

10391

Diagram No. 8861-2

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. .... RA-5-4-91  
Office No..... H-10391

LOCALITY

State ..... Alaska  
General Locality .. Captains Bay  
Sublocality ..... Port Levashef to Arch Rock

19 91

CHIEF OF PARTY  
CAPT T.W. Richards

LIBRARY & ARCHIVES

DATE ..... May 11, 1993

10391

P/L  
PRODUCTS

16530  
16529  
16528  
16500  
16520  
16011  
CP9  
16522-NC  
16006-NC

H-10391

**HYDROGRAPHIC TITLE SHEET**

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-5-4-91

State Alaska

General locality Captains Bay

Locality Port Levashef to Arch Rock

Scale 1:5,000 Date of survey August 7-20, 1991

Instructions dated May 29, 1991 Project No. OPR-Q181-RA

Vessel NOAA Ship RAINIER, Launches RA-4(2124), RA-5(2125), and RA-6(2126)

Chief of party CAPT Thomas W. Richards, NOAA

Surveyed by LT D. Cole, LTJG E. Nelson, LTJG C. Ward, ENS H. Johnson, ENS J. Klay,  
and ENS R. Ramos

Soundings taken by echo sounder, hand lead, ~~none~~ DSF-6000N

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Verification by: Thelma Jones, Matthew Sanders Automated plot by PHS Xynetics Plotter

