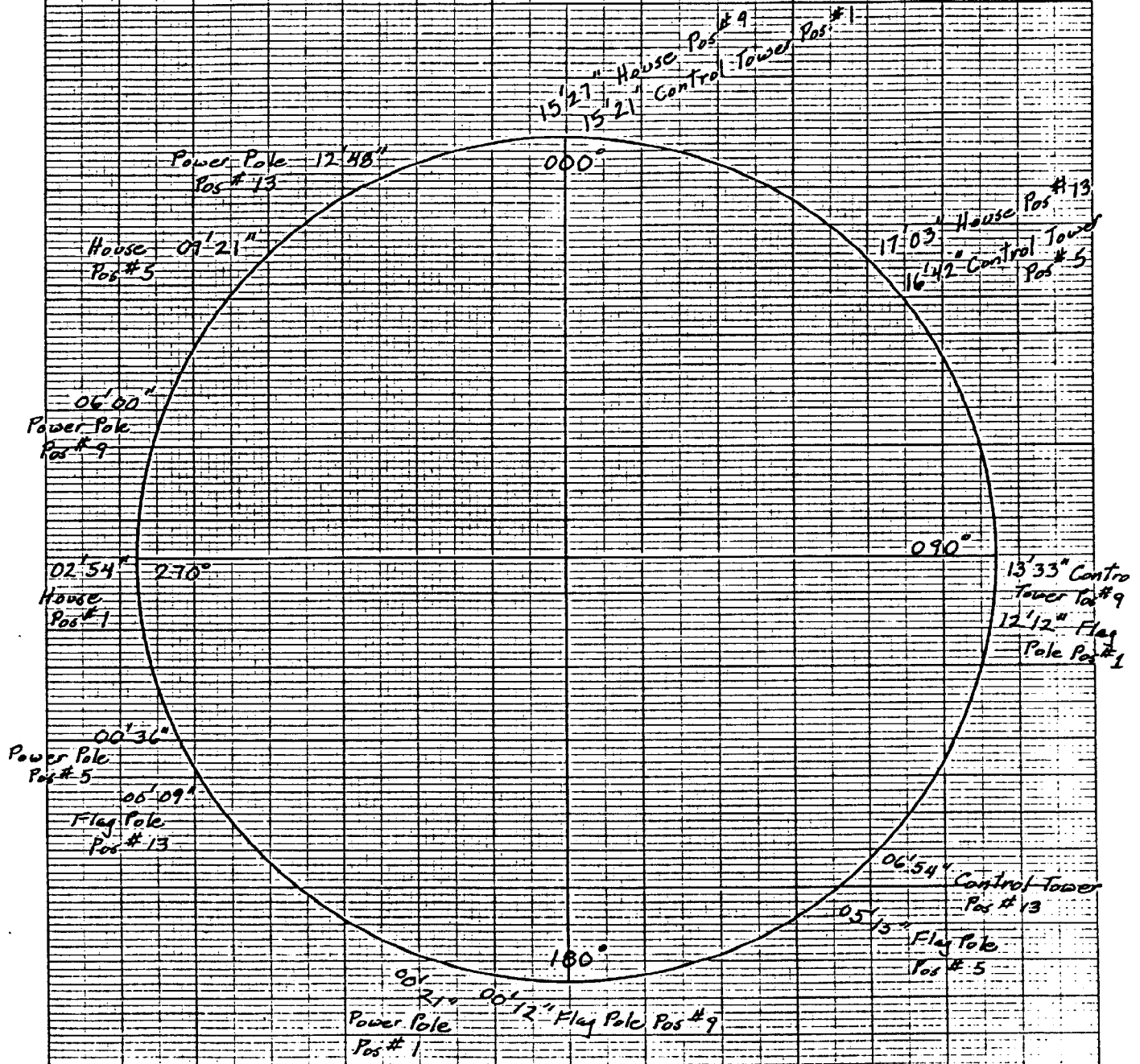


46 1240

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

# GRAPH II

COLLIMATION ERROR PLOTTED AS FUNCTION OF  
DIRECT POSITION POINTING WITH T-1 # 13063



46 1240

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

WORKSHEET

TABLE I  
T-1 # 13063 Observations  
Supporting Graph # I

Position Number	Object	Observed Direction	D/R Diff.	Collimation corrected Error
1	Control Tower	D 000° 00' 12"		
		R 180° 30' 54"	30' 42"	15' 21"
	Flag Pole	D 100° 10' 54"		
		R 280° 35' 18"	24' 24"	12' 12"
Power Pole	D 201° 33' 54"			
	R 021° 33' 12"	00' 42"	00' 21"	
House	D 269° 06' 54"			
	R 089° 12' 42"	05' 48"	02' 54"	
5	Control Tower	D 044° 29' 12"		
		R 225° 02' 36"	33' 24"	16' 42"
	Flag Pole	D 145° 00' 18"		
		R 325° 10' 48"	10' 30"	05' 15"
Power Pole	D 246° 15' 06"			
	R 066° 16' 18"	01' 12"	00' 36"	
House	D 313° 42' 54"			
	R 134° 01' 36"	18' 42"	09' 21"	

WORKSHEET

Position Number	Object	Observed Direction	D/R Diff.	Collimation corrector
9	Control Tower	D 096° 04' 12"		
		R 270° 31' 18"	27' 06"	13' 33"
	Flag Pole	D 190° 37' 42"		
		R 010° 38' 06"	00' 24"	00' 12"
	Power Pole	D 291° 42' 06"		
		R 111° 54' 06"	12' 00"	06' 00"
House	D 359° 08' 48"			
	R 179° 39' 42"	30' 54"	15' 27"	
13	Control Tower	D 135° 06' 00"		
		R 315° 19' 48"	13' 48"	06' 54"
	Flag Pole	D 235° 33' 00"		
		R 055° 32' 42"	00' 18"	00' 09"
	Power Pole	D 336° 30' 18"		
		R 156° 55' 54"	25' 36"	12' 48"
House	D 044° 02' 18"			
	R 224° 36' 24"	34' 06"	17' 03"	

TABLE II

COLLIMATION ERROR CORRECTORS OF DIRECT POSITION  
POINTING WITH T-1 #13063

<u>Position, Direct</u>	<u>Collimation Error <del>Corrector</del></u>	<u>Position, Direct</u>	<u>Collimation Error <del>Corrector</del></u>
000°	-15'27"	185°	-00'33"
005°	-15'39"	190°	-00'09"
010°	-16'24"	195°	+00'00"
015°	-16'33"	200°	+00'09"
020°	-16'54"	205°	+00'30"
025°	-17'03"	210°	+00'42"
030°	-17'12"	215°	+00'39"
035°	-17'12"	220°	+00'33"
040°	-17'06"	225°	+00'27"
045°	-16'54"	230°	+00'22"
050°	-16'54"	235°	+00'07"
055°	-16'42"	240°	-00'03"
060°	-16'24"	245°	-00'30"
065°	-16'00"	250°	-00'57"
070°	-15'42"	255°	-01'21"
075°	-15'09"	260°	-01'51"
080°	-14'27"	265°	-02'30"
085°	-14'00"	270°	-03'06"
090°	-13'36"	275°	-03'42"
095°	-12'48"	280°	-04'15"
100°	-12'06"	285°	-05'03"
105°	-11'21"	290°	-05'48"
110°	-10'30"	295°	-06'30"
115°	-09'48"	300°	-07'18"
120°	-09'09"	305°	-08'15"
125°	-08'38"	310°	-08'57"
130°	-07'42"	315°	-09'48"
135°	-06'48"	320°	-10'33"
140°	-06'00"	325°	-11'09"
145°	-05'21"	330°	-11'57"
150°	-04'36"	335°	-12'42"
155°	-03'57"	340°	-13'21"
160°	-03'18"	345°	-13'51"
165°	-02'48"	350°	-14'24"
170°	-02'00"	355°	-15'00"
175°	-01'30"	360°	-15'27"
180°	-00'57"		

Note: The collimation error corrector for any angular measurement can be obtained from Table II as follows:

$$\text{Error}_{\text{Initial}} - \text{Error}_{\text{Pointing}} = \text{Angular Error Corrector}$$

WORKSHEET

Instrument Check Out of T-1# 13063  
with D/R pairings taken at approximately 5° plate  
settings from 000° to 360°

Position	Direction	D/R Diff	Collimation Corrector Error	Position	Direction	D/R Diff	Collimation Corrector Error
1	D 000° 10' 06"			15	D 070° 11' 12"		
	R 180° 41' 00"	30' 54"	15' 27"		R 250° 42' 36"	31' 24"	15' 42"
2	D 004° 38' 42"			16	D 075° 12' 18"		
	R 185° 10' 00"	31' 18"	15' 39"		R 255° 42' 36"	30' 18"	15' 09"
3	D 010° 09' 54"			17	D 080° 12' 30"		
	R 190° 42' 42"	32' 48"	16' 24"		R 260° 41' 24"	28' 54"	14' 27"
4	D 015° 09' 36"			18	D 085° 13' 18"		
	R 195° 42' 42"	33' 06"	16' 33"		R 265° 41' 18"	28' 00"	14' 00"
5	D 020° 09' 48"			19	D 090° 13' 00"		
	R 200° 43' 36"	33' 48"	16' 54"		R 270° 40' 12"	27' 12"	13' 36"
6	D 025° 09' 30"			20	D 095° 14' 36"		
	R 205° 43' 36"	34' 06"	17' 03"		R 275° 40' 12"	25' 36"	12' 48"
7	D 030° 09' 24"			21	D 100° 14' 42"		
	R 210° 43' 48"	34' 24"	17' 12"		R 280° 38' 54"	24' 12"	12' 06"
8	D 035° 09' 18"			22	D 105° 16' 18"		
	R 215° 43' 42"	34' 24"	17' 12"		R 285° 39' 00"	22' 42"	11' 21"
9	D 040° 09' 18"			23	D 110° 16' 24"		
	R 220° 43' 30"	34' 12"	17' 06"		R 290° 37' 24"	21' 00"	10' 30"
10	D 044° 35' 18"			24	D 115° 18' 06"		
	R 225° 09' 06"	33' 48"	16' 54"		R 295° 37' 42"	19' 36"	09' 48"
11	D 050° 09' 54"			25	D 120° 18' 00"		
	R 230° 43' 42"	33' 48"	16' 54"		R 300° 36' 18"	18' 18"	09' 09"
12	D 055° 10' 18"			26	D 125° 19' 07"		
	R 235° 43' 42"	33' 24"	16' 42"		R 305° 36' 24"	17' 17"	08' 38"
13	D 060° 10' 24"			27	D 130° 19' 48"		
	R 240° 43' 12"	32' 48"	16' 24"		R 310° 35' 12"	15' 24"	07' 42"
14	D 065° 11' 12"			28	D 135° 21' 36"		
	R 245° 43' 12"	32' 00"	16' 00"		R 315° 35' 12"	13' 36"	06' 48"

