

H10767

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic.....
Field No. RA-10-21-97.....
Registry No. H-10767.....

LOCALITY

State Alaska.....
General Locality ... Southwest Alaska Peninsula ...
Sublocality Anguvik Island and Vicinity.....

1997

CHIEF OF PARTY

CAPT Alan D. Anderson, NOAA

LIBRARY & ARCHIVES

DATE JUL 1 1998.....

HYDROGRAPHIC TITLE SHEET

H-10767

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.

RA-10-21-97

State Alaska

General locality Southwest Alaska Peninsula

Locality Anguvik Island and Vicinity

Scale 1:10,000 Date of survey July 30 to August 24, 1997

Instructions dated 12/20/96, Change #1-6/3/97 Project No. OPR-P182-RA

Vessel NOAA Ship RAINIER Launches (2121), (2124), (2125), (2126)

Chief of party CAPT Alan D. Anderson, NOAA

Surveyed by CAPT A. Anderson, LT G. Noll, LT S. Lemke, LT D. Baird, LT JG S. Maenner, ST S. Baum, ST J. Cheech

Soundings taken by echo sounder, hand level, pole ~~hand level, pole~~ DSF-6000N, Knudsen 320M

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Evaluation by: R. Davies Automated plot by HP Design Jet 650C

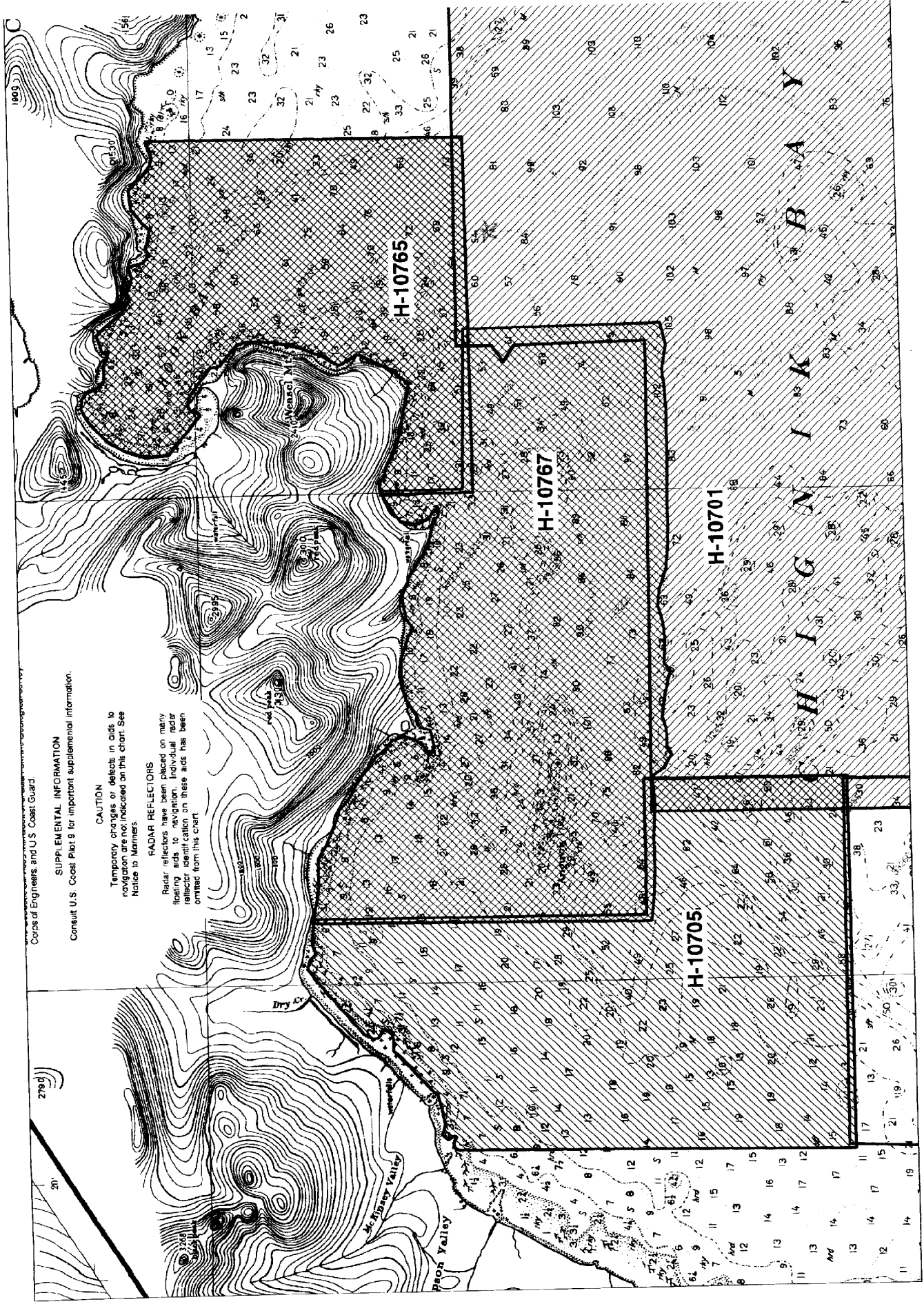
Verification by R. Davies

Soundings in fathoms ~~feet~~ at MLLW ~~MLLW~~ and tenths

REMARKS: Time in UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

All depths listed in this report are referenced to mean lower low water unless otherwise noted.

THURIS/SURF 6/23/98
mck



Corps of Engineers and U.S. Coast Guard.
 SUPPLEMENTAL INFORMATION
 Consult U.S. Coast Plot 9 for important supplemental information.

CAUTION
 Temporary changes or defects in aids to navigation are not indicated on this chart. See Notice to Mariners.