Evaluation by: I. Almacen

Soundings in ~~fathoms~~ ~~feet~~ ~~MLW~~ meters at MLLW and decimeters

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

*Surf and Awaits 7/2/93 MCR*

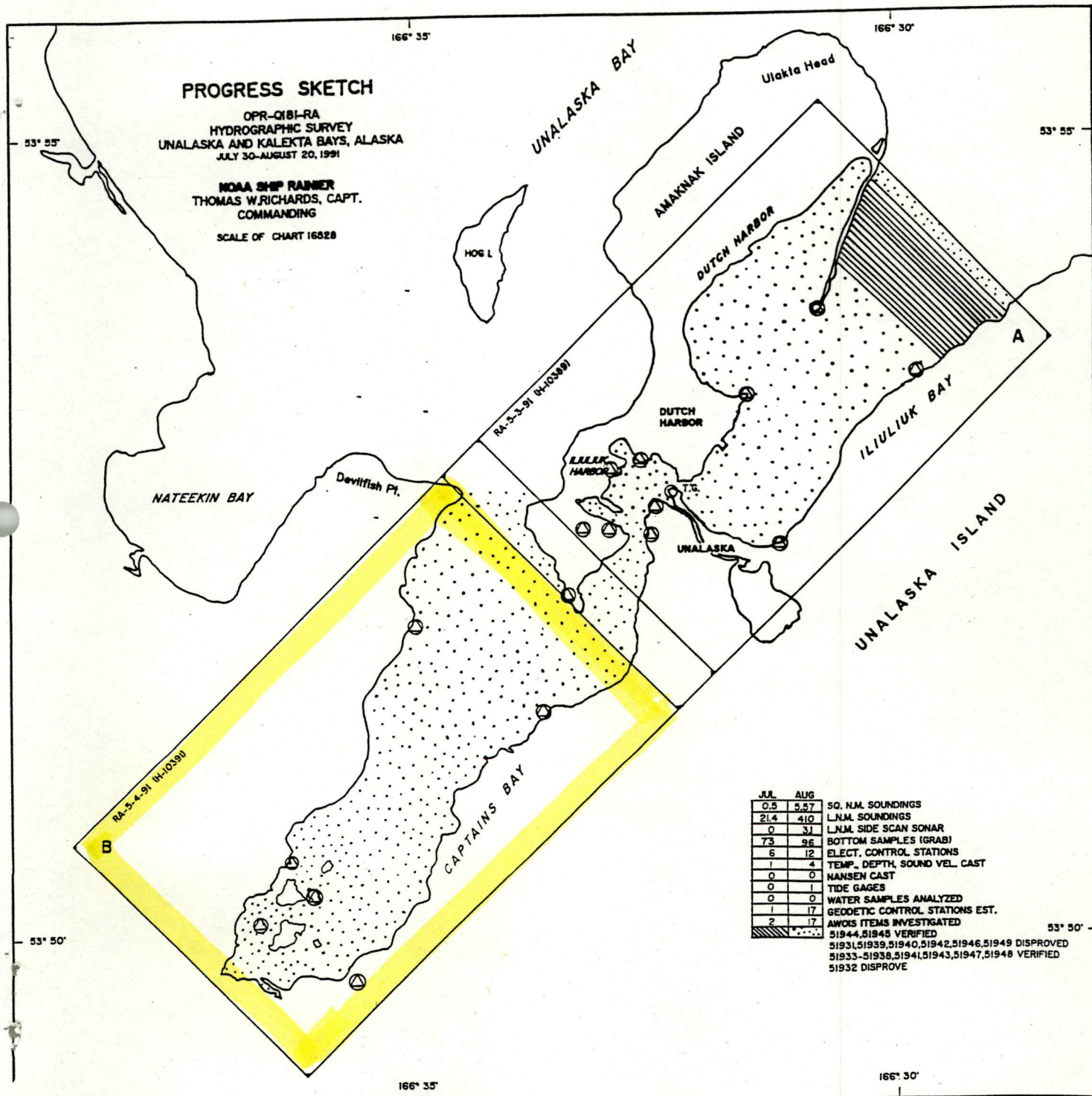
*SL* JAN 29 1997

**PROGRESS SKETCH**

OPR-QIBI-RA  
HYDROGRAPHIC SURVEY  
UNALASKA AND KALEKTA BAYS, ALASKA  
JULY 30-AUGUST 20, 1991

NOAA SHIP RAINIER  
THOMAS W. RICHARDS, CAPT.  
COMMANDING

SCALE OF CHART 16528



JUL	AUG	
0.5	9.57	SQ. N.M. SOUNDINGS
21.4	410	L.N.M. SOUNDINGS
0	31	L.N.M. SIDE SCAN SONAR
73	96	BOTTOM SAMPLES (GRAB)
6	12	ELECT. CONTROL STATIONS
1	4	TEMP., DEPTH, SOUND VEL. CAST
0	0	NANSEN CAST
0	1	TIDE GAGES
0	0	WATER SAMPLES ANALYZED
1	17	GEODETIC CONTROL STATIONS EST.
2	17	AWOIS ITEMS INVESTIGATED
		51944, 51945 VERIFIED
		51931, 51939, 51940, 51942, 51946, 51949 DISPROVED
		51933-51938, 51941, 51943, 51947, 51948 VERIFIED
		51932 DISPROVE

# Descriptive Report to Accompany Hydrographic Survey H-10391

Field Number RA-5-4-91

Scale 1:5,000

July-August 1991

NOAA Ship RAINIER

Chief of Party: Captain Thomas W. Richards

## A. PROJECT

This basic hydrographic survey was completed in Unalaska, in the Aleutian Islands, Alaska as specified by Project Instructions OPR-Q181-RA dated May 29, 1991, Change No. 1 dated June 17, 1991, and Change No. 2 dated July 12, 1991. This survey is designated Sheet B on the sheet layout dated July 3, 1991. ✓

This project will provide contemporary hydrography for Unalaska and Kalekta Bays, Alaska, and their immediate approaches. The majority of charted soundings and rocks originate from surveys performed approximately 50 to 60 years ago. The port of Unalaska/Dutch Harbor is continuing to expand as the area is strategically located in one of the world's richest fisheries. Updated charts are required as a result of this growth. Requests for hydrographic surveys have been received from the United States Coast Guard, Defense Mapping Agency, National Marine Fisheries Service, and the Alaska Marine Pilots. ✓

## B. AREA SURVEYED

The survey, located in Unalaska Island, Alaska, encompasses Captains Bay which is directly southwest of the city of Unalaska. To the north, the survey encompasses the area south of  $53^{\circ}52'50''\text{N}$  and the area west of  $166^{\circ}33'50''\text{W}$ . The northeastern limit is  $53^{\circ}52'00''\text{N}$ . Data acquisition was conducted from August 7 through August 20, 1991 (DN 219 to 232). ✓  
 $166^{\circ}32'45''$

## C. SURVEY VESSELS

All data were acquired by NOAA Ship RAINIER's three automated survey launches shown below:

<u>Vessel</u>	<u>EDP No.</u>	<u>Operation</u>
RA-4	2124	Sounding Operations Range/Azimuth Hydro Shoreline Verification
RA-5	2125	Sounding Operations Shoreline Verification Velocity Casts Bottom Samples
RA-6	2126	Dive Operations

 ✓

In addition to the survey vessels listed above, two 17' Boston Whalers, a 19' MonArk, and a 12' Zodiac were used to support operations for horizontal control, diving, and range/azimuth hydrography. ✓