WORKSHEET

Position	Direction		D/R Diff.	Collimation corrector Error	Position	Direction		D/R Diff.	Collimation corrector Error
29	D 140°	21' 42"			43	D 210°	09' 42"		
	R 320°	33' 42"	12' 00"	06' 00"		R 030°	08' 18"	01' 24"	00' 42"
30	D 145°	23' 00"			44	D 215°	09' 24"		
	R 325°	33' 42"	10' 42"	05' 21"		R 035°	08' 06"	01' 18"	00' 39"
31	D 150°	22' 54"			45	D 220°	09' 18"		
	R 330°	32' 06"	09' 12"	04' 36"		R 040°	08' 12"	01' 06"	00' 33"
32	D 155°	24' 24"			46	D 225°	08' 54"		
	R 335°	32' 18"	07' 54"	03' 57"		R 045°	08' 00"	00' 54"	00' 27"
33	D 160°	24' 42"			47	D 230°	09' 00"		
	R 340°	31' 18"	06' 36"	03' 18"		R 050°	08' 16"	00' 44"	00' 22"
34	D 165°	26' 00"			48	D 235°	08' 30"		
	R 345°	31' 36"	05' 36"	02' 48"		R 055°	08' 16"	00' 14"	00' 07"
35	D 170°	26' 06"			49	D 240°	08' 42"		
	R 350°	30' 06"	04' 00"	02' 00"		R 060°	08' 48"	00' 06"	00' 03"
36	D 175°	26' 42"			50	D 245°	08' 00"		
	R 355°	29' 42"	03' 00"	01' 30"		R 065°	09' 00"	01' 00"	00' 30"
37	D 180°	07' 48"			51	D 250°	07' 54"		
	R 000°	09' 42"	01' 54"	00' 57"		R 070°	09' 48"	01' 54"	00' 57"
38	D 185°	08' 18"			52	D 255°	07' 12"		
	R 005°	09' 24"	01' 06"	00' 33"		R 075°	09' 54"	02' 42"	01' 21"
39	D 190°	08' 36"			53	D 260°	07' 12"		
	R 010°	08' 54"	00' 18"	00' 09"		R 080°	10' 54"	03' 42"	01' 51"
40	D 195°	09' 06"			54	D 265°	05' 48"		
	R 015°	09' 06"	00' 00"	00' 00"		R 085°	10' 48"	05' 00"	02' 30"
41	D 200°	09' 00"			55	D 270°	06' 00"		
	R 020°	08' 42"	00' 18"	00' 09"		R 090°	12' 12"	06' 12"	03' 06"
42	D 205°	09' 36"			56	D 275°	04' 48"		
	R 025°	08' 36"	01' 00"	00' 30"		R 095°	12' 12"	07' 24"	03' 42"



WORKSHEET DATA TO SUPPORT TABLE II  
(CONT)

Position	Direction	D/R	Collimation	Position	Direction	D/R	Collimation
		Diff.	corrector error			Diff.	corrector error
57	D 280° 05' 12"			71	D 350° 04' 42"		
	R 100° 13' 42"	08' 30"	04' 15"		R 170° 33' 30"	28' 48"	14' 24"
58	D 285° 03' 42"			72	D 355° 03' 36"		
	R 105° 13' 48"	10' 06"	05' 03"		R 175° 33' 36"	30' 00"	15' 00"
59	D 290° 04' 00"			73	D 360° 03' 24"		
	R 110° 15' 36"	11' 36"	05' 48"		R 180° 34' 18"	30' 54"	15' 27"
60	D 295° 02' 18"						
	R 115° 15' 18"	13' 00"	06' 30"				
61	D 300° 02' 12"						
	R 120° 16' 48"	14' 36"	07' 18"				
62	D 305° 00' 24"						
	R 125° 16' 54"	16' 30"	08' 15"				
63	D 310° 10' 24"						
	R 130° 28' 18"	17' 54"	08' 57"				
64	D 315° 08' 42"						
	R 135° 28' 18"	19' 36"	09' 48"				
65	D 320° 08' 42"						
	R 140° 29' 48"	21' 06"	10' 33"				
66	D 325° 07' 24"						
	R 145° 29' 42"	22' 18"	11' 09"				
67	D 330° 07' 24"						
	R 150° 31' 18"	23' 54"	11' 57"				
68	D 335° 05' 48"						
	R 155° 31' 12"	25' 24"	12' 42"				
69	D 340° 05' 36"						
	R 160° 32' 18"	26' 42"	13' 21"				
70	D 345° 04' 36"						
	R 165° 32' 18"	27' 42"	13' 51"				

TABLE III

Position Error Due to T-1 Pointing =  $R \tan \phi$  (Meters)

$\phi$	2500 M x Tan $\phi$	3000 M x Tan $\phi$	3500 M x Tan $\phi$
1'	0.728	0.873	1.018
2'	1.455	1.746	2.037
3'	2.182	2.618	3.055
4'	2.910	3.492	4.074
5'	3.635	4.362	5.089
6'	4.360	5.232	6.104
7'	5.090	6.108	7.126
8'	5.820	6.984	8.148
9'	6.545	7.854	9.163
10'	7.270	8.724	10.178
11'	8.000	9.600	11.200
12'	8.730	10.476	12.222
13'	9.455	11.346	13.237
14'	10.180	12.216	14.252
15'	10.910	13.092	15.274
16'	11.635	13.962	16.289
17'	12.360	14.832	17.304
18'	13.090	15.708	18.326



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Service  
Nautical Chart Branch  
7600 Sand Point Way NE  
BIN C15700, Bldg. 3  
Seattle, Washington 98115-0070

November 18, 1983

TO: All N/MOP21 Employees

FROM: *Ned C. Austin*  
N/MOP21 - Ned C. Austin

SUBJECT: Collimation Error in Theodolite T-1 13063

NOAA Ship FAIRWEATHER has reported a collimation problem in Theodolite T-1 #13063 which impacts all 1983 work involving this instrument. Based on tests by the FAIRWEATHER the collimation error is approximately as follows:

Horizontal Circle Reading (Direct)	Collimation Error (Minutes)
000°	15'
090°	14'
180°	1'
270°	3'

The error is apparently systematic and therefore correctable, but additional tests need to be conducted. At this point I am calling the problem to your attention so you will be aware of it. Additional information will be provided when we develop a plan for handling the problem.





6000 10/20/84  
ysm

U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SURVEY  
National Geodetic Survey  
I & E Branch  
P.O. Box 1  
Corbin, Virginia 22446

TO: NOAA Ship Fairweather  
Capt. Christian Andreasen , Cmdg.

FROM: Richard L. Wright  
Geodetic Techn.  
Theodolite Section  
I & E Branch

RECEIVED  
JUL 27 1984

SUBJECT: Wild Theodolite TX-13063

Around January 1984 I received this instrument with colimation horizontal angular error.

The horizontal circle plate was found to be ecc. A calibration test was made using 5° intervals of the horizontal plate and fed into the computer to print out to 1° to 2.0 , however the signs + or - will be reversed when making the corrections.

This instrument was tested over the Corbin Quad using the calibration tables and the observed angles checked to + or - 0.2".

The instrument has been dropped or jarred , shifting the horizontal plate ecc.

The instrument will be repaired, serviced and calibrated and returned to you.

The instrument was last serviced and calibrated March 7, 1982 and found to be in good working condition.

Thank you  
Richard L. Wright  
Geodetic Techn.  
Theodolite Section  
I & E Branch  
Corbin, Virginia 22446

Per telephone call with Dick Wright  
on July 27, 1984, the T-1 (SN-13063)  
was last serviced March 1983.

M. Kury





U.S. DEPARTMENT OF COMMERCE  
 National Oceanic and Atmospheric Administration  
~~NATIONAL OCEANIC AND ATMOSPHERIC SERVICE~~ NATIONAL OCEAN SERVICE  
 Charting & Geodetic Services  
 National Geodetic Survey Division  
 Instrumentation and Equipment Section  
 P.O. Box 1  
 Corbin, VA 22446

N/CG163:WVM

June 29, 1984

TO: Lt. Cmdr. David W. Yeager, MOP 21  
 7600 Sand Point Way, NE  
 Bin - C15700 Bldg. 3  
 Seattle, WA 98115-0070

FROM: Richard L. Wright  
 NOAA, NOS, NGSD

SUBJECT: Theodolite, TI s/n 13063 Circle Error

This instrument was serviced and tested in 1982 by this facility and returned to Pacific Marine Center in good condition.

The instrument was sent to us in 1983 for calibration of plate readings to salvage surveys performed with the instrument after it had been damaged.

A system of calibration was devised and the data was plotted on a graph. These graph plots were then put on a computer, which generated a correction table.

After the plots and correction tables were made it was discovered that all signs of corrections were reversed. The plots and computer correction tables are good except the correction signs should be reversed.

*Per telephone call with  
 Dick Wright on July 27, 1984  
 the TI (SN-13063) was last  
 serviced March 1983.*

By William V. Mast  
 For Richard L. Wright

*M. Kenny*



10TH ANNIVERSARY 1970-1980

National Oceanic and Atmospheric Administration

A young agency with a history





CALIBRATION HORIZONTAL PLATE

MODEL NO 13863

JAN 31, 1984

I & E BRANCH, CORBIN VIRGINIA

MIN -	00	25	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC <i>error</i>												
40.0	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.
41.0	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.
42.0	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.	-1021.
43.0	-1020.	-1020.	-1020.	-1020.	-1020.	-1020.	-1020.	-1020.	-1020.	-1019.	-1019.	-1019.	-1019.
44.0	-1019.	-1019.	-1019.	-1019.	-1019.	-1019.	-1018.	-1018.	-1018.	-1018.	-1018.	-1018.	-1017.
45.0	-1017.	-1017.	-1017.	-1017.	-1017.	-1017.	-1016.	-1016.	-1016.	-1016.	-1016.	-1016.	-1015.
46.0	-1015.	-1015.	-1015.	-1015.	-1014.	-1014.	-1014.	-1014.	-1014.	-1013.	-1013.	-1013.	-1013.
47.0	-1013.	-1013.	-1012.	-1012.	-1012.	-1012.	-1012.	-1011.	-1011.	-1011.	-1011.	-1011.	-1010.
48.0	-1010.	-1010.	-1010.	-1010.	-1009.	-1009.	-1009.	-1009.	-1009.	-1009.	-1009.	-1009.	-1009.
49.0	-1008.	-1007.	-1007.	-1007.	-1007.	-1007.	-1006.	-1006.	-1006.	-1006.	-1005.	-1005.	-1005.
50.0	-1005.	-1005.	-1004.	-1004.	-1004.	-1004.	-1003.	-1003.	-1003.	-1003.	-1002.	-1002.	-1002.
51.0	-1002.	-1002.	-1001.	-1001.	-1001.	-1001.	-1000.	-1000.	-1000.	-1000.	-999.	-999.	-999.
52.0	-999.	-999.	-998.	-998.	-998.	-998.	-998.	-997.	-997.	-997.	-997.	-996.	-996.
53.0	-996.	-996.	-996.	-995.	-995.	-995.	-995.	-994.	-994.	-994.	-994.	-994.	-993.
54.0	-993.	-993.	-993.	-993.	-992.	-992.	-992.	-992.	-991.	-991.	-991.	-991.	-990.
55.0	-990.	-990.	-990.	-990.	-990.	-990.	-989.	-989.	-989.	-989.	-989.	-988.	-988.
56.0	-988.	-988.	-988.	-988.	-987.	-987.	-987.	-987.	-986.	-986.	-985.	-985.	-985.
57.0	-985.	-985.	-985.	-985.	-984.	-984.	-984.	-984.	-983.	-983.	-983.	-983.	-982.
58.0	-982.	-982.	-982.	-981.	-981.	-981.	-981.	-980.	-980.	-980.	-979.	-979.	-979.
59.0	-979.	-978.	-978.	-978.	-978.	-977.	-977.	-977.	-976.	-976.	-976.	-975.	-975.