RADAR REFLECTORS
 Radar reflectors have been placed on many leading aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

279d

20

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

1960

PROGRESS SKETCH
 OPR.P182-RA-97
 SOUTHWEST ALASKA PENINSULA
 JULY-AUGUST 1997
 CAPT A. D. ANDERSON, NOAA
 COMMANDING
 CHART 16566

Downtime_Type	July	August
Weather - Hr	0	4
Mechanical -Hr	0	2
Electronic -Hr	0	2

Accomplished	July	August
LNM Hydro	2539.4	1732.6
LNM SSS	20.83	15.85
SQ NM	77.9	224.5
AWOIS Invest.	5	0
Other Invest.	1	8
LNM Multibeam	0	68.5

Sheet	Reg. No	Started	Percent	Completed	Submitted	SQNM
J	H-10761	7/10	100	8/2		29.3
K	H-10762	7/10	100	8/1		14.4
L	H-10765	7/19	100	8/20		12.6
M	H-10767	7/30	100	8/24		17.0
P	H-10760	7/14	100	8/19		13.8
S	H-10759	7/13	100	8/19		7.9
V	H-10701	7/24	100	8/25		16.0
Q	H-10768	8/5	100	8/22		11.4
X	H-10770	8/15	100	8/26		20.8

holidays in
 1996 work
 to be done in 1997

Additional lines

Sheet L
 12.6 sq nm
 100%

Sheet M
 17.0 sq nm
 100%

Sheet N
 14.4 sq nm
 100%

Sheet O
 11.4 sq nm
 100%

Sheet P
 13.8 sq nm
 100%

Sheet Q
 7.9 sq nm
 100%

Sheet R
 16 sq nm
 100%

Sheet S
 7.9 sq nm
 100%

Sheet T
 20.8 sq nm
 100%

Sheet U
 29.3 sq nm
 100%

Sheet V
 16 sq nm
 100%

Sheet W
 11.4 sq nm
 100%

Sheet X
 20.8 sq nm
 100%

Sheet Y
 29.3 sq nm
 100%

Sheet Z
 20.8 sq nm
 100%

Sheet AA
 11.4 sq nm
 100%

Sheet AB
 16 sq nm
 100%

Sheet AC
 7.9 sq nm
 100%

Sheet AD
 13.8 sq nm
 100%

Sheet AE
 17.0 sq nm
 100%

Sheet AF
 12.6 sq nm
 100%

Sheet AG
 14.4 sq nm
 100%

Sheet AH
 11.4 sq nm
 100%

Sheet AI
 20.8 sq nm
 100%

Sheet AJ
 29.3 sq nm
 100%

Sheet AK
 16 sq nm
 100%

Sheet AL
 7.9 sq nm
 100%

Sheet AM
 13.8 sq nm
 100%

Sheet AN
 17.0 sq nm
 100%

Sheet AO
 12.6 sq nm
 100%

Sheet AP
 14.4 sq nm
 100%

Sheet AQ
 11.4 sq nm
 100%

Sheet AR
 20.8 sq nm
 100%

Sheet AS
 29.3 sq nm
 100%

Sheet AT
 16 sq nm
 100%

Sheet AU
 7.9 sq nm
 100%

Sheet AV
 13.8 sq nm
 100%

Sheet AW
 17.0 sq nm
 100%

Sheet AX
 12.6 sq nm
 100%

Sheet AY
 14.4 sq nm
 100%

Sheet AZ
 11.4 sq nm
 100%

Sheet BA
 20.8 sq nm
 100%

Sheet BB
 29.3 sq nm
 100%

Sheet BC
 16 sq nm
 100%

Sheet BD
 7.9 sq nm
 100%

Sheet BE
 13.8 sq nm
 100%

Sheet BF
 17.0 sq nm
 100%

Sheet BG
 12.6 sq nm
 100%

Sheet BH
 14.4 sq nm
 100%

Sheet BI
 11.4 sq nm
 100%

Sheet BJ
 20.8 sq nm
 100%

Sheet BK
 29.3 sq nm
 100%

Sheet BL
 16 sq nm
 100%

Sheet BM
 7.9 sq nm
 100%

Sheet BN
 13.8 sq nm
 100%

Sheet BO
 17.0 sq nm
 100%

Sheet BP
 12.6 sq nm
 100%

Sheet BQ
 14.4 sq nm
 100%

Sheet BR
 11.4 sq nm
 100%

Sheet BS
 20.8 sq nm
 100%

Sheet BT
 29.3 sq nm
 100%

Sheet BU
 16 sq nm
 100%

Sheet BV
 7.9 sq nm
 100%

Sheet BV
 13.8 sq nm
 100%

Sheet BV
 17.0 sq nm
 100%

Sheet BV
 12.6 sq nm
 100%

Sheet BV
 14.4 sq nm
 100%

Sheet BV
 11.4 sq nm
 100%

Sheet BV
 20.8 sq nm
 100%

Sheet BV
 29.3 sq nm
 100%

Sheet BV
 16 sq nm
 100%

Sheet BV
 7.9 sq nm
 100%

Sheet BV
 13.8 sq nm
 100%

Sheet BV
 17.0 sq nm
 100%

Sheet BV
 12.6 sq nm
 100%

Sheet BV
 14.4 sq nm
 100%

Sheet BV
 11.4 sq nm
 100%

Sheet BV
 20.8 sq nm
 100%

Sheet BV
 29.3 sq nm
 100%

Sheet BV
 16 sq nm
 100%

Sheet BV
 7.9 sq nm
 100%

Sheet BV
 13.8 sq nm
 100%

Sheet BV
 17.0 sq nm
 100%

Sheet BV
 12.6 sq nm
 100%

Sheet BV
 14.4 sq nm
 100%

Sheet BV
 11.4 sq nm
 100%

Sheet BV
 20.8 sq nm
 100%

Sheet BV
 29.3 sq nm
 100%

Sheet BV
 16 sq nm
 100%

Sheet BV
 7.9 sq nm
 100%

Sheet BV
 13.8 sq nm
 100%

Sheet BV
 17.0 sq nm
 100%

Sheet BV
 12.6 sq nm
 100%

Sheet BV
 14.4 sq nm
 100%

Sheet BV
 11.4 sq nm
 100%

Sheet BV
 20.8 sq nm
 100%

Descriptive Report to Accompany Hydrographic Survey H-10767

Field Number RA-10-21-97

Scale 1:10,000

August 1997

NOAA Ship RAINIER

Chief of Party: Captain Alan D. Anderson, NOAA

A. PROJECT ✓

This hydrographic survey was completed as specified by Project Instructions OPR-P182-RA dated December 20, 1996, and change number 1 dated June 3, 1997. Survey H-10767 corresponds to sheet M as defined in the sheet layout. The purpose of this survey is to provide contemporary surveys for updating National Ocean Service (NOS) nautical charts. The majority of charted hydrography in the 1997 project area is from 1924 lead-line hydrographic surveys. Requests for hydrographic surveys and updated charts in this area have been received from a U.S. Senator, a U.S. Congressman, the United States Coast Guard (USCG), the commercial fishing industry, and NOAA.