#### D. AUTOMATED DATA ACQUISITION AND PROCESSING

Data acquisition and processing were accomplished with Hewlett-Packard (HP) 340M workstations and the following HDAPS programs:

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
SURVEY	6.04	12 Jul 1991
POSTSUR	5.14/5.16/5.17	12 Jul, 8 Aug, 16 Aug 1991
PLOTALL	1.93/1.96/1.97	12 Jul, 8 Aug, 16 Aug 1991
POINT	1.31	12 Jul 1991
BACKUP	2.00	20 Mar 1991
CONVERT	2.42	12 Jul 1991
PRINTOUT	2.30	20 Mar 1991
DIAGNOSTIC	2.70	20 Mar 1991
INVERSE	1.31	12 Jul 1991
INSTALL	2.01	12 Jul 1991
BASELINE	1.10	20 Mar 1991
QUICK	1.10	20 Mar 1991
LISTAWOIS	1.32	12 Mar 1991
LOADNEW	1.30	20 Mar 1991
REJECT	1.00	20 Mar 1991
CARTO	1.20	20 Mar 1991
Vers	NA	20 Mar 1991
BACKOLD	1.11	12 Jul 1991
NEWCONT	1.10	20 Mar 1991
DISC_UTIL	1.00	20 Mar 1991
MB	0.00	20 Mar 1991
HJ	0.00	20 Mar 1991
AUTOST	1.10	19 Apr 1991
GLOBAL	1.11	12 Jul 1991
MAKEFIX	1.00	20 Mar 1991
BIGABST	1.12	12 Jul 1991
REAPPLY	1.31/1.33/1.33	12 Jul, 8 Aug, 16 Aug 1991
PREDICT	1.11	12 Jul 1991
READPROJS	1.07	12 Jul 1991
SOFTCHECK	1.11	12 Jul 1991
HPRAZ	1.23	12 Jul 1991
FILESYS	2.11	19 Apr 1991
DP	1.11	12 Jul 1991
MANU_DATA	1.11	12 Jul 1991
RAMSAVER	1.00	20 Mar 1991
GRAPHEDIT	1.60/1.01/1.02	12 Jul, 3 Sept, 18 Sept 1991
EXCESS	3.00/3.02	12 Jul, 3 Sept 1991
DAS_SURV	6.05	12 Jul 1991
CAT_KEYS	0.99B	12 Jul 1991
CSTAT_UP	1.00	12 Jul 1991

BIGAUTOST	1.10	12 Jul 1991
ABST	3.05	12 Jul 1991

RAINIER noticed during processing that HDAPS had not updated the day number after crossing 0000 GMT. This happened only when HDAPS was logging data during the crossover between days, and consequently did not affect any of the Dutch Harbor survey data. If the line was broken before 0000 GMT and restarted after 0000 GMT then the day number was updated and the correct tide correctors applied. Otherwise when HDAPS logged data through 0000 GMT, correctors of the previous day were applied to the data until the line ended. The HDAPS Office was notified of this problem on July 22. ✓

On August 8, RAINIER loaded programs REAPPLY (Ver 1.33), POSTSUR (Ver 5.16), and PLOTALL (Ver 1.96) onto all acquisition and processing systems. These new versions were received from the HDAPS Office in an attempt to fix the above tide corrector problem. The new versions did not correct the problem. The new programs correctly updated the day number after 0000 GMT, but it was still using incorrect tide correctors from 24 hours previous. In addition, when the line was broken after being on line through 0000 GMT, the program would incorrectly update the day number again. The HDAPS Office was notified of this problem on August 12, 1991. ✓

On August 16, RAINIER loaded programs REAPPLY (Ver 1.33), POSTSUR (Ver 5.17), and PLOTALL (Ver 1.97) onto all acquisition and processing systems. The new versions corrected the tide corrector problem mentioned above. The correctors have been reapplied to the data, and therefore the problem resolved. ✓

On September 3, RAINIER loaded programs GRAPHEDIT (Ver 1.01) and EXCESS (Ver 3.02) onto all processing systems to correct problems seen in the earlier versions. ✓

On September 18, RAINIER loaded GRAPHEDIT (Ver 1.02) onto all processing systems. This version corrected the problem of GRAPHEDIT only showing part of the survey when zooming out. ✓

Velocity corrections were determined using:

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
VELOCITY	1.11	09 Mar 1990

**E. SONAR EQUIPMENT**

Side scan sonar was not used during this survey. ✓

**F. SOUNDING EQUIPMENT**

All survey launches were equipped with the Raytheon DSF-6000N echo sounders shown below. The echo sounders were operated in the HIGH + LOW (HIGH DIGITIZED) function, using manual gain controls on both high and low frequencies to obtain the best analog trace. Soundings were recorded in meters and tenths of meters. Six-meter bar checks were conducted and recorded daily, using both the ✓

LOW and the HIGH + LOW (HIGH DIGITIZED) functions. The echo sounders were operated in accordance with the Provisional Instructions "Raytheon DSF-6000N Echo-Sounder Operating and Processing Instructions", dated July 5, 1983, and the Field Procedures Manual for Hydrographic Surveying (FPM). ✓

#### Raytheon DSF-6000N Echo Sounders

<u>Vessel</u>	<u>Serial No.</u>	<u>DN</u>
2124	A103N	219-232
2125	B048N	219-232
2126	A114N	223-230

The echo sounders were continuously monitored during data acquisition. All sounding data were scanned at least two times, to ensure all significant peaks were inserted, and to verify the digitized depths. While running over steep or irregular areas, the echo sounders sometimes failed to track properly. Running at minimum speeds usually alleviated this problem, but marginal analog traces could not always be avoided. ✓

#### G. CORRECTIONS TO ECHO SOUNDINGS

Corrections to echo soundings were determined for static draft, heave, velocity of sound through water, and settlement and squat. Sounding correctors apply to both narrow and wide beams of the DSF-6000N echo sounder. Supporting data and computations for all corrections to echo soundings, except heave, are included in the Summer 1991 Corrections to Echo Sounding Data Package for OPR-Q181-RA. ✓

#### Offset Tables

<u>Vessel</u>	<u>Offset Table No.</u>
2124	4
2125	5
2126	6

### Sound Velocity

Correctors for the velocity of sound through water were determined from the casts listed below:

<u>Velocity Table No.</u>	<u>Cast No.</u>	<u>Deepest Depth (m)</u>	<u>Applicable DN</u>	<u>Cast Position</u>	<u>Day</u>	
1	1	36.8	211-221	53°53'25"N 166°30'56"W	211	(not used)
2	2	92.8	219-232	53°52'27"N 166°34'24"W	223	
3	3	36.4	222-232	53°53'27"N 166°30'53"W	225	(not used)
	4	19.1		53°52'47"N 166°32'38"W	225	(not used)

Sound velocity casts numbered 1, 2, 3, and 4 were acquired with an AML SVP, S/N 3042, which was calibrated at the Northwest Regional Calibration Center in Bellevue, WA, on March 11, 1991. Casts No. 3 and No. 4 were performed on August 13, 1991 and showed excellent agreement, therefore, Cast No. 4 was not applied to echosoundings. ✓

Velocity correctors were computed using the PC program VELOCITY in accordance with Hydrographic Survey Guideline (HSG) #69. A printout of the Sound Velocity Corrector Tables used in the HDAPS Post Survey program are included in the Summer 1991 Corrections to Echo Sounding Data Package for OPR-Q181-RA. ✓

### Static Draft

For all launches, the distance from the transducer face to the gunwhale was measured with a large metal square. Static draft measurements were then determined by dropping a leadline from the gunwhale to the water and subtracting this distance from the distance measured with the square. The measurements from the gunwhale to the waterline were conducted with the fuel tanks averaging 3/4 full and three people aboard. A transducer depth of 0.6 meter was determined for all launches on March 23-25, 1991. This transducer depth agrees with the launches' historical records. ✓

### Settlement and Squat

Settlement and squat correctors were determined in Shilshole Bay, WA, for Vesnos 2125 on February 25, Vesno 2126 on February 26, and Vesno 2124 on March 12, 1991. All tests were conducted over a hard bottom in depths well exceeding 7 times the vessels' drafts. Both sea and wind were calm. Observations were made through a Zeiss Ni2 leveling instrument (S/N 103453) to a rod held vertically on deck, directly over the transducer. Correctors were computed in accordance with Hydrographic Manual 4.9.4.2, using FPM Fig. 2.2 and 2.3, and are included in the Summer 1991 Corrections to Echo Sounding Data Package for OPR-Q181-RA. ✓



**Heave**

Corrections for heave were applied while scanning echograms. The scanning technique employed in comparing analog traces with the digital record eliminated significant fluctuations resulting from sea action.

✓

**Pneumatic Depth Gage**

The Pneumatic Depth gage was calibrated March 3, 1991, by the Pacific Operations Group (N/OMA1214). In addition, field systems checks were performed via comparison with diver depth gages each time the pneumatic gage was used. Calibration data and correctors applied to the pneumatic depth gage are included in the Summer 1991 Correctors to Echo Sounding Data Package for OPR-Q181-RA.