CALIBRATION HORIZONTAL PLATE

SI - THEODORE, LTD NO 13263

JAN 31, 1964

I & E BRAND - GREEN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC*												
	<i>error</i>												
60.0	-975.	-975.	-974.	-974.	-973.	-973.	-973.	-972.	-972.	-972.	-971.	-971.	-970.
61.0	-970.	-970.	-970.	-969.	-969.	-969.	-968.	-968.	-967.	-967.	-967.	-966.	-966.
62.0	-966.	-966.	-965.	-965.	-965.	-964.	-964.	-963.	-963.	-963.	-962.	-962.	-962.
63.0	-962.	-961.	-961.	-961.	-960.	-960.	-959.	-959.	-959.	-958.	-958.	-958.	-957.
64.0	-957.	-957.	-957.	-956.	-956.	-956.	-955.	-955.	-954.	-954.	-954.	-953.	-953.
65.0	-953.	-953.	-952.	-952.	-952.	-952.	-951.	-951.	-951.	-950.	-950.	-950.	-949.
66.0	-949.	-949.	-949.	-948.	-948.	-948.	-947.	-947.	-947.	-946.	-946.	-945.	-945.
67.0	-945.	-945.	-944.	-944.	-944.	-943.	-943.	-942.	-942.	-942.	-941.	-941.	-940.
68.0	-940.	-940.	-940.	-939.	-939.	-938.	-938.	-938.	-937.	-937.	-936.	-936.	-935.
69.0	-935.	-935.	-935.	-934.	-934.	-933.	-933.	-932.	-932.	-931.	-931.	-930.	-930.
70.0	-930.	-929.	-929.	-928.	-928.	-927.	-927.	-926.	-926.	-925.	-925.	-924.	-924.
71.0	-924.	-923.	-923.	-922.	-922.	-921.	-921.	-920.	-920.	-919.	-919.	-918.	-918.
72.0	-918.	-917.	-917.	-916.	-916.	-915.	-915.	-914.	-914.	-913.	-913.	-912.	-912.
73.0	-912.	-911.	-911.	-910.	-910.	-909.	-909.	-908.	-908.	-908.	-907.	-907.	-906.
74.0	-906.	-906.	-905.	-905.	-904.	-904.	-903.	-903.	-902.	-902.	-901.	-901.	-900.
75.0	-900.	-900.	-900.	-899.	-899.	-898.	-898.	-898.	-897.	-897.	-896.	-896.	-895.
76.0	-895.	-895.	-894.	-894.	-894.	-893.	-893.	-892.	-892.	-891.	-891.	-890.	-890.
77.0	-890.	-890.	-889.	-889.	-888.	-888.	-887.	-887.	-886.	-886.	-885.	-885.	-884.
78.0	-884.	-884.	-883.	-883.	-882.	-882.	-881.	-881.	-880.	-880.	-879.	-879.	-879.
79.0	-879.	-878.	-878.	-877.	-877.	-876.	-876.	-875.	-875.	-874.	-874.	-873.	-872.

COLLIMATION HORIZONTAL PLATE  
 TO THEODOLITE NO 13263  
 JAN 31, 1934  
 I & E BRAND, CORBEN VIRGINIA

MIN -	02	05	10	15	20	25	30	35	40	45	50	55	60
DEC	CORRECTION IN SECONDS OF ARC												
	error												
80.0	-872.	-872.	-871.	-871.	-870.	-870.	-869.	-869.	-868.	-868.	-867.	-867.	-866.
81.0	-866.	-866.	-865.	-864.	-864.	-863.	-863.	-862.	-862.	-861.	-861.	-860.	-860.
82.0	-859.	-859.	-859.	-858.	-858.	-857.	-857.	-856.	-856.	-855.	-854.	-854.	-853.
83.0	-853.	-853.	-852.	-852.	-851.	-851.	-850.	-850.	-849.	-849.	-848.	-848.	-847.
84.0	-847.	-847.	-846.	-846.	-845.	-845.	-844.	-844.	-843.	-843.	-842.	-842.	-841.
85.0	-841.	-840.	-840.	-839.	-839.	-838.	-838.	-837.	-837.	-836.	-836.	-835.	-835.
86.0	-835.	-834.	-834.	-833.	-833.	-832.	-832.	-831.	-831.	-830.	-830.	-829.	-829.
87.0	-829.	-828.	-828.	-827.	-826.	-826.	-825.	-825.	-824.	-824.	-823.	-823.	-822.
88.0	-822.	-822.	-821.	-821.	-820.	-820.	-819.	-819.	-818.	-818.	-817.	-817.	-816.
89.0	-816.	-816.	-815.	-815.	-814.	-814.	-813.	-813.	-812.	-812.	-811.	-811.	-810.
90.0	-810.	-809.	-809.	-808.	-808.	-807.	-807.	-806.	-806.	-805.	-805.	-804.	-804.
91.0	-804.	-803.	-803.	-802.	-802.	-801.	-800.	-800.	-799.	-799.	-798.	-798.	-797.
92.0	-797.	-797.	-796.	-796.	-795.	-794.	-794.	-793.	-793.	-792.	-792.	-791.	-791.
93.0	-791.	-790.	-790.	-789.	-789.	-788.	-787.	-787.	-786.	-786.	-785.	-785.	-784.
94.0	-784.	-784.	-783.	-783.	-782.	-781.	-781.	-780.	-780.	-779.	-779.	-778.	-777.
95.0	-777.	-777.	-777.	-776.	-776.	-775.	-775.	-774.	-774.	-773.	-773.	-772.	-772.
96.0	-772.	-771.	-771.	-770.	-770.	-769.	-768.	-768.	-767.	-767.	-766.	-766.	-765.
97.0	-765.	-764.	-764.	-763.	-763.	-762.	-761.	-761.	-760.	-759.	-759.	-758.	-757.
98.0	-757.	-757.	-756.	-755.	-755.	-754.	-753.	-753.	-752.	-751.	-750.	-750.	-749.
99.0	-749.	-748.	-748.	-747.	-746.	-745.	-745.	-744.	-743.	-742.	-742.	-741.	-740.

CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 13263  
 JAN 31, 1984  
 I & E BRANCH, CORBIN VIRGINIA

MIN -	10	25	40	55	70	85	100	115	130	145	160	175	190
DEG	CORRECTION IN SECONDS OF ARC												
	error												
100.0	-740.	-739.	-738.	-737.	-737.	-736.	-735.	-734.	-733.	-732.	-732.	-731.	-730.
101.0	-730.	-729.	-728.	-727.	-727.	-726.	-725.	-724.	-723.	-722.	-722.	-721.	-720.
102.0	-720.	-719.	-718.	-717.	-716.	-716.	-715.	-714.	-713.	-712.	-711.	-711.	-710.
103.0	-710.	-709.	-708.	-707.	-706.	-706.	-705.	-704.	-703.	-702.	-702.	-701.	-700.
104.0	-700.	-699.	-698.	-697.	-697.	-696.	-695.	-694.	-693.	-692.	-692.	-691.	-690.
105.0	-690.	-689.	-688.	-687.	-686.	-686.	-685.	-684.	-683.	-682.	-681.	-680.	-680.
106.0	-680.	-679.	-678.	-677.	-676.	-675.	-675.	-674.	-673.	-672.	-671.	-671.	-670.
107.0	-670.	-669.	-668.	-667.	-667.	-666.	-665.	-664.	-663.	-663.	-662.	-661.	-660.
108.0	-660.	-659.	-658.	-657.	-657.	-656.	-655.	-654.	-653.	-653.	-652.	-651.	-650.
109.0	-650.	-649.	-648.	-647.	-646.	-646.	-645.	-644.	-643.	-643.	-642.	-641.	-640.
110.0	-640.	-639.	-638.	-637.	-636.	-636.	-635.	-634.	-633.	-633.	-632.	-631.	-630.
111.0	-630.	-629.	-628.	-627.	-626.	-626.	-625.	-624.	-623.	-623.	-622.	-621.	-620.
112.0	-620.	-619.	-618.	-617.	-616.	-615.	-615.	-614.	-613.	-612.	-611.	-611.	-610.
113.0	-610.	-609.	-608.	-607.	-606.	-605.	-605.	-604.	-603.	-602.	-601.	-600.	-599.
114.0	-600.	-599.	-598.	-597.	-596.	-595.	-594.	-593.	-592.	-591.	-590.	-589.	-588.
115.0	-590.	-589.	-588.	-587.	-586.	-585.	-584.	-583.	-582.	-581.	-580.	-579.	-578.
116.0	-580.	-579.	-578.	-577.	-576.	-575.	-574.	-573.	-572.	-571.	-570.	-569.	-568.
117.0	-570.	-569.	-568.	-567.	-566.	-565.	-564.	-563.	-562.	-561.	-560.	-559.	-558.
118.0	-560.	-559.	-558.	-557.	-556.	-555.	-554.	-553.	-552.	-551.	-550.	-549.	-548.
119.0	-550.	-549.	-548.	-547.	-546.	-545.	-544.	-543.	-542.	-541.	-540.	-539.	-538.