B. AREA SURVEYED ✓ See Encl Rpt., Section B

The survey area is in Chignik Bay, along the southern coast of the Alaska Peninsula. The survey limits are $56^{\circ} 25' 00''$ N to the south; $158^{\circ} 18' 45''$ W to the west, the Alaska Peninsula to the north, and a line from the Peninsula at $158^{\circ} 10' 00''$ W to $56^{\circ} 26' 50''$ N, $158^{\circ} 10' 00''$ W to $56^{\circ} 26' 50''$ N, $158^{\circ} 06' 45''$ W to $56^{\circ} 25' 00''$ N, $158^{\circ} 06' 45''$ W on the east. Data acquisition was conducted from July 30 to August 24, 1997 (DN 211 - 236).

C. SURVEY VESSELS ✓

Data were acquired by RAINIER and her survey launches as noted in the Survey Information Summary included with this report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

All data were acquired and processed using the Hydrographic Data Acquisition and Processing System (HDAPS.) The final field sheet was generated using MapInfo (Version 4.1) and MapBasic software developed by N/CS32 and modified by RAINIER personnel. A complete listing of software for HDAPS is included in Appendix VI. *

E. SONAR EQUIPMENT ✓

Neither Side Scan Sonar nor multi-beam echo sounder equipment were used on this survey. *Correct*

F. SOUNDING EQUIPMENT

The Raytheon DSF-6000N is a dual frequency (100 kHz, 24 kHz), paper trace echo sounder. The Knudsen 320M is a dual frequency, thermal depth sounder using the same transducer frequencies. Serial numbers are included on the headers of the daily Raw Master Printouts. *No new problems, which affect survey data, were encountered. All soundings were acquired in meters using the High + Low, high frequency digitized setting. *Final plotted soundings have been shown on the smooth sheet in Fathoms.*

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Two sound velocity casts were used for this survey. Information on the casts is included in the Survey

Information Summary report. *Attached to this report.*

The sound velocity casts were acquired with SBE SEACAT Profiler (S/N 219), calibrated December 16, 1996. Velocity correctors were computed using the PC programs SEACAT and VELOCITY, version 3.3, in accordance with Hydrographic Survey Guideline (HSG) No. 69. A printout of the Sound Velocity Corrector Table used in the HDAPS Post Survey program is included in the "Separates to be Included with Survey Data, IV. Sounding Equipment Calibrations and Corrections". *

A static transducer depth was determined using FPM Fig 2.2 for vessels 2121-2126 in the spring of 1997. Settlement and squat correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2., using FPM Fig. 2.3, and are included with project data for OPR-P182-RA. The data for vessels 2121, 2122, 2123 were collected in Shilshole Bay, Washington in the Spring of 1997; data for vessels 2124 and 2126 were measured in the same location in Spring of 1996. The data for 2125 was collected near Scull Island, Alaska in March 1997. All offset tables* contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables 1-6 correspond to the last digit of the vessel number. Offset table 7 is for RAINIER. The offset tables are included with project data for OPR-P182-RA. The launches are not equipped with heave, roll and pitch sensors.

The Coastal and Estuarine Oceanography Branch (N/OES334) through N/CS31 provided predicted tides for the project on diskette for the Southwest Alaska Peninsula, West End, Sutwik Island, Alaska reference station (945-8665). HDAPS listings of the data used in generating tide corrector tables are included in Appendix V* of this report. Tidal correctors as provided in the project instructions for H-10767 are in the Survey Information Summary included with this report.

Sand Point, Alaska (945-9450) is the primary control station for datum determination at all subordinate stations. RAINIER personnel installed Sutron 8200 tide gages at Chignik, Anchorage Bay (945-8917) and Univikshak Island (945-8762) on July 9 and 12, 1997, and removed them on August 26th and 27th, respectively. Refer to the Field Tide Notes and supporting data in Appendix V* for individual gage performance and level closure information. This information has been forwarded to N/OES212 in accordance with HSG 50 and FPM 4.3. A request for approved tides was forwarded at the completion of the project to N/OES23. *Approved tide note, dated JAN 5, 1998 is attached to this report.*

H. CONTROL STATIONS *See Eval Rpt., section II.*

The horizontal datum for this project is NAD 83. Stations SHAK and ANG were recovered and used as primary hydrographic positioning control for the survey. The control stations used for this survey are listed in Appendix III. *See the OPR-P182-RA-97 Horizontal Control Report for more information.*
this report.

I. HYDROGRAPHIC POSITION CONTROL *See Eval Rpt., section I*

All soundings were positioned using differential GPS. Primary control was the VHF differential reference station at ANG. VHF differential station SHAK was used as a back up. The US Coast Guard Beacons at KODIAK and COLD BAY were used when the VHF stations were not usable. Launch-to-launch DGPS performance checks* were performed in accordance with Section 3.4.4 of the FPM. Two observations of position were made from two different DGPS base stations, ANG, SHAK and/or KODIAK and COLD BAY, while the launches were rafted together with their GPS antennae within 2-3 meters of each other. RAINIER also used SHIPDIM, version 2.2R (April 1996) with a Trimble Centurion P-code receiver and an Ashtech sensor (both differentially-corrected) to monitor the performance of the USCG Beacons. ANG and SHAK were compared to KODIAK during 8-hour daily comparisons and occasional performance checks. Some outliers were noted, but none indicated systematic or continuous errors in the KODIAK beacon. The SHIPDIM OUTLIER.SUM results are included in the project data for OPR-P182-RA.

J. SHORELINE *See Eval Report, section J*

The shoreline manuscript from Coastal Mapping survey CM-8309 was supplied by N/CS341 on stable base Mylar. Shoreline features were manually transferred from TP-00907 and TP-00905 to the boat sheets. Shoreline data was digitized in DXF by N/CS34 and registered in MapInfo by RAINIER personnel.