✓

**Bar Check Lines**

Bar check lines were calibrated by RAINIER personnel during January 1991 at PMC. Calibration forms are included in the Summer 1991 Corrections to Echo Sounding Data Package for OPR-Q181-RA.

✓

**Tide Correctors**

The Unalaska, Alaska, tide station (946-2620) served as control for datum determination. Dutch Harbor, Alaska (station #2109) was the reference station for predicted tides. The time and height correctors for station #2109 were applied to the predicted tides at Dutch Harbor and are shown below:

✓

<u>Zone Correctors</u>	<u>Range Ratio</u>	<u>Time</u>
1. Dutch Harbor, Amaknak Island	Direct	Direct

HDAPS listings of the data used in generating tide corrector tables are included in Appendix V of this report. \*

✓

The closing leveling records have been forwarded to N/OMA1212 in accordance with HSG 50 and FPM 4.3. Requests for approved tides have been forwarded to N/OMA12. Copies of the Field Tide Notes and the request for approved tides are included in Appendix V. \*

**H. CONTROL STATIONS**

Geographic positions for all control stations are based on the North American Datum of 1983 (NAD83) and the Geodetic Reference System 1980 Ellipsoid.

A listing of the geodetic stations used to control this survey is included in ~~Appendix~~ <sup>this report.</sup>

✓

\* Filed with the hydrographic data.

Positions for all existing stations are from the NGS data base. All existing stations were recovered in accordance with methods stated in Section 5.2.4 of the Field Procedures Manual. New stations were positioned via traverse methods to meet third-order class I standards. Further information can be found in the Summer 1991 Horizontal Control Report for OPR-Q181-RA. ✓

## I. HYDROGRAPHIC POSITION CONTROL

### Method of Position Control

Soundings, bottom samples, and detached positions were located using the Motorola Mini Ranger Falcon 484 microwave positioning system in multiple-range and manual range-azimuth modes. ✓

### Accuracy Requirements/Problems

Accuracy requirements specified in the Hydrographic Manual and in FPM 3.1.3.1 were generally met. Under some wind and sea conditions null zones were experienced. When this problem was suspected, the R/T mast height or shore transponder height was adjusted to improve control. When maximum residuals exceeded the specified limits, OICs deselected the station(s) with the highest residual value and continued hydrography.

Occasionally, ECRs and maximum residuals exceeded the specified limits. When this happened, the data were usually rejected and the area rerun with different control. If maximum residuals exceeded tolerances, they were flagged and reviewed. Data between good positions were smoothed when maximum residuals showed unusual accelerations off the expected track. ✓

*See EML RPT.  
Sec. 4*

The loss of one or more LOP's frequently occurred when collecting data close inshore. If this loss generated high ECRs and/or maximum residuals, the OICs annotated the raw master printout (RMPO). If the data plotted on track and sounding intervals appeared correct, the data were retained. Some data were acquired with only two LOP's because stations were blocked or deselected. When this occurred, data were bracketed by multiple LOP hydrography providing continuous critical system checks when ECRs and maximum residuals fell within survey specifications.

On August 1 (DN 213), C-O correctors and signal strength cutoff values were modified in order to meet the tighter control requirements of a 1:5,000 scale survey, as compared to a 1:20,000 scale survey for which they were originally calculated. ✓

### Equipment

A Wild T-2 theodolite was used for manual range/azimuth observations in conjunction with a Motorola Mini Ranger (M/R). Serial numbers for all positioning equipment are annotated on the RMPO for each day of hydrography. A complete list of all electronic equipment serial numbers is included in the Summer 1991 Electronic Control Data Package for OPR-Q181-RA. ✓

## Calibrations & Systems Check Methods

Baseline calibrations were conducted in accordance with FPM 3.1.2.1 and 3.1.3.2. On May 15-17 (DN135-DN137), and May 21-23 (DN 141-DN 143) calibrations were conducted at the SANDPOINT BASELINE over a known distance of 1058.1876 m. Calibration data and a description of the baseline is included in the Summer 1991 Electronic Control Data Package for OPR-Q181-RA. ✓