CALIBRATION HORIZONTAL PLATE

T1 - THEODOLITE NO 12063

JAN 31, 1984

T & E BRANCH, CERRILLO VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEC	CORRECTION IN SECONDS OF ARC												
	<i>error</i>												
120.0	-550.	-550.	-549.	-549.	-548.	-548.	-547.	-547.	-546.	-546.	-545.	-545.	-544.
121.0	-544.	-543.	-543.	-542.	-542.	-541.	-541.	-540.	-539.	-539.	-538.	-537.	-537.
122.0	-537.	-536.	-535.	-535.	-534.	-533.	-533.	-532.	-531.	-531.	-530.	-529.	-528.
123.0	-528.	-528.	-527.	-526.	-526.	-525.	-524.	-523.	-522.	-522.	-521.	-520.	-519.
124.0	-519.	-519.	-518.	-517.	-516.	-515.	-514.	-514.	-513.	-512.	-511.	-510.	-509.
125.0	-509.	-508.	-507.	-506.	-505.	-504.	-503.	-502.	-501.	-500.	-499.	-498.	-497.
126.0	-497.	-495.	-495.	-494.	-493.	-492.	-491.	-490.	-489.	-488.	-487.	-487.	-486.
127.0	-486.	-485.	-484.	-483.	-482.	-481.	-480.	-480.	-479.	-478.	-477.	-476.	-475.
128.0	-475.	-475.	-474.	-473.	-472.	-471.	-471.	-470.	-469.	-468.	-468.	-467.	-466.
129.0	-465.	-465.	-465.	-464.	-463.	-462.	-462.	-461.	-460.	-459.	-459.	-458.	-458.
130.0	-457.	-457.	-457.	-456.	-456.	-455.	-455.	-454.	-453.	-453.	-452.	-452.	-451.
131.0	-451.	-451.	-450.	-450.	-449.	-448.	-448.	-447.	-447.	-446.	-445.	-445.	-444.
132.0	-444.	-444.	-443.	-442.	-442.	-441.	-440.	-440.	-439.	-438.	-438.	-437.	-436.
133.0	-436.	-436.	-435.	-434.	-434.	-433.	-432.	-432.	-431.	-430.	-429.	-429.	-428.
134.0	-428.	-427.	-427.	-426.	-425.	-424.	-424.	-423.	-422.	-421.	-421.	-420.	-419.
135.0	-419.	-418.	-417.	-416.	-415.	-415.	-414.	-413.	-412.	-411.	-410.	-409.	-409.
136.0	-409.	-408.	-407.	-406.	-405.	-404.	-404.	-403.	-402.	-401.	-400.	-399.	-399.
137.0	-399.	-398.	-397.	-396.	-395.	-395.	-394.	-393.	-392.	-391.	-391.	-390.	-389.
138.0	-389.	-388.	-387.	-387.	-386.	-385.	-384.	-384.	-383.	-382.	-381.	-381.	-380.
139.0	-380.	-379.	-378.	-378.	-377.	-376.	-375.	-375.	-374.	-373.	-372.	-372.	-371.

CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 13863  
 JAN 31, 1964  
 T & E BRANCH, CORBIN VIRGINIA

MIN -	20	25	30	35	40	45	50	55	60				
140.0	-371.	-370.	-370.	-369.	-368.	-367.	-367.	-366.	-365.	-365.	-355.	-354.	-353.
141.0	-363.	-352.	-351.	-361.	-360.	-359.	-358.	-358.	-357.	-356.	-356.	-355.	-354.
142.0	-354.	-354.	-353.	-352.	-352.	-351.	-350.	-349.	-349.	-348.	-347.	-347.	-346.
143.0	-346.	-345.	-345.	-344.	-343.	-343.	-342.	-341.	-341.	-340.	-339.	-338.	-338.
144.0	-338.	-337.	-336.	-336.	-335.	-334.	-334.	-333.	-332.	-332.	-331.	-330.	-330.
145.0	-329.	-329.	-328.	-328.	-327.	-326.	-326.	-325.	-325.	-324.	-323.	-323.	-322.
146.0	-322.	-321.	-321.	-320.	-319.	-319.	-318.	-317.	-317.	-316.	-315.	-315.	-314.
147.0	-314.	-313.	-313.	-312.	-311.	-311.	-310.	-309.	-308.	-308.	-307.	-306.	-306.
148.0	-305.	-305.	-304.	-303.	-303.	-302.	-301.	-300.	-300.	-299.	-298.	-297.	-297.
149.0	-297.	-296.	-295.	-294.	-294.	-293.	-292.	-291.	-291.	-290.	-289.	-288.	-288.
150.0	-287.	-287.	-286.	-285.	-284.	-283.	-282.	-281.	-280.	-279.	-278.	-278.	-277.
151.0	-277.	-276.	-275.	-274.	-273.	-273.	-272.	-271.	-270.	-269.	-269.	-268.	-267.
152.0	-257.	-266.	-266.	-265.	-264.	-263.	-263.	-262.	-261.	-260.	-260.	-259.	-258.
153.0	-258.	-257.	-257.	-256.	-255.	-255.	-254.	-253.	-253.	-252.	-251.	-251.	-250.
154.0	-250.	-249.	-249.	-248.	-247.	-247.	-246.	-245.	-245.	-244.	-244.	-243.	-243.
155.0	-242.	-242.	-242.	-241.	-241.	-240.	-240.	-239.	-239.	-238.	-238.	-237.	-237.
156.0	-237.	-236.	-235.	-235.	-234.	-234.	-233.	-233.	-232.	-232.	-231.	-231.	-230.
157.0	-230.	-230.	-229.	-229.	-228.	-227.	-227.	-226.	-226.	-225.	-225.	-224.	-224.
158.0	-224.	-223.	-222.	-222.	-221.	-221.	-220.	-220.	-219.	-218.	-218.	-217.	-217.
159.0	-217.	-216.	-215.	-215.	-214.	-214.	-213.	-212.	-212.	-211.	-211.	-210.	-210.

"CORRECTION IN SECONDS OF ARC"  
 error

CALIBRATION HORIZONTAL PLATE  
 TI - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CORDEA VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DES	CORRECTION IN SECONDS OF ARC												
150.0	-209.	-209.	-208.	-207.	-207.	-206.	-206.	-205.	-204.	-204.	-203.	-202.	-202.
161.0	-202.	-201.	-200.	-200.	-199.	-198.	-198.	-197.	-197.	-196.	-195.	-195.	-194.
162.0	-194.	-193.	-193.	-192.	-192.	-191.	-190.	-190.	-189.	-188.	-188.	-187.	-187.
163.0	-187.	-186.	-185.	-185.	-184.	-184.	-183.	-182.	-182.	-181.	-181.	-180.	-180.
164.0	-180.	-179.	-178.	-176.	-177.	-177.	-176.	-175.	-175.	-174.	-174.	-173.	-173.
165.0	-172.	-172.	-172.	-171.	-171.	-170.	-170.	-169.	-169.	-168.	-168.	-167.	-167.
166.0	-167.	-166.	-166.	-165.	-165.	-164.	-164.	-163.	-163.	-162.	-162.	-161.	-161.
167.0	-161.	-160.	-159.	-159.	-158.	-158.	-157.	-156.	-156.	-155.	-155.	-154.	-153.
168.0	-153.	-153.	-152.	-151.	-151.	-150.	-150.	-149.	-149.	-148.	-147.	-146.	-146.
169.0	-146.	-145.	-144.	-144.	-143.	-142.	-142.	-141.	-140.	-140.	-139.	-138.	-138.
170.0	-137.	-137.	-136.	-135.	-134.	-133.	-132.	-131.	-131.	-130.	-129.	-128.	-127.
171.0	-127.	-127.	-126.	-125.	-124.	-124.	-123.	-122.	-121.	-121.	-120.	-119.	-118.
172.0	-118.	-118.	-117.	-116.	-116.	-115.	-114.	-114.	-113.	-112.	-112.	-111.	-111.
173.0	-111.	-110.	-109.	-109.	-108.	-108.	-107.	-106.	-106.	-105.	-105.	-104.	-104.
174.0	-104.	-103.	-103.	-102.	-101.	-101.	-100.	-100.	-99.	-99.	-98.	-98.	-98.
175.0	-97.	-97.	-97.	-96.	-96.	-95.	-95.	-94.	-94.	-94.	-93.	-93.	-92.
176.0	-92.	-92.	-92.	-91.	-91.	-90.	-90.	-90.	-89.	-89.	-88.	-88.	-88.
177.0	-85.	-87.	-87.	-87.	-86.	-86.	-85.	-85.	-85.	-84.	-84.	-84.	-83.
178.0	-83.	-83.	-83.	-82.	-82.	-81.	-81.	-81.	-80.	-80.	-80.	-79.	-79.
179.0	-79.	-79.	-78.	-78.	-78.	-77.	-77.	-77.	-76.	-76.	-76.	-75.	-75.

CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CORBIN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC error												
180.0	-75.	-75.	-75.	-74.	-74.	-74.	-74.	-73.	-73.	-73.	-73.	-72.	-72.
181.0	-72.	-72.	-71.	-71.	-71.	-71.	-70.	-70.	-70.	-69.	-69.	-69.	-68.
182.0	-68.	-68.	-68.	-67.	-67.	-67.	-66.	-66.	-65.	-65.	-65.	-65.	-64.
183.0	-64.	-64.	-64.	-63.	-63.	-62.	-62.	-62.	-61.	-61.	-61.	-60.	-60.
184.0	-60.	-59.	-59.	-59.	-58.	-58.	-57.	-57.	-57.	-56.	-56.	-55.	-55.
185.0	-55.	-55.	-54.	-54.	-53.	-53.	-52.	-52.	-51.	-51.	-50.	-50.	-49.
186.0	-49.	-49.	-48.	-48.	-46.	-47.	-47.	-46.	-46.	-45.	-45.	-44.	-44.
187.0	-44.	-44.	-43.	-43.	-42.	-42.	-41.	-41.	-41.	-40.	-40.	-39.	-39.
188.0	-39.	-38.	-38.	-38.	-37.	-37.	-36.	-36.	-35.	-35.	-35.	-34.	-34.
189.0	-34.	-34.	-33.	-33.	-33.	-32.	-32.	-31.	-31.	-31.	-30.	-30.	-30.
190.0	-29.	-29.	-29.	-28.	-28.	-28.	-27.	-27.	-26.	-26.	-25.	-25.	-25.
191.0	-25.	-25.	-24.	-24.	-24.	-23.	-23.	-23.	-22.	-22.	-22.	-21.	-21.
192.0	-21.	-21.	-20.	-20.	-20.	-19.	-19.	-19.	-18.	-18.	-18.	-17.	-17.
193.0	-17.	-17.	-16.	-16.	-16.	-15.	-15.	-15.	-15.	-14.	-14.	-14.	-13.
194.0	-13.	-13.	-13.	-13.	-12.	-12.	-12.	-11.	-11.	-11.	-11.	-10.	-10.
195.0	-10.	-10.	-10.	-9.	-9.	-9.	-9.	-9.	-9.	-8.	-8.	-8.	-8.
196.0	-8.	-8.	-7.	-7.	-7.	-7.	-6.	-6.	-6.	-6.	-5.	-5.	-5.
197.0	-5.	-5.	-4.	-4.	-4.	-4.	-3.	-3.	-3.	-3.	-2.	-2.	-2.
198.0	-2.	-2.	-1.	-1.	-1.	-.	-.	.	.	1.	1.	1.	2.
199.0	2.	2.	2.	2.	3.	3.	3.	4.	4.	4.	4.	5.	5.





CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 12063  
 JAN 31, 1984  
 T & E BRANCH, CORBIN VIRGINIA

PIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC												
	<i>error</i>												
228.0	30.	30.	31.	31.	31.	31.	32.	32.	32.	32.	32.	32.	32.
221.0	33.	33.	33.	33.	33.	33.	33.	33.	33.	33.	33.	33.	33.
222.0	33.	33.	32.	32.	33.	33.	33.	32.	32.	32.	32.	32.	32.
223.0	32.	31.	31.	31.	31.	31.	32.	32.	32.	32.	29.	29.	29.
224.0	29.	29.	28.	28.	28.	27.	27.	27.	26.	25.	25.	25.	25.
225.0	25.	24.	23.	23.	22.	21.	20.	19.	19.	18.	17.	17.	16.
226.0	15.	15.	15.	14.	14.	13.	13.	12.	12.	11.	11.	10.	10.
227.0	10.	9.	9.	8.	8.	5.	7.	7.	6.	6.	6.	6.	5.
228.0	5.	5.	5.	4.	4.	4.	4.	3.	3.	3.	3.	3.	2.
229.0	2.	2.	2.	2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
230.0	1.	1.	2.	2.	2.	3.	3.	3.	3.	4.	4.	4.	4.
231.0	4.	4.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
232.0	5.	6.	6.	6.	6.	6.	5.	5.	5.	5.	5.	5.	5.
233.0	5.	5.	5.	5.	5.	4.	4.	4.	4.	4.	4.	3.	3.
234.0	3.	3.	3.	2.	2.	2.	2.	1.	1.	1.	1.	.	0.
235.0	0.	-1.	-1.	-2.	-2.	-3.	-3.	-4.	-4.	-5.	-5.	-6.	-6.
236.0	-6.	-7.	-7.	-8.	-8.	-9.	-9.	-9.	-10.	-10.	-11.	-11.	-12.
237.0	-12.	-12.	-13.	-13.	-13.	-14.	-14.	-15.	-15.	-15.	-16.	-16.	-17.
238.0	-17.	-17.	-17.	-18.	-18.	-18.	-19.	-19.	-20.	-20.	-20.	-21.	-21.
239.0	-21.	-21.	-22.	-22.	-22.	-23.	-23.	-23.	-24.	-24.	-24.	-25.	-25.

CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CORBIN VIRGINIA

MIN -	20	25	30	35	40	45	50	55	60				
DES	CORRECTION IN SECONDS OF ARC error												
240.0	-25.	-25.	-26.	-25.	-25.	-26.	-27.	-27.	-27.	-27.	-28.	-28.	-28.
241.0	-28.	-28.	-29.	-29.	-29.	-29.	-30.	-30.	-30.	-31.	-31.	-31.	-31.
242.0	-31.	-32.	-32.	-32.	-33.	-33.	-33.	-33.	-34.	-34.	-34.	-35.	-35.
243.0	-35.	-35.	-35.	-35.	-36.	-36.	-37.	-37.	-37.	-38.	-38.	-35.	-39.
244.0	-39.	-39.	-39.	-40.	-40.	-40.	-41.	-41.	-41.	-42.	-42.	-42.	-42.
245.0	-42.	-43.	-43.	-43.	-44.	-44.	-44.	-45.	-45.	-45.	-46.	-46.	-46.
246.0	-46.	-47.	-47.	-47.	-48.	-48.	-48.	-49.	-49.	-50.	-50.	-50.	-51.
247.0	-51.	-51.	-51.	-52.	-52.	-52.	-53.	-53.	-54.	-54.	-54.	-55.	-55.
248.0	-55.	-56.	-56.	-56.	-57.	-57.	-58.	-58.	-58.	-59.	-59.	-60.	-60.
249.0	-60.	-60.	-61.	-61.	-62.	-62.	-62.	-63.	-63.	-64.	-64.	-65.	-65.
250.0	-65.	-65.	-66.	-66.	-67.	-67.	-68.	-68.	-69.	-69.	-70.	-70.	-71.
251.0	-71.	-71.	-72.	-72.	-73.	-73.	-73.	-74.	-74.	-75.	-75.	-76.	-76.
252.0	-76.	-77.	-77.	-78.	-78.	-79.	-79.	-79.	-80.	-80.	-81.	-81.	-82.
253.0	-82.	-82.	-83.	-83.	-83.	-84.	-84.	-85.	-85.	-86.	-86.	-87.	-87.
254.0	-87.	-88.	-88.	-88.	-89.	-89.	-90.	-90.	-91.	-91.	-92.	-92.	-92.
255.0	-92.	-93.	-93.	-94.	-94.	-95.	-95.	-96.	-96.	-97.	-97.	-97.	-98.
256.0	-98.	-98.	-99.	-99.	-100.	-100.	-101.	-101.	-102.	-102.	-103.	-103.	-103.
257.0	-103.	-104.	-104.	-105.	-105.	-106.	-106.	-107.	-107.	-108.	-108.	-109.	-109.
258.0	-109.	-110.	-110.	-111.	-111.	-112.	-112.	-112.	-113.	-113.	-114.	-114.	-115.
259.0	-115.	-115.	-116.	-116.	-117.	-117.	-118.	-118.	-119.	-119.	-120.	-120.	-121.

CALIBRATION HORIZONTAL PLATE  
 TI - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CORBIN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	"CORRECTION IN SECONDS OF ARC" <i>error</i>												
250.0	-121.	-121.	-122.	-122.	-123.	-123.	-123.	-124.	-124.	-125.	-125.	-126.	-126.
261.0	-126.	-127.	-127.	-128.	-128.	-129.	-129.	-130.	-130.	-131.	-131.	-132.	-132.
262.0	-132.	-133.	-133.	-134.	-135.	-135.	-136.	-136.	-137.	-138.	-138.	-139.	-139.
263.0	-139.	-140.	-141.	-141.	-142.	-143.	-143.	-144.	-145.	-145.	-146.	-147.	-147.
264.0	-147.	-148.	-149.	-150.	-150.	-151.	-152.	-152.	-153.	-154.	-155.	-155.	-156.
265.0	-156.	-157.	-158.	-159.	-159.	-160.	-161.	-162.	-163.	-164.	-165.	-165.	-166.
266.0	-166.	-167.	-168.	-169.	-170.	-170.	-171.	-172.	-173.	-174.	-174.	-175.	-176.
267.0	-176.	-177.	-178.	-178.	-179.	-180.	-181.	-181.	-182.	-183.	-184.	-185.	-185.
268.0	-185.	-186.	-187.	-188.	-188.	-189.	-190.	-190.	-191.	-192.	-193.	-193.	-194.
269.0	-194.	-195.	-196.	-196.	-197.	-198.	-198.	-199.	-200.	-200.	-201.	-202.	-203.
270.0	-202.	-203.	-204.	-205.	-206.	-206.	-207.	-208.	-208.	-209.	-210.	-211.	-211.
271.0	-211.	-212.	-213.	-213.	-214.	-215.	-215.	-216.	-217.	-217.	-218.	-219.	-219.
272.0	-219.	-220.	-221.	-221.	-222.	-222.	-223.	-224.	-224.	-225.	-225.	-226.	-227.
273.0	-227.	-227.	-228.	-228.	-229.	-229.	-230.	-230.	-231.	-232.	-232.	-233.	-233.
274.0	-233.	-234.	-234.	-235.	-235.	-236.	-236.	-237.	-237.	-238.	-238.	-239.	-240.
275.0	-239.	-240.	-240.	-240.	-241.	-241.	-241.	-242.	-242.	-243.	-243.	-243.	-244.
276.0	-244.	-244.	-245.	-245.	-245.	-246.	-246.	-247.	-247.	-248.	-248.	-249.	-249.
277.0	-249.	-250.	-250.	-251.	-251.	-252.	-252.	-253.	-253.	-254.	-254.	-255.	-256.
278.0	-256.	-256.	-257.	-257.	-258.	-258.	-259.	-260.	-260.	-261.	-262.	-262.	-263.
279.0	-263.	-264.	-264.	-265.	-266.	-266.	-267.	-268.	-268.	-269.	-270.	-270.	-271.

CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CERRIN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC error												
280.0	-271.	-272.	-273.	-274.	-275.	-275.	-276.	-277.	-278.	-279.	-280.	-281.	-281.
281.0	-281.	-282.	-283.	-284.	-285.	-286.	-286.	-287.	-288.	-289.	-290.	-290.	-291.
282.0	-291.	-292.	-293.	-293.	-294.	-295.	-295.	-297.	-297.	-298.	-299.	-300.	-300.
283.0	-300.	-301.	-302.	-303.	-303.	-304.	-305.	-305.	-306.	-307.	-308.	-308.	-309.
284.0	-309.	-310.	-310.	-311.	-312.	-313.	-313.	-314.	-315.	-315.	-316.	-317.	-318.
285.0	-317.	-318.	-318.	-319.	-319.	-320.	-320.	-321.	-321.	-322.	-322.	-323.	-323.
286.0	-323.	-324.	-325.	-325.	-326.	-326.	-327.	-328.	-328.	-329.	-330.	-330.	-331.
287.0	-331.	-332.	-332.	-333.	-334.	-334.	-335.	-336.	-337.	-337.	-338.	-339.	-340.
288.0	-340.	-340.	-341.	-342.	-343.	-344.	-344.	-345.	-346.	-347.	-348.	-349.	-349.
289.0	-349.	-350.	-351.	-352.	-353.	-354.	-355.	-356.	-356.	-357.	-358.	-359.	-360.
290.0	-360.	-361.	-363.	-364.	-365.	-365.	-367.	-369.	-370.	-371.	-372.	-373.	-374.
291.0	-374.	-375.	-376.	-378.	-379.	-380.	-381.	-382.	-383.	-384.	-385.	-386.	-387.
292.0	-387.	-388.	-389.	-389.	-390.	-391.	-392.	-393.	-394.	-395.	-396.	-397.	-397.
293.0	-397.	-398.	-399.	-400.	-401.	-401.	-402.	-403.	-404.	-404.	-405.	-406.	-407.
294.0	-407.	-407.	-408.	-409.	-410.	-410.	-411.	-412.	-412.	-413.	-414.	-414.	-415.
295.0	-415.	-415.	-416.	-416.	-416.	-417.	-417.	-418.	-418.	-418.	-419.	-419.	-420.
296.0	-420.	-420.	-421.	-421.	-421.	-422.	-422.	-423.	-423.	-424.	-425.	-425.	-426.
297.0	-426.	-426.	-427.	-427.	-428.	-428.	-429.	-430.	-430.	-431.	-432.	-432.	-433.
298.0	-433.	-433.	-434.	-435.	-435.	-436.	-437.	-437.	-438.	-439.	-440.	-440.	-441.
299.0	-441.	-442.	-442.	-443.	-444.	-445.	-445.	-446.	-447.	-448.	-448.	-449.	-450.