Limited shoreline verification was conducted in accordance with the Project Instructions. For this survey the general limit of safe navigation of a survey launch is 5-50 meters offshore of apparent low tide, generally 3-10 meters of depth at Mean Lower Low Water. Features shown on the SHORELINE NOTES layer in the MapInfo workspace inshore of the NALL are the hydrographer's representation of the shoreline while slowly transiting along the shore, and are intended to aid chart compilation. *Shoreline verification data was analyzed during office processing and shown on the smooth sheet as warranted.*

Shoreline manuscript and field features were compared to an enlargement of chart 16566 8th Edition, August 3, 1996 BSB version. This was converted to a raster image and registered in MapInfo, and plotted at survey scale by RAINIER personnel. There was general agreement between the charted and photogrammetric shoreline and what the hydrographer found on this survey, with the exception of the ledge* leading east from Anguvik Island - which proved to be larger than charted or presented on the manuscript shoreline. *Concur * The revision of this ledge has been shown on the smooth sheet based on the hydrographer's findings.*

The north shore of Chignik Bay was the majority of the shoreline on this survey, and is generally foul with rocks and thick kelp, as is the shoreline of Anguvik Island. The NALL accurately depicts the extent of the safely navigable water. *Concur*

K. CROSSLINES ✓

Crosslines agreed within 1 meter with mainscheme hydrography. There was a total of 28.84 nautical miles of crosslines, comprising 8.4% of mainscheme hydrography.

L. JUNCTIONS *See Eval Report, section L*

This survey junctions with H-10705, 1:10,000, 1996 to the west, H-10701, 1:20,000, 1996 to the south and east, and H-10765, 1:10,000, 1997 to the northeast. Soundings on these surveys were found to be in agreement within 2 meters. Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after reduction to final vertical datum.

M. COMPARISON WITH PRIOR SURVEYS *See Eval Report, section M*

Prior surveys H-4427 (1:20,000, 1924) and H-4449 (1:60,000, 1924) compare favorably with H-10767. Due to modern survey techniques and positioning systems there were numerous instances where H-10767 revealed shallower depths than survey H-4427. Comparing current survey depths with survey H-4449 show agreement between the two surveys to be within 2 fathoms. The differences between the current survey and H-4427 are listed below in the following two tables.

There are six features that are not similarly depicted in H-10767 and H-4427. *Concur ** Two shoals east of the Anguvik ledge found during H-10767 were not found during H-4427. Three rocks west of Anguvik Island surveyed during H-4427 were searched for twice but not found during H-10767. The search time varied between 10 and 20 minutes, in a radius of 200 to 300 meters, in water depths of 5 to 25 meters, with water visibility of at least three meters. The two shoreline verifications conducted at Anguvik Island resulted in several duplicate fix positions on the same feature.

** These three prior rocks fall in depths of 2.7-13.7 fathoms on the present survey. It is very likely these rocks were shown on the prior survey to portray the foul nature of the area and not isolated prominent pinacles. Additionally, these prior rocks were likely positioned as approximate in warning the mariner about the foul nature offshore of Anguvik Island.*

H-4427 Feature	H-10767 Feature	Position	Depth		Fix Number
None	Shoal	56° 25' 56.766" N 158° 14' 51.965" W	7.6 m	4.2 fm ✓	10576.4
None	Shoal	56° 25' 51.506" N 158° 14' 57.358" W	5.5 m 45.6	3.8 fm 25.5 m*	10563.6
Rock	None	56° 26' 13.308" N 158° 17' 16.296" W	5.7 m	3.4 fm 6	10001 50721
Rock	None	56° 26' 10.284" N 158° 17' 19.068" W	20.6 m	11.3 fm 3	10003 50722
Rock	None	56° 26' 13.056" N 158° 17' 24.360" W	20.1 m	11.8 fm	10004 50720
None	Rock	56° 27' 37.944" N 158° 12' 20.556" W	0.7 m	0.4 fm 0.5 RK	50291

* Revised to 25 Fathoms. See danger letter dated April 22, 1998 (attached)

Below are a sample of compared soundings, between prior survey H-4427 and the current survey.

H-4427 Depth (fm)	H-10767 Depth (fm)	Position	H-10767 Fix #
55	48.40	56° 25' 51.798" N 158° 17' 03.601" W	40053.03
18	19.1 ✓	56° 27' 20.366" N 158° 17' 55.940" W	41115.08
64	56.30	56° 25' 06.197" N 158° 17' 40.449" W	10203.07
82	73.30	56° 25' 08.582" N 158° 15' 44.059" W	10371.07
75	71.80	56° 25' 28.353" N 158° 16' 07.638" W	10346.04
101	94.0 93.5	56° 25' 39.680" N 158° 14' 46.153" W	10587.01
24	22.40	56° 26' 26.259" N 158° 16' 25.169" W	10464.01
38	29.30	56° 26' 43.478" N 158° 16' 07.687" W	10444.08
31	29.5 30.0	56° 26' 27.057" N 158° 17.41.100" W	10209
35	31.7 32.0	56° 26' 50.618" N 158° 16' 39.796" W	60167.04
57	43.20	56° 26' 21.238" N 158° 14' 52.123" W	10578
24	20.8 21.0	56° 26' 11.236" N 158° 09' 39.510" W	10870.03
44	38.30	56° 26' 24.209" N 158° 08' 35.032" W	40023.05

Final comparisons will be performed at the Pacific Hydrographic Branch (PHB) after final tides have been applied to H-10767.

N. ITEM INVESTIGATIONS ✓

No AWOIS items were located within H-10767 survey area. *Concur*

O. COMPARISON WITH THE CHART See Eval Rpt., Section O.

Chart 16566, 1:77,477, 8th Edition, 8/3/96 is the largest scale chart covering the survey area. Soundings from this survey are in agreement or shoaler than charted soundings, with one exception. The current survey found a depth of 44.3 fathoms at 56° 25' 53.180" N 158° 17' 35.133"W, and survey H-4427 indicates a depth of 43 fathoms (fix numbers 10219.03 and 40f, respectively), but the chart shows a depth of 29* fathoms. There are also five discrepancies between charted and H-10767 features, as noted in Section M. The hydrographer recommends that all charted soundings and features within the survey area be superseded by H-10767. * 29 fathom depths exist approximately 100 meters north on the present survey. CONCUR

Non-sounding features are discussed in Section J. Final sounding comparisons will be made at PHB after reduction to final vertical datum.

Dangers to Navigation See Eval Report section O.b.

One danger to navigation* was reported to the 17th Coast Guard by the hydrographer. The chart adequately depicts the foul nature of the inshore areas of the mainland, but not east of Anguvik Island. A new shoal was found and developed with 10 meter spacing, 500 meters from the charted eastern end of Anguvik Island reef, a 3.5 fathom sounding offshore of a charted 13 fathom. Copies of the reports are attached. * The reported 3 fathom sounding was evaluated during office processing and found to be incorrect. The new shoal, 4.2 fathoms, was reported as a danger to navigation during office processing.

P. ADEQUACY OF SURVEY

Survey H-10767 is complete and adequate to supersede prior soundings and features. CONCUR

Q. AIDS TO NAVIGATION ✓

There were no aids to navigation within the survey area. CONCUR

R. STATISTICS ✓

This survey contained 24,057 selected soundings, additional statistics are listed in the Survey Information Summary included with this report.

S. MISCELLANEOUS ✓

Bottom samples were collected and sent to the Smithsonian in accordance with Project Instructions. No unusual tidal currents or magnetic variations were found during this survey.

T. RECOMMENDATIONS

The hydrographer recommends adding a large vessel anchorage symbol to the chart, 0.95 nautical mile northwest of Anguvik Island. The evaluator recommends Marine Chart Division CONCUR Consider this addition to the next chart edition.

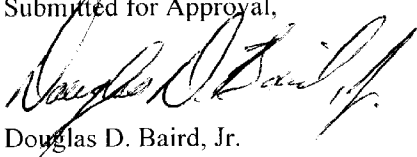
U. REFERRAL TO REPORTS ✓

The following supplemental reports contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
OPR-P182-RA Horizontal Control Report	October 1997	N/CS34
OPR-P182-RA 1997 Coast Pilot Report	September 1997	N/CS26
Project related data for OPR-P182-RA	Incremental	N/CS34
Secchi Disk Observations for OPR-P182-RA	September 1997	N/CS31

OPR-P182-RA	H-10767	RA-10-21-97
-------------	---------	-------------

Submitted for Approval,



Douglas D. Baird, Jr.
Lieutenant, NOAA

Approved and Forwarded,



Alan D. Anderson
Captain, NOAA
Commanding Officer

APPROVAL SHEET

for

H-10767

Standard field surveying and processing procedures were followed in producing this examination in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1994.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

DATE: October 1, 1997

Approved and Forwarded,



Alan D. Anderson
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

Survey Information Summary

Project: OPR-P182-97 **Project Name:** SW ALASKA PENINSULA - YEAR 2
Instructions Dated: 5/15/96 **Project Change Info:**

Change #	Dated
1	6/3/97

Sheet Letter: M **Registry Number:** H-10767
Sheet Number: RA-10-21-97

Survey Title: VICINITY OF ANGUIK ISLAND

Data Acquisition Dates: **From:** 30-Jul-97 211 **To:** 24-Aug-97 236

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2120							1	
2121	3	1		1	1	1		
2124	9	8	4	2	2	2		
2125	3	3	1		4	4	2	
2126		1	1			1		

Sound Velocity Cast Information

Launch Table #	Ship Table #	Cast DN	Max Depth	Position	Applicable DN
4	0	211	205.2	56/25/27 158/09/14	DN 211-

Tide Zone Information

Zone #	Time Corr.	Height Corr.
SAP8	000 hr 00 min	X0.96

Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
945-8762	UNAVIKSHAK IS	7/9/97	8/27/97
945-8917	ANCHORAGE BAY	7/12/97	8/26/97

Statistics Summary

Type	Total:
BS	38
DEV	5.19
DP	19
MS	344
S/L	14.52
SPLIT	181.79
XL	28.84

Percent XL: 8.4%

SQNM: 17

CONTROL STATIONS as of 3 Oct 1977

No	Type	Latitude	Longitude	U Code	Freq	Vel Code	HR/DC/PA	Station Name
001	B	08e10+09.71e	157+45+12.024	161	250	0.0	00/00/07	CHAK
002	G	05e+28+0e.935	175+10+10.000	55	070	0.0	00/00/07	ANS
100	B	057+37+07.900	182+11+01.000	0	050	0.0	00/00/07	COBIAN 313 140 USCG DGPS
101	B	085+09+30.000	162+31+50.000	0	050	0.0	00/00/07	COLO BAY 137 142 USCG DGPS
102	B	070+21+50.000	170+50+10.000	010	050	0.0	00/00/07	ANS
103	B	03e+18+04.000	170+13+01.000	04	050	0.0	00/00/07	COLOMAN 137



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

NOAA Ship RAINIER
August 28, 1997

Commander (mon)
Seventeenth Coast Guard District
Post Office Box 25517
Juneau, Alaska 99802-5517

**ADVANCE
INFORMATION**

Dear Sir:

The following dangers to navigation should be included in the Local Notice to Mariners. They were positioned by the NOAA Ship RAINIER while conducting hydrographic surveys in the vicinity of Chignik Bay, Alaska. The dangers are shown on the three pages of attached chartlet and affect chart 16566, 8TH ED., 96/08, 1:77,477, NAD 83. Depths of features are referenced to Mean Lower Low Water using predicted tides.

FEATURE	DEPTH (Fathoms)	LATITUDE (N)	LONGITUDE (W)	POSITION	Depth (Meters)	Survey Number
Shoal	8 ¾	56:21:02.864	157:47:54.013	"10511+3"	16.1	H-10770
Shoal	4 ¾	56:20:56.574	157:54:28.371	"20031+6"	8.9	""
Shoal	3 ¼	56:21:03.582	157:48:16.931	"10521+4"	6.2	""
Shoal	7 ¾	56:20:14.131	158:23:47.644	"20999+4"	14.3	H-10759
Rock	5 ¾	56:21:45.730	158:25:05.943	"60000+0"	10.8	H-10760
Rock	5 ¾	56:22:36.980	158:23:54.010	"60479+0"	10.8	""
Rock	5 ½	56:22:13.660	158:25:48.307	"60480+0"	10.3	""
Rock	2 ½	56:24:49.525	158:24:13.456	"60514+0"	4.8	""
Rock	1 ¾	56:23:35.287	158:26:00.622	"60515+0"	3.4	""
Rock	1 ½	56:26:12.124	158:24:02.193	"60482+0"	3.1	""
Shoal	3	56:25:51.506	158:14:57.358	"10563+6"	5.5	H-10767 ✓
Shoal	4	56:30:20.082	158:02:56.410	"30303+6"	7.8	H-10765
Shoal	7 ¾	56:26:07.352	157:48:41.918	"10082+1"	14.6	H-10761

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-P182-RA-97 and Danger to Navigation message RA-5-97. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