CALIBRATION HORIZONTAL PLATE  
 T1 - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CORBIN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC ERROR												
300.0	-450.	-451.	-452.	-453.	-454.	-455.	-456.	-457.	-458.	-459.	-460.	-461.	-462.
301.0	-462.	-463.	-464.	-465.	-466.	-467.	-467.	-468.	-469.	-470.	-471.	-472.	-473.
302.0	-473.	-474.	-474.	-475.	-476.	-477.	-478.	-479.	-479.	-480.	-481.	-482.	-483.
303.0	-483.	-483.	-484.	-485.	-486.	-486.	-487.	-488.	-489.	-489.	-490.	-491.	-492.
304.0	-492.	-492.	-493.	-494.	-494.	-495.	-496.	-497.	-497.	-498.	-499.	-499.	-500.
305.0	-500.	-500.	-501.	-501.	-502.	-502.	-502.	-503.	-503.	-504.	-504.	-505.	-505.
306.0	-505.	-505.	-505.	-507.	-507.	-508.	-509.	-509.	-510.	-510.	-511.	-512.	-512.
307.0	-512.	-513.	-514.	-514.	-515.	-516.	-516.	-517.	-518.	-518.	-519.	-520.	-521.
308.0	-521.	-521.	-522.	-523.	-524.	-524.	-525.	-526.	-527.	-526.	-528.	-529.	-530.
309.0	-530.	-531.	-532.	-533.	-533.	-534.	-535.	-536.	-537.	-538.	-539.	-540.	-541.
310.0	-540.	-542.	-543.	-544.	-545.	-546.	-548.	-549.	-550.	-551.	-552.	-553.	-554.
311.0	-554.	-555.	-556.	-558.	-559.	-560.	-561.	-562.	-563.	-564.	-565.	-566.	-567.
312.0	-567.	-568.	-568.	-569.	-570.	-571.	-572.	-573.	-574.	-575.	-576.	-577.	-577.
313.0	-577.	-578.	-579.	-580.	-581.	-582.	-582.	-583.	-584.	-585.	-586.	-586.	-587.
314.0	-587.	-588.	-589.	-589.	-590.	-591.	-592.	-592.	-593.	-594.	-595.	-595.	-595.
315.0	-596.	-597.	-597.	-598.	-598.	-599.	-599.	-600.	-600.	-601.	-602.	-602.	-603.
316.0	-603.	-603.	-604.	-604.	-605.	-605.	-606.	-607.	-607.	-608.	-609.	-609.	-610.
317.0	-610.	-610.	-611.	-612.	-612.	-613.	-613.	-614.	-615.	-615.	-616.	-616.	-617.
318.0	-617.	-618.	-618.	-619.	-620.	-620.	-621.	-621.	-622.	-623.	-623.	-624.	-625.
319.0	-625.	-625.	-626.	-627.	-627.	-628.	-629.	-629.	-630.	-631.	-631.	-632.	-633.

CALIBRATION HORIZONTAL PLATE

THEODOLITE NO 43063

JAN 31, 1984

I & E BRANCH, CORBIN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC <i>error</i>												
320.0	-632.	-633.	-634.	-634.	-635.	-636.	-636.	-637.	-638.	-638.	-639.	-640.	-640.
321.0	-640.	-641.	-642.	-642.	-643.	-644.	-644.	-645.	-646.	-646.	-647.	-648.	-649.
322.0	-649.	-649.	-650.	-651.	-651.	-652.	-653.	-654.	-654.	-655.	-655.	-656.	-657.
323.0	-657.	-658.	-659.	-659.	-660.	-661.	-662.	-662.	-663.	-664.	-664.	-665.	-666.
324.0	-666.	-667.	-667.	-668.	-669.	-670.	-670.	-671.	-672.	-673.	-673.	-674.	-675.
325.0	-675.	-676.	-677.	-677.	-678.	-679.	-680.	-681.	-682.	-682.	-683.	-684.	-685.
326.0	-685.	-685.	-686.	-687.	-688.	-689.	-689.	-690.	-691.	-692.	-693.	-693.	-694.
327.0	-694.	-695.	-696.	-696.	-697.	-698.	-699.	-700.	-700.	-701.	-702.	-703.	-703.
328.0	-703.	-704.	-705.	-705.	-706.	-707.	-708.	-709.	-709.	-710.	-711.	-712.	-712.
329.0	-712.	-713.	-714.	-714.	-715.	-716.	-717.	-717.	-718.	-719.	-720.	-720.	-721.
330.0	-721.	-722.	-722.	-723.	-724.	-724.	-725.	-726.	-727.	-727.	-728.	-729.	-729.
331.0	-729.	-730.	-731.	-731.	-732.	-733.	-734.	-734.	-735.	-736.	-736.	-737.	-738.
332.0	-738.	-738.	-739.	-740.	-740.	-741.	-742.	-743.	-743.	-744.	-745.	-745.	-746.
333.0	-746.	-747.	-747.	-748.	-749.	-749.	-750.	-751.	-752.	-752.	-753.	-754.	-754.
334.0	-754.	-755.	-756.	-756.	-757.	-758.	-758.	-759.	-760.	-760.	-761.	-762.	-763.
335.0	-762.	-763.	-764.	-765.	-765.	-766.	-767.	-767.	-768.	-769.	-769.	-770.	-771.
336.0	-771.	-771.	-772.	-773.	-773.	-774.	-775.	-775.	-776.	-777.	-777.	-778.	-779.
337.0	-779.	-779.	-780.	-781.	-781.	-782.	-783.	-783.	-784.	-785.	-785.	-786.	-787.
338.0	-787.	-787.	-788.	-789.	-789.	-790.	-791.	-791.	-792.	-793.	-793.	-794.	-795.
339.0	-795.	-795.	-796.	-797.	-797.	-798.	-799.	-799.	-800.	-801.	-801.	-802.	-803.

CALIBRATION HORIZONTAL PLATE  
 T: - THEODOLITE NO 13063  
 JAN 31, 1984  
 I & E BRANCH, CORBIN VIRGINIA

MIN -	00	05	10	15	20	25	30	35	40	45	50	55	60
DEG	CORRECTION IN SECONDS OF ARC <i>error</i>												
340.0	-802.	-803.	-804.	-805.	-805.	-806.	-807.	-807.	-808.	-809.	-809.	-810.	-811.
341.0	-811.	-811.	-812.	-813.	-813.	-814.	-815.	-815.	-816.	-817.	-817.	-818.	-819.
342.0	-819.	-819.	-822.	-820.	-821.	-822.	-822.	-823.	-824.	-824.	-825.	-825.	-826.
343.0	-826.	-827.	-827.	-829.	-828.	-829.	-829.	-830.	-831.	-831.	-832.	-832.	-833.
344.0	-833.	-833.	-834.	-835.	-835.	-836.	-836.	-837.	-837.	-838.	-838.	-839.	-840.
345.0	-839.	-840.	-840.	-841.	-841.	-842.	-842.	-843.	-843.	-844.	-844.	-845.	-845.
346.0	-845.	-845.	-846.	-847.	-847.	-848.	-848.	-849.	-849.	-850.	-850.	-851.	-851.
347.0	-851.	-852.	-852.	-853.	-853.	-854.	-854.	-855.	-855.	-856.	-856.	-857.	-857.
348.0	-857.	-858.	-858.	-859.	-859.	-860.	-860.	-861.	-861.	-862.	-862.	-863.	-863.
349.0	-863.	-864.	-864.	-865.	-865.	-866.	-866.	-867.	-867.	-868.	-868.	-869.	-870.
350.0	-869.	-870.	-870.	-871.	-871.	-872.	-872.	-873.	-873.	-874.	-874.	-875.	-875.
351.0	-875.	-876.	-876.	-877.	-877.	-878.	-878.	-879.	-879.	-880.	-880.	-881.	-881.
352.0	-881.	-882.	-882.	-883.	-883.	-884.	-884.	-885.	-885.	-886.	-886.	-887.	-887.
353.0	-887.	-888.	-889.	-889.	-890.	-890.	-891.	-891.	-892.	-892.	-893.	-893.	-894.
354.0	-894.	-894.	-895.	-895.	-896.	-896.	-897.	-897.	-898.	-898.	-899.	-899.	-900.
355.0	-900.	-901.	-901.	-902.	-902.	-903.	-903.	-904.	-904.	-905.	-905.	-906.	-907.
356.0	-907.	-907.	-908.	-908.	-909.	-909.	-910.	-910.	-911.	-911.	-912.	-912.	-913.
357.0	-913.	-913.	-914.	-914.	-915.	-915.	-916.	-916.	-917.	-917.	-918.	-918.	-919.
358.0	-919.	-919.	-920.	-920.	-921.	-921.	-922.	-922.	-923.	-923.	-924.	-924.	-925.
359.0	-925.	-925.	-926.	-926.	-926.	-927.	-927.	-928.	-928.	-929.	-929.	-930.	-930.

Approval Sheet

The Commanding Officer inspected all field sheets and field data on a daily basis. The survey sheets that are included with this report are complete and adequate for charting purposes.

Submitted by;

*Jeffrey A. Koch*  
Jeffrey A. Koch  
Ensign, NOAA

Approved by:

*Christian Andreasen*  
Christian Andreasen  
Captain, NOAA  
Commanding Officer



LIST OF SIGNALS

OPR-146-FA-83

FA 10-6-82 H-10039

LEE, 1944							571562	9	1013
251 0	57	26	11656	156	15	51538	250	0018	000000
COAL, 1982							571562		FAIRWEATHER
252 0	57	26	1965 <sup>65</sup>	156	12	454 <sup>14</sup>	250	0017 <sup>8</sup>	000000
EAST CHANNEL, 1923							571562		1006
276 0	57	24	3410 <sup>9</sup>	156	11	5572 <sup>13</sup>	250	0026 <sup>7</sup>	000000
TERRACE, 1923							571562		1022
310 3	57	22	48321	156	16	12267	250	0095 <sup>2</sup>	000000
GUANO, 1982							571562		FAIRWEATHER
400 0	57	27	3252 <sup>3</sup>	156	11	0064 <sup>77</sup>	250	0005 <sup>7</sup>	000000
SKIFF, 1982							571562		FAIRWEATHER
402 0	57	25	4546 <sup>86</sup>	156	04	4198 <sup>90</sup>	250	0016 <sup>8</sup>	000000
OTIME, 1983							571562		22
406 0	57	25	26445	156	10	2023 <sup>3</sup>	250	0019	000000
TP-12							571562		27
408 0	57	23	1611 <sup>7</sup>	156	13	5854 <sup>50</sup>	254	0000	000000
CAL POLE TEMP							571562		
410 0	57	26	0731 <sup>23</sup>	156	13	0001 <sup>2</sup>	243	0000	000000
TP-13							571562		7
414 0	57	27	4485 <sup>70</sup>	156	08	0406 <sup>78</sup>	254	0018	000000
SKIFF AZ MK, 1982									
404 0	57	26	04127	156	01	20408	139	0010	000000

FIELD TIDE NOTE

1982

OPR-P146-FA-82

Wide Bay, Alaska

Tide Gage (945-5500) Seldovia, Alaska served as reference station for predicted tides for the entire Wide Bay project as stated in Project Instructions OPR-P146-FA-82. Because leveling was required at the beginning and end of project OPR-P114-RA-82, which was run concurrently with OPR-P146-FA-82, leveling of station (945-5500) Seldovia, Alaska was not conducted by FAIRWEATHER personnel. See Field Tide Note for P114-RA-82 for level data applicable to OPR-P146-FA-82.