Sincerely,

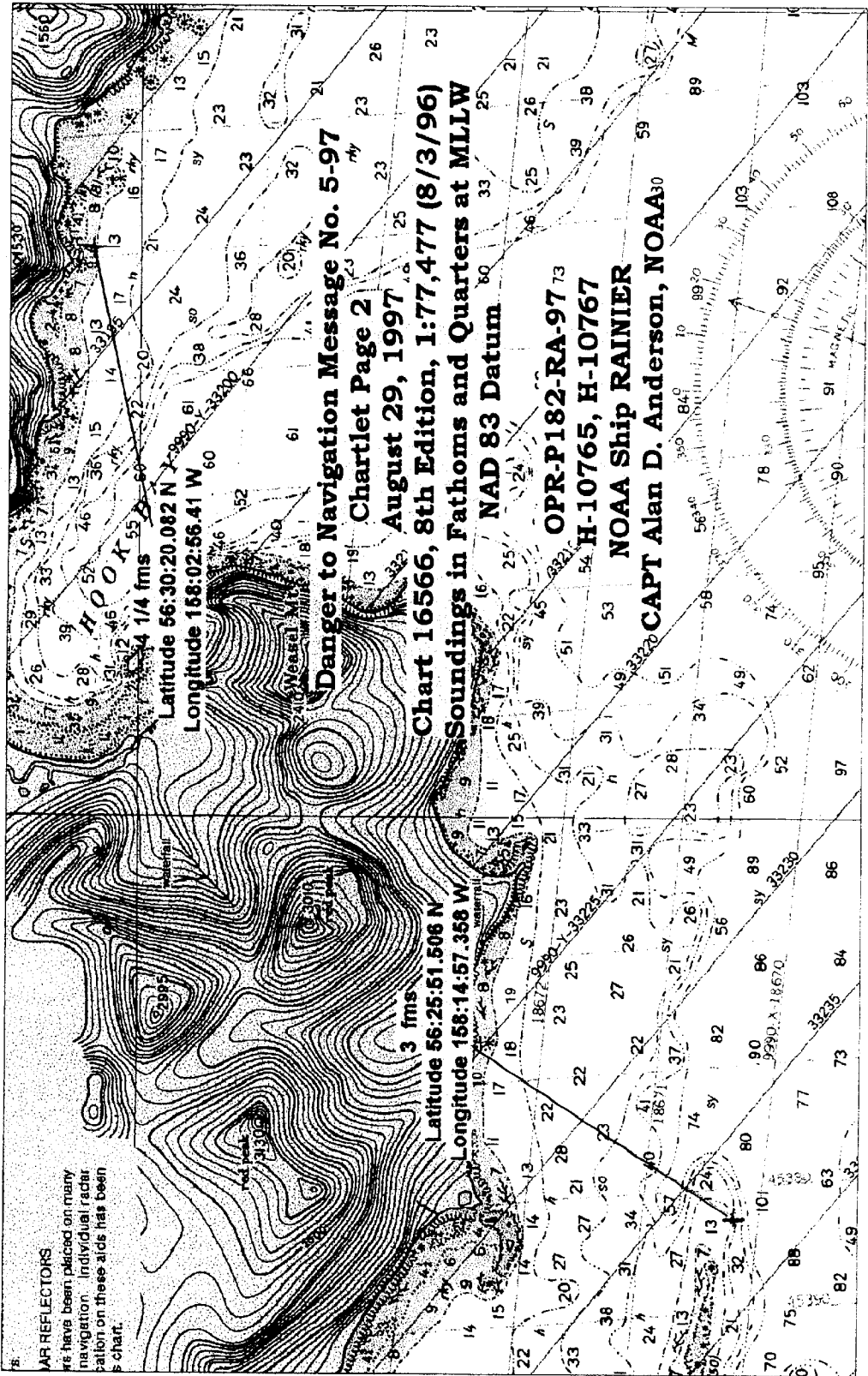
Alan D. Anderson

Alan D. Anderson
Captain, NOAA
Commanding Officer

Attachment

cc: NIMA
PMC
N/CS261
N/CS34





AIR REFLECTORS
 have been placed on many
 navigation. Individual factor
 on these aids has been
 chart.

Latitude 56:30:20.082 N
 Longitude 158:02:56.41 W

Danger to Navigation Message No. 5-97

Chartlet Page 2

August 29, 1997

Chart 16566, 8th Edition, 1:77,477 (8/3/96)

Soundings in Fathoms and Quarters at MLLW

NAD 83 Datum

OPR-P182-RA-97 73

H-10765, H-10767

NOAA Ship RAINIER

CAPT Alan D. Anderson, NOAA30

ADVANCE
 INFORMATION



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
Seattle, Washington 98115-0070

April 23, 1998

**ADVANCE
INFORMATION**

Commander (OAN)
Seventeenth Coast Guard District
P.O. Box 25517
Juneau, AK 99802

Dear Sir:

During office review of hydrographic survey H-10767, Alaska, Southwest Alaska Peninsula, Vicinity of Anguvik Island two additional shoal soundings were found and are considered to be a potential danger to navigation. Also, a 3 fathom depth which was reported by the NOAA Ship RAINIER as a potential danger to navigation on August 28, 1997, was found to be a 25 fathom depth after further review and therefore considered not to be a danger to navigation.

It is recommended that the enclosed Report of Dangers to Navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6836.

Sincerely,

A handwritten signature in cursive script that reads "Kathy A. Timmons".

Kathy A. Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Enclosure

cc: NIMA
NCS/261



REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H-10767

Survey Title: State: ALASKA
 Locality: SOUTHWEST ALASKA PENINSULA
 Sublocality: VICINITY OF ANGUIK ISLAND

Project Number: OPR-P182-RA, NOAA Ship Rainier

Survey Date: JULY 30 - AUGUST 24, 1997

Soundings are reduced to Mean Lower Low Water using approved tides and are positioned on NAD 83.

Chart affected: 16566 8TH Edition/August 3, 1996, scale 1:77,477, NAD 83

<u>DANGER TO NAVIGATION</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
Erroneous 3 fathom depth	56/25/51.50	158/14/57.36
4 1/4 fathoms	56/25/56.76	158/14/51.96
2 1/4 fathoms	56/27/59.80	158/15/47.27

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206)526-6836.

floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

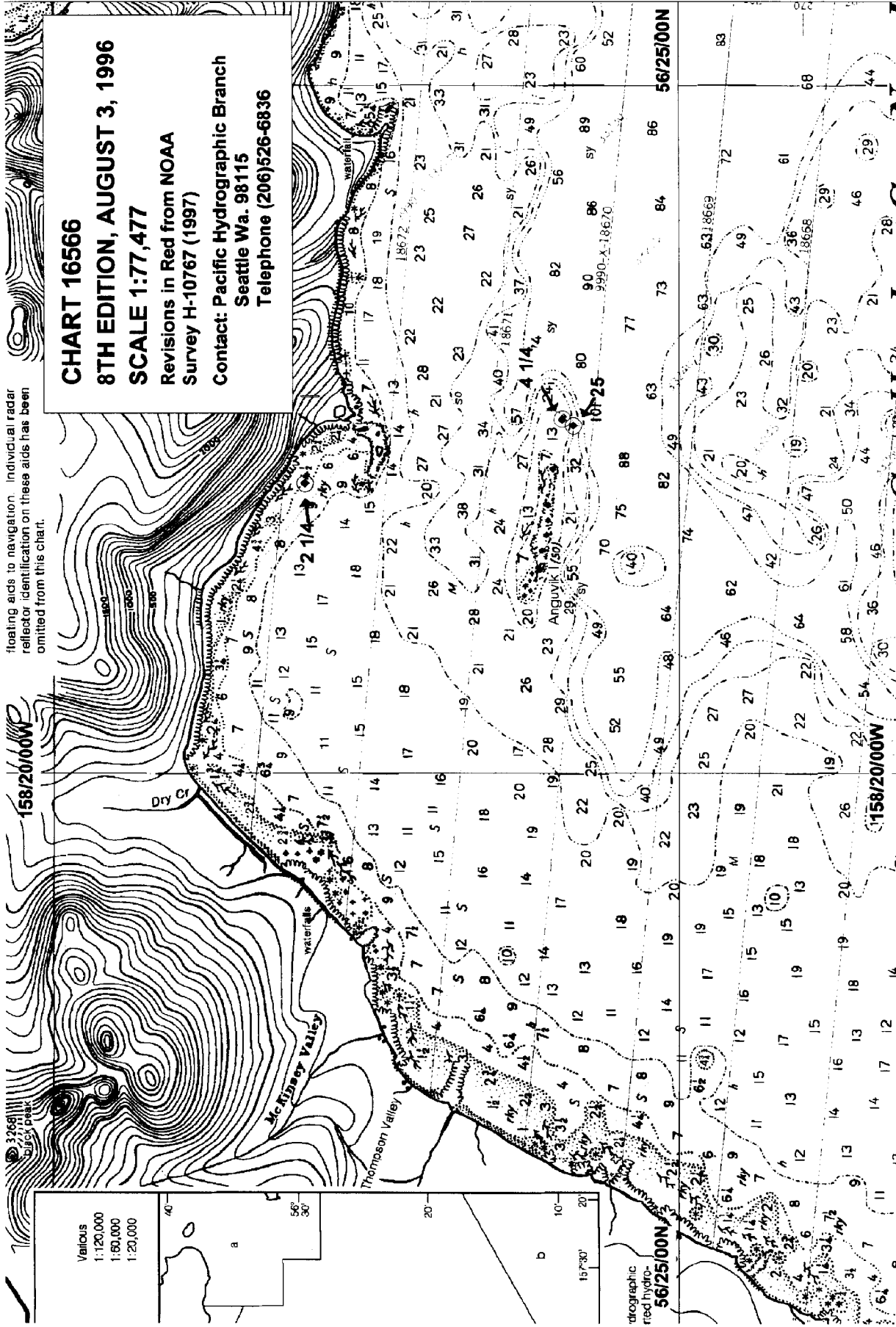
CHART 16566

8TH EDITION, AUGUST 3, 1996

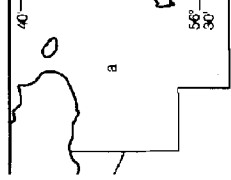
SCALE 1:77,477

Revisions in Red from NOAA
Survey H-10767 (1997)

Contact: Pacific Hydrographic Branch
Seattle Wa. 98115
Telephone (206)526-6836



Various
1:120,000
1:60,000
1:20,000



hydrographic
red hydro-
56/25/00N
56/25/00N

ADVANCE INFORMATION



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: January 5, 1998

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P182-RA
HYDROGRAPHIC SHEET: H-10767

LOCALITY: Southwest Alaska Peninsula

TIME PERIOD: Jul 30 - Aug 24, 1997

TIDE STATION USED: 945-8762 Unavikshak Island, AK.
Lat. 56° 29.5'N Lon. 157° 44.4'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.519 meters

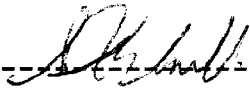
TIDE STATION USED: 945-8849 Chankluit Island, AK.
Lat. 56° 08.8'N Lon. 158° 06.4'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.367 meters

TIDE STATION USED: 945-8917 Chignik, Anchorage Bay, AK.
Lat. 56° 17.8'N Lon. 158° 24.0'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.486 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SAP7, SAP8 & SAP11
Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (Meters), relative to MLLW and on Greenwich Mean Time.

Note 2: Use tide data from the appropriate station for each zone according to the order in which they are listed in the "Tidezone" corrector files. For example, tide station one (TS1) would be the first choice for an applicable zone followed by TS2, etc. when data are not available. All zones within a survey sheet may not have the same order of applicable tide stations.



CHIEF, OPERATIONAL ANALYSIS BRANCH



GEOGRAPHIC NAMES

H - 10767

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST			
ALASKA (title)	X										1
ALASKA PENINSULA (title)	X										2
ALASKA PENINSULA	X		X								3
ANGUVIK ISLAND	X		X								4
CHIGNIK BAY	X		X								5
											6
											7
											8
											9
											10
											11
											12
											13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25

Dennis J. Kennedy
Chief Geographer

FEB - 6 1998

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

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

SHORELINE DATA

SHORELINE MAPS (List): **TP-00905 and TP-00907**

PHOTOBATHYMETRIC MAPS (List): **NA**

NOTES TO THE HYDROGRAPHER (List): **NA**

SPECIAL REPORTS (List): **NA**

NAUTICAL CHARTS (List): **Chart 16556 9th Edition, August 3, 1996**

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			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION VERIFICATION			
COMPILATION OF SMOOTH SHEET	89		89
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		20	20
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS	89	20	109

Pre processing Examination by M. Bigelow	Beginning Date 11/5/97	Ending Date 12/4/97
Verification of Field Data by D. Doles, M. Bigelow, R. Mayor, R. Davies	Time (Hours) 89	Ending Date 4/13/98
Verification Check by B. Olmstead	Time (Hours) 5	Ending Date 5/1/98
Evaluation and Analysis by R. Davies	Time (Hours) 20	Ending Date 4/22/98
Inspection by B. Olmstead	Time (Hours) 8	Ending Date 5/8/98

EVALUATION REPORT

H-10767

A. PROJECT

The hydrographer's report contains a complete discussion of the Project information.