Predicted tide correctors were interpolated by the hydroplot system using program AM 500. All times of both predicted and recorded tides were based on Universal Coordinated Time. All predicted tides were acceptable for hydrography with no discrepancies in data attributable to tides errors.

Tide station (945-8461) Wide Bay, Alaska (Mouth of Short Creek) located at latitude  $57^{\circ} 21' 54''N$ , longitude  $156^{\circ} 24' 07''W$  was the primary gage during this project. Opening levels were run to four existing Temporary Bench Marks (TBM's) on 04 June 1982 (J.D. 155). Two additional Bench Marks stamped 8461E and 8461F were established and included in leveling observations. A closure of 7.14mm was obtained for the entire run of 0.6km. Closing levels were run on 20 August 1982 (J.D. 232) to the above-mentioned marks resulting in a 27.10mm closure. This closure is 6.1mm above the acceptable limits set forth by the Hydrographic Manual, Fourth Edition, Section A.8.4. A comparison of opening to closing levels shows no sign of any vertical movement in the marks or tide staff. This error is presumed to be located at set-up number one between the staff stop and TBM #1. This area is a sand bar which covers at high water and is very soft sand, making stable set-ups difficult.

OPERATIONAL PROBLEMS

ADR Gage 6402A4596M2 operated well until 4 July 1982 (J.D. 185) when it was discovered that the gage was skip and double punching. On 15 July 1982 (J.D. 196) the gage was removed and replaced with ADR Gage 7404A0407M3 at 165400 (GMT +9). A new staff to gage comparison was taken and the new gage functioned well until projects end on 20 August 1982 (J.D. 232). Gage 6402A4596M2 was found to have bad punch block pins, which were replaced in the field. The gage was tested for three days without malfunction, and then stored aboard. Table I, Gage Malfunctions, is a listing of skip and double punches found on tidal records for the period of time. ADR Gage 6402A4596M2 was operating.

No hydrographic data was lost as a result of skipping or double punching by the ADR gage. Interpolation may be used to provide a tidal data record for the periods of gage malfunction.

### MISCELLANEOUS

Overall, gage site (945-8461) proved to be a very convenient, useful location for a tide station. The ADR float well, and the tide staff, were both left at the station site to expedite gage installation for future work in the Wide Bay area.

TABLE I  
Gage Malfunctions

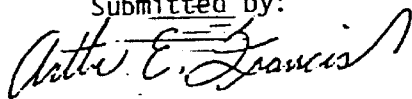
<u>Date</u>	<u>Time</u>	<u>Comments</u>
29 June	183000	Restarted
30 June	183450	Guide roller was causing right edge of tape to fray. Adjusted and restarted at 184800.
01 July	230600-233600	Skipped punches.
02 July	004200-004800	Skipped punches.
03 July	003000	Double or more punches.
	003600-013000	Skipped punches.
	013600	Double or more punches.
	014200-023000	Skipped punches.
	045400-053000	Skipped punches.
	121800	Jammed and tore punch holes.
	150600-171200	Appears good.
	171900	Double punches.
	191200	Skipped.
	2012-2030	Skipped.
<del>04 July</del>	<del>0024-0030</del>	<del>Skipped.</del>
	<del>0324-0348</del>	<del>Skipped.</del>
	<del>0400</del>	<del>Skipped.</del>
	<del>0454</del>	<del>Double punched and tore tape.</del>
	<del>0554</del>	<del>Good.</del>
	<del>0806</del>	<del>Double punched and tore tape.</del>
	<del>0830-0854</del>	<del>Good.</del>
	<del>0900</del>	<del>Skipped.</del>
	<del>1006</del>	<del>Double punched, then skipped.</del>
	<del>1100-1624</del>	<del>Good.</del>
	<del>1630-1654</del>	<del>Skipped.</del>
	<del>1730</del>	<del>Skipped.</del>
	<del>1754-1836</del>	<del>Skipped.</del>
1948	Double punched and skipped.	

1982

Table I, Gage Malfunctions, Cont.

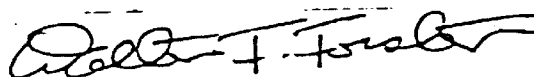
<u>Date</u>	<u>Time</u>	<u>Comments</u>
05 July	0106	Good.
	0112	Double punched, skipped.
	0130-0342	Good.
	0348	Double punched, skipped.
	0436-0512	Good.
06 July	0518	Double punched, skipped.
	2142	Good.
	2148	Double punched, skipped.
07 July	2224	Good.
	0624	Good
08 July	0630	Double punched, jammed.
	031800	Restarted.
09 July	1700	Double punched, skipped.
	1718-2142	Good.
	2148	Skipped.
	2154	Good.
	2312-18	Skipped.
10 July	2324	Good
	0442-54	Skipped.
	0500	Good.
	2342	Skipped.
11 July	2354	Skipped.
	0518-30	Skipped.
	0542-54	Skipped.
	1000	Skipped.
	1706-12	Skipped.
	1824-36	Skipped.
	2242	Skipped.

Submitted by:



Arthur E. Francis  
Ensign, NOAA

Approved by:



Walter F. Forster  
Commander, NOAA  
Commanding Officer

1983

Field Tide Note  
OPR-P146-FA-83  
Wide Bay, Alaska

The primary tide gauge (945-7283) Kodiak, Alaska served as reference station for the predicted tides for the entire Wide Bay project as stated in the Project Instructions, OPR-P146-FA-83. Leveling and periodic maintenance of this station are performed by the Pacific Tide Party.

Predicted tide correctors were interpolated aboard the FAIRWEATHER using the program AM 500 dated 10 Nov 72.

All times of both predicted and recorded tides are expressed in Universal Coordinated Time. All predicted tides were acceptable for hydrography with no discrepancies in data attributable to tide errors.

Tide station (945-8461) Wide Bay, Alaska located at Latitude 57°21'54"N, Longitude 156°24'07"W was the field tide gauge in support of this project. Opening levels were run on 28 May 83 between the tide staff mounted on the pier ruins, and five bench marks established by FAIRWEATHER personnel (one of which was established on 27 May 83). A closure of four millimeters was obtained for the entire run of approximately 0.6 nautical miles.

A second tide staff was mounted on the pipe casing with the tide gauge on 27 May 83 (JD 147). The purpose of the additional staff was to allow gauge to staff comparisons during times when the pier staff was dry or in the surf zone. Gauge to pipe staff comparisons from 27 May 83 to 24 Aug 83 established a gauge reading of 11.02 feet for the zero elevation of this staff. A series of simultaneous staff comparisons made on 9 July 83 (JD 190) found a difference of 8.16 feet to exist between the staff mounted on the standpipe and the shallower staff mounted on the pier ruins. These comparisons established a gauge reading of 19.18 feet for the zero mark on the pier staff. Tide gauge records from 27 May 83 to 24 Aug 83 indicate that the gauge reading for the pier staff zero should be 19.34 feet. The reason for this is probably due to errors introduced by reading a staff in a surf zone as well as time delays associated with transiting from the gauge to the pier staff.

Closing levels were run on 24 Aug 83 (JD 236) to the same five bench marks with a closure of four millimeters. A comparison of opening to closing levels showed no sign of any vertical movement in the marks or tide staff.

#### Operational Problems

Fisher Porter ADR gauge 73C4A1380M17 operated without a problem from the date of installation until 4 Aug 83 (JD 216) when the punch block jammed while removing data. High winds and seas prevented the repairing of the gauge until 6 Aug 83 (JD 218). During this period of approximately 45 hours when tidal data was not collected, some hydrography was conducted. Interpolation can be used to provide a tidal record for the period of the gauge malfunction. No hydrographic data was lost due to this malfunction.



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Rockville, Maryland 20852

March 1, 1984

TO: N/MOP21 - Pacific Marine Center  
FROM: N/OMS123 - *James R. Hubbard*  
SUBJECT: Tide Correctors for Wide Bay, Alaska, 945-8461

The Wide Bay (945-8461), tide gage recorded flat high waters from July 16 to August 20, 1982. The missing hourly heights have been inferred by making adjustments to the predicted tides. The inferred values are estimated to be accurate to within +0.5 foot (95 percent confidence level).

The tide gage had severe malfunctions during the period 0400, July 8 to July 13, 1982, which required extensive hand processing of the tide roll. The hourly heights from 0000, July 7 through 0300, July 8, 1982, were inferred from predictions, but accuracy cannot be estimated due to the lack of observed data.



DATE: March 8, 1984 U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Pacific

OPR: P146

Hydrographic Sheet: H-10039

Locality: Wide Bay, Alaska

Time Period: August 6-20, 1982

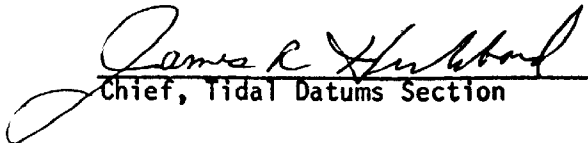
Tide Station Used: 945-8461 Wide Bay, Alaska

Plane of Reference (Mean Lower Low Water): 0.54 feet

Height of Mean High Water Above Plane of Reference: 11.0 feet

Remarks: Recommended Zoning:

Zone Direct

  
Chief, Tidal Datums Section

March 23, 1984

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Pacific

OPR: P146

HYDROGRAPHIC SHEET: H - 10039

Locality: Wide Bay, Alaska

Time Period: May 28 - August 10, 1983

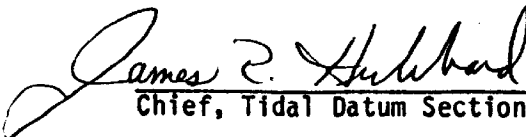
Tide Station Used: 9458461 Wide Bay, Alaska

Plane Of Reference (Mean Lower Low Water): 0.48 Ft.

Height Of Mean High Water Above Plane Of Reference: 11.0 Ft.