B. AREA SURVEYED

The survey area is adequately described in the hydrographer's report. A page-size plot of the charted area depicting the limits of supersession accompany this report as Attachment 1.

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line throughout the survey area. Charted features and soundings inshore of this limit line have not been specifically addressed during survey operations and should be retained as charted.

The bottom consists mainly of sand, mud and shells. Depths range from 0 to 106 fathoms.

C. SURVEY VESSELS

The hydrographer's report contains information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using the same Hydrographic Data Acquisition/Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS), and MicroStation 95.

Digital data for this survey exists in the standard HPS format, that is a database format using the .dbf extension. In addition, the smooth sheet drawing is filed in the MicroStation format, i.e., dgn (extension). Copies of these files will be forwarded to the Hydrographic Surveys Division and a backup copy will be retained at PHB. Database records forwarded are in the Internal Data Format (IDF) and are in compliance with specifications in existence at the time of survey processing.

The drawing files necessarily contain information that is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The data is plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Neither side scan sonar nor multibeam echo sounder operations were conducted on survey H-10767.

F. SOUNDING EQUIPMENT

Sounding equipment has been adequately addressed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

The sounding data have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, dynamic draft, and sound velocity. These reducers have been reviewed and are consistent with NOS specifications.

Predicted tides were used for reduction of soundings during field processing. During office processing, tide reductions were derived from approved hourly heights zoned direct from Chignik, Anchorage Bay, gage 945-8917. The tide gage at Unavikshak Island was not used for final reduction of sounding data due to an inoperable tide gage. This gap in corrector values from August 3 at 220600 to August 6 at 204200 coincides with times of data collection.

H. CONTROL STATIONS

Section H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD 27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections

Latitude:	-2.787 seconds	(-86.215 meters)
Longitude:	7.357 seconds	(126.039 meters)

The year of establishment of control stations originate with the horizontal control records for this survey.

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 meters was computed for survey operations. The quality of several positions exceeds limits in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data, however, suggests that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable. DGPS performance checks were conducted in the field and found adequate.

NAD 83 is used as the horizontal datum for plotting and position computations.

Additional information concerning calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Shoreline from TP-00907 and TP-00905 has been shown in black on the smooth sheet. TP-00907 and TP-00905 are class III shoreline maps at a scale of 1:20,000, with a date of photography of July 1987, and have been compiled on NAD83. Shoreline drawn on the smooth sheet originates from a digital file created by the Pacific Hydrographic Branch. The shoreline map and the results of the fieldwork as portrayed on the smooth sheet should supersede charted shoreline.

K. CROSSLINES

Crosslines are discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10767 junctions with the following surveys:

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10701	1996	1:20,000	South
H-10705	1996	1:10,000	West
H-10765	1997	1:10,000	East

The junction with survey H-10765 is complete. A "Joins" note has been added to the smooth sheet where applicable. The junctions with surveys H-10701 and H-10705 were not formally completed since these surveys were previously processed and forwarded for charting. However, depths are in good agreement within the common area. An "Adjoins" note has been added to the smooth sheet. Portions of the depth curves on surveys H-10071 and H-10705 should be adjusted to conform to those shown on survey H-10767. A few soundings from surveys H-10765, H-10701 and H-10705 have been transferred within the common areas of the present survey to better delineate the bottom configuration.

M. COMPARISON WITH PRIOR SURVEYS

H-4427(1924) 1:20,000
H-4449 (1924) 1:20,000

Prior surveys H-4427 and H-4449 cover the entire area of the present survey. Sounding agreement is fair with the present survey depth generally shoaler between 1 and 5 fathoms. A few larger differences of up to 9 fathoms were noted. The present survey reveals a consistent pattern of shoaler depths than collected in 1924. This is reflected in the standard depth curves that show a movement seaward of approximately 50 to 100 meters. These differences may be attributed to greater sounding coverage, improved positioning and sounding methods and relative accuracy of the data acquisition techniques.

Survey H-10767 is adequate to supersede the prior surveys within the common area.

N. ITEM INVESTIGATIONS

There were no AWOIS items assigned to this survey.

O. COMPARISON WITH CHART

Survey H-10767 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
16566	9th	Aug. 3, 1996	1:10,000	NAD83

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys. The prior surveys have been adequately addressed in section M and require no further discussion.

The application of this survey to charts of a scale greater than 1:40,000 may require the generalization of features such as ledges, and reefs. The recommended charting disposition of specific ledges or reefs is their depiction as isolated rocks. The application of this survey to charts of a scale less than 1:40,000 may be accomplished without generalization of features.

Survey H-10767 is adequate to supersede charted hydrography within the charted area.

b. Dangers To Navigation

One danger to navigation was discovered during survey operations and reported to the USCG on August 28, 1997. After a review of this danger it was found to be an erroneous depth. A danger to navigation letter was generated during office processing to change this incorrect reported danger and report two additional dangers. Copies of both of these reports are attached.

P. ADEQUACY OF SURVEY

Hydrography contained on survey H-10767 is adequate to:

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

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, April 1994 Edition, with the exception of the following.

In the event that the field units submission of survey data will exceed four weeks from the completion of field work, the Chief of Party will submit a written explanation for the delay indicating the anticipated transmittal date to the Chief of the appropriate processing section. Marine Center ships will forward their explanation through the Marine Center Director. Fieldwork for survey H-10767 was completed on August 24, 1997 but not transmitted for office processing until October 27, 1997.

Q. AIDS TO NAVIGATION

There are no fixed and floating aids to navigation within the survey area.

There were no features of landmark value located within the area of this survey.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS


Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is a good hydrographic survey. No additional work is recommended.

U. REFERRAL TO REPORTS

Referral to reports is discussed in the hydrographer's report.


Charles R. Davies
Cartographer

APPROVAL SHEET
H-10767

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Bruce A. Olmstead Date: 5/11/98
Bruce A. Olmstead
Senior Cartographer, Cartographic Section
Pacific Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Kathy Timmons Date: 5/21/98
Kathy Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Andrew A. Armstrong III Date: July 2, 1998
Andrew A. Armstrong III
Captain, NOAA
Chief Hydrographic Surveys Division

For identification on these aids has been
ed from this chart.