Remarks: Recommended Zoning:

Zone Direct

  
Chief, Tidal Datum Section



GEOGRAPHIC NAMES

H-10039

Name on Survey

A CHART NO. 76570 8th Ed., Feb. 18/78  
 B ON PREVIOUS SURVEY NO. H-4384  
 C U.S. QUADRANGLE MAPS Ugashik B-1,2  
 D FROM LOCAL INFORMATION  
 E ON LOCAL MAPS  
 F H-4206  
 G H-4398  
 H Chart 1656B  
 K H-4385

Name on Survey	A	B	C	D	E	F	G	H	K	
E. Channel Island	X	X	X			X	X			1
Channel Rock	X	X	X			X	X			2
W. Channel Island	X	X	X			X	X			3
Alaska Peninsula						X	X			4
Shelikof Strait	X		X				X			5
Wide Bay	X		X			X	X			6
Cape Igvak	X		X			X		X		7
<i>Alaska (title)</i>										8
										9
										10
										11
										12
										13
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										23
										24
										25

**HYDROGRAPHIC SURVEY STATISTICS**

H-10039

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		6
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		3
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDIAN FILES	3				
ENVELOPES					
VOLUMES	4				
CARRIERS					
BOXES					

<b>SHORELINE DATA</b>					
SHORELINE MAPS(List):					
PHOTOBATHYMETRIC MAPS(List):					
NOTES TO THE HYDROGRAPHER(List):					
SPECIAL REPORTS(List):					
NAUTICAL CHARTS(List):					

**OFFICE PROCESSING ACTIVITIES**  
The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			5865
POSITIONS REVISED	5561		
SOUNDINGS REVISED	577		
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION	6.0		6.0
VERIFICATION OF CONTROL	3.0		3.0
VERIFICATION OF POSITIONS	111.5		111.5
VERIFICATION OF SOUNDINGS	229.5		229.5
VERIFICATION OF JUNCTIONS	5.0		5.0
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION	23.0		23.0
COMPILATION OF SMOOTH SHEET	42.0		42.0
COMPARISON WITH PRIOR SURVEYS AND CHARTS	2.5	14.0	16.5
EVALUATION OF SIDESCAN SONAR RECORDS			
EVALUATION OF WIRE DRAWS AND SWEEPS			
EXAMINATION REPORTS	3.5	20.0	23.5
OTHER Digitization	30.0		30.0
Misc.		16.0	16.0
<b>TOTALS</b>	<b>456.0</b>	<b>50.0</b>	<b>506.0</b>

Pre-processing Examination by <b>G. Kay, M. Kenny</b>	Beginning Date	Ending Date <b>11/16/82</b>
Verification of Field Data by <b>I. Almacen</b>	Beginning Date <b>4/20/84</b>	Ending Date <b>4/19/85</b>
Verification Check by <b>S. Otsubo, B. Olmstead, J. Green</b>	Beginning Date <b>5/25/85</b>	Ending Date <b>5/25/85</b>
Evaluation and Analysis by <b>A. Luceno</b>	Beginning Date <b>5/6/85</b>	Ending Date <b>5/25/85</b>
Inspection by <b>D.Hill</b>	Time (Hours) <b>7</b>	Ending Date <b>6-11-85</b>

PACIFIC MARINE CENTER

EVALUATION REPORT

H-10039

1. INTRODUCTION

H-10039 is a 1:10,000 basic hydrographic survey executed in the 1982 and 1983 field seasons by NOAA Ship FAIRWEATHER. The survey was performed in compliance with Project Instructions OPR-P146-FA-82 dated February 23, 1982 and Change No. 1 dated May 25, 1982; Project Instructions OPR-P146-FA-83 dated March 11, 1983 and Change No. 1 dated April 15, 1983. The survey covers a portion of Shelikof Strait from Cape Igvak to West Channel Island southeast of the many small islands separating Wide Bay from Shelikof Strait.

The projection parameters were revised to change the projection from modified mercator to polyconic and to center the hydrography on the smooth sheet.

Velocity corrections were revised to reflect correctors from replotted velocity correction curves.

Electronic correctors were revised with results from recomputation of electronic calibration data.

Predicted tides for reduction of soundings on the field sheet are based on Seldovia, Alaska reference station. Final tide reducers for the smooth sheet are derived from the single gage in Wide Bay operated by the field party. Tides for JD 233 (1982) were inferred due to tide gage malfunction. The inferred values were estimated to be accurate to within  $\pm 0.5$  feet. (See attached memorandum, N/OMS123, dated March 1, 1984)

2. CONTROL AND SHORELINE

Horizontal and hydrographic position control are discussed adequately in sections F and G in the Descriptive Report and in the Horizontal and Electronic Control Reports for OPR-P146-FA-82 and OPR-P146-FA-83. The smooth sheet is plotted using published and preliminary adjusted positions based on the North American Datum of 1927.

The ship reported a possible collimation error for theodolite number 13063. This instrument was used in the range/azimuth control mode on some occasions during the survey. Although correctors were supplied by NGS Corbin, these were not applied to the survey because of the unknown times that the errors were in effect. Furthermore, on several occasions, the identity of the theodolite was not recorded.

In the worst case, if there is any positional displacement caused by this error, the maximum displacement was determined to be approximately 24 meters affecting a small confined area adjacent to a ledge limit located about 200 meters east of triangulation station OTIME. The data obtained within this area is consistent with the data in the surrounding area and an error in position even of that magnitude would not pose a hazard to navigation. Possible positional errors in other areas range from 1.5 to 3.5 meters, all within acceptable limits.

TP-00927 Class III registered shoreline manuscript was used to support the hydrography.

Date of Photography	June 1976
Date of Field Edit	None
Date of Final Compilation	August 1981
Date of Final Review	December 1982

TP-00927 was partially field edited in June, July and August of 1982. Corrections, deletions and additions were annotated on the Master Field Edit Print. However, the results of the field edit were only partially applied to the registered manuscript and a 1:10,000 enlargement copy of a Hydrographic Maintenance Print from the registered manuscript was provided. For smooth sheet plotting, the Hydrographic Maintenance Print was used as the source for positions while elevations of features were obtained from the Master Field Edit Print.

The following exposed reefs shown on the TP manuscript were found to be either submerged reefs or a covered rock:

<u>Feature</u>	<u>Latitude North</u>	<u>Longitude West</u>
subm. reef	57°26'57"N	156°07'25"W
rock covered one foot approximate center of	57°26'03.48"N	156°05'16.57"W
extensive submerged reef	57°24'51"N	156°10'11"W

### 3. HYDROGRAPHY

The depths obtained in the survey are adequate to draw the depth curves completely. To aid users of the survey, brown contours were used to emphasize soundings which cannot be delineated by standard or supplemental depth curves. The bottom configuration was adequately developed and least depths determined. Soundings at line crossings are generally in good agreement or within allowable differences.

There is no conflict between the hydrography and the supporting shoreline manuscript. The low water line and features seaward from the high waterline on the smooth sheet originate from the hydrography and the TP manuscripts except for changes indicated by the hydrographer.

### 4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records, Descriptive Report and special reports are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change Three except as noted in the Preprocessing Report, dated April 2, 1984, and:

The elevations of a few isolated bare rocks seaward of the low waterline shown on the TP manuscript were not determined by the hydrographer.

### 5. JUNCTIONS

Junctions have been adequately effected with the following surveys:

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Note</u>	<u>Junctions</u>
H-10025	1982	1:10,000	Joins	Southwest
H-10026	1982	1:10,000	Joins	Southwest
H-10040	1982-84	1:20,000	Joins	Southeast
H-10089	1983	1:10,000	Joins	Northwest
H-10108	1983	1:10,000	Joins	Northeast

#### 6. COMPARISON WITH PRIOR SURVEYS

H-4295 (1923) 1:20,000  
 H-4296 (1923) 1:20,000  
 H-4384 (1924) 1:20,000  
 H-4385 (1924) 1:20,000

Because of the lack of a NAD 27 grid adjustment on the prior surveys, comparison between the prior surveys with the present survey was accomplished by orienting the sheets relative to their topographic and/or hydrographic features. Soundings in this survey are generally either one fathom shallower or in agreement with the prior surveys, except a few soundings on H-4385 between latitude 57°24'37"N, longitude 156°01'53"W and latitude 57°25'04"N, longitude 156°01'57"W where soundings in the present survey are two to six fathoms shallower.

A line of ten rocks plotted on H-4296 between latitude 57°25'50"N, longitude 156°05'36"W and latitude 57°25'49"N longitude 156°05'59"W was not found in this survey. These same rocks inside a ledge are also shown on H-4385. These rocks are considered disproven by the present survey.

Some bare rocks shown in the prior surveys were found to be inside or immediately adjacent to the ledge limits of the present survey.

#### AWOIS Item #50273

The existence of the 15 fathom depth located at latitude 57°23'52"N, longitude 156°13'46"W on H-4295 has been disproven in this survey. This depth should be replaced by the depth obtained in the present survey. AWOIS lists the position of this sounding at latitude 57°23'03.00"N, longitude 156°13'30.00"W which has been determined to be incorrect and should be revised to 57°23'52"N, 156°13'46"W.

#### AWOIS Item #50275

This item is adequately discussed in Paragraph K of the Descriptive Report. The AWOIS listed position at latitude 57°24'10.00"N, longitude 156°16'55.00"W for the water passage between East Channel Island and Channel Rock is incorrect and should be revised to latitude 57°24'15"N, longitude 156°12'45"W.

A minimum depth of 20 fathoms is available through a 130 meter wide passage to Wide Bay between West Channel Island and Channel Rock. There is also a minimum depth of 10 fathoms that is available through a 350 meter wide passage to Wide Bay between Channel Rock and East Channel Island. Passage

through these channels requires local knowledge since there are no aids to navigation.

#### 7. COMPARISON WITH CHART

Chart 16570, 8th Edition, February 18, 1979

a. Hydrography - Most soundings and other hydrographic information on the portion of the chart covered by the survey originate from the prior surveys mentioned in section 6 of this report.

An extensive area inside the ten fathom depth curve at latitude 57°23'33"N, longitude 156°11'40"W shown as uncovered at low water on the chart was found to be covered with depths ranging from four to 12 fathoms. Another area at latitude 57°23'50"N between longitudes 156°12'36"W and 156°13'36"W shown on the chart as uncovered at half tide was found to be covered with depths ranging from one to 30 fathoms.

Charted rocks awash originating from unknown sources were determined to be parts of submerged reefs or located within or adjacent to foul limits.

Geographic names appearing on the smooth sheet originate from chart 16570.

H-10039 is adequate to supersede the charted hydrography within the area of common coverage.

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

c. Aids to Navigation - There are no fixed or floating aids to navigation within the limits of the survey.

#### 8. COMPLIANCE WITH INSTRUCTIONS

H-10039 complies adequately with the Project Instructions and changes to the instructions mentioned in section one of this report.

#### 9. ADDITIONAL FIELD WORK

This is a good basic hydrographic survey. No additional field work is required.

*Arsenio A. Luceno*  
Arsenio A. Luceno  
Cartographer

This survey has been examined by me and it meets the Charting and Geodetic Services survey standards and requirements for use in nautical charting except as noted in the Evaluation Report. The survey is recommended for approval.



Dennis Hill  
Chief, Hydrographic Section

ATTACHMENT TO DESCRIPTIVE REPORT FOR H-10039

I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. Except as noted in the Evaluation Report, the hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth sheet and digital data file for use in nautical charting.

David W. Leaper 6/18/85  
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWMordock

SIGNATURE AND DATE:

Samuel Mordock 6/19/85

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

Robert L. Saundt 6-19-85  
Director, Pacific Marine Center (Date)