In accordance with FPM 3.1.3.3, formal system checks were not documented for multiple LOP hydrography. Data collected with two LOP's were always bracketed by multiple LOP data acquired with ECR and maximum residuals within acceptable limits, which served as critical system checks. Critical system checks for range-azimuth hydrography were made by observing the range-azimuth M/R code in conjunction with two or more M/R codes. In addition, azimuth checks for range-azimuth hydrography were performed by sighting on another third-order control station. The check was considered satisfactory if the azimuth difference was less than 30 seconds of arc. ✓

## Other Factors

Antenna offset and layback correctors were applied via HDAPS offset tables, and are found in the separates included with the survey. \* ✓

## J. SHORELINE

The shoreline map (T-sheet) used to transfer shoreline detail to the final field sheets was a 1:5,000-scale enlargement of TP-01358 (1:10,000; NAD83; flown June 1983). ✓

Shoreline verification was conducted below or near predicted lower low water in accordance with FPM 7.1. Shoreline verification was mostly accomplished by assigning sequential reference numbers and taking detached positions (DPs) in a manner explained later in this section. ✓

Shoreline and T-sheet features verified via visual inspection were assigned sequential reference numbers and were recorded in the field using sounding volumes and corresponding 1:5,000 scale photocopies of the T-sheet. Reference numbers, descriptions and heights, corrected to predicted MLLW, are recorded in the sounding volumes. Corresponding notes were annotated on the photocopies of the T-sheet. Changes to shoreline features are described in the sounding volumes where applicable. The annotated photocopies of the T-sheet are attached to the sounding volumes which are included with the survey data. \* ✓

DPs taken during shoreline verification were recorded on the master printouts and indicate significant features, features not found on the T-sheet, and locations of disprovals. Where possible, positions of some T-sheet features were verified during inshore mainscheme hydrography and annotated on the raw master printouts. ✓

Some T-sheet rocks were found to be isolated boulders, reefs, islets, high points within foul areas, or ledges in the intertidal zone. T-sheet features which were verified were retained and shown on the final field sheets (FFS). Verified shoreline ✓

\* Filed with the hydrographic data.

and new features are shown in black on the FFS, changes to the shoreline are shown in red, and unverified shoreline is shown in blue. Kelp symbols are shown on the FFS in areas where surface kelp was visible. *See EVAL RPT. Sec. 2*

Detailed 1:5,000-scale paper plots showing all DPs, reference numbers, and notes relating to each feature are included with the sheets submitted with this survey. The HDAPS DP Program requires that cartographic codes be assigned to all DPs. These cartographic codes were not plotted because the majority of DPs describe features that are offset slightly from the DP. Position numbers for all DPs are plotted on the two DP overlays. Heights are recorded in meters and are corrected to predicted MLLW. ✓

The large number of new features and disprovals found during this survey indicate that the aerial photography flown in 1983 inadequately depicts the shoreline for this survey. The rapid growth of the area has added many piers, docks, processing plants, roads, buoys, and dolphins that are not included in the 1983 aerial photography. Consequently these new features are drawn on the FFS according to DPs taken during the survey. The main discrepancies are the many cultural additions along the shoreline that have been constructed since the photography was flown. ✓

#### Disprovals

The following disprovals were conducted near predicted lower low water. A visual and echosounder search was conducted for each item lasting an average of fifteen minutes. Positioning was accomplished via Range/Azimuth or by using two or more ranges from Falcon Mini-Rangers with ECRs and maximum residuals within acceptable limits for a 1:5,000 scale survey. ✓

The vicinity of the charted rock at 53°51'25"N, 166°33'45"W was inspected (Pos. No. 4094) and the rock was not seen. Water visibility was 2 m and the search radius was 25 m from the DP. The position of the charted rock is in the vicinity of T-sheet rock R4-3 (0<sup>2</sup>) at 53°51'25"N, 166°33'45"W. The hydrographer believes the charted rock and T-sheet rock to be the same feature. ✓

The vicinity of the T-sheet rock at 53°51'25"N, 166°33'46"W was inspected (Pos. No. 4095) and the rock was not seen. Water visibility was 2 m and the search radius was 15 m from the DP. ✓

The vicinity of the charted rock at 53°51'18"N, 166°33'54"W was inspected (Pos. No. 4101) and the rock was not seen. Water visibility was 2 m and the search radius was 15 m from the DP. ✓

The vicinity of the charted rock at 53°51'16"N, 166°33'56"W was inspected (Pos. No. 4102) and the rock was not seen. Water visibility was 2 m and the search radius was 20 m from the DP. ✓

The vicinity of the T-sheet obstruction at 53°52'31"N, 166°33'56"W was inspected (Pos. No. 4136) and the obstruction was not seen. Water visibility was 2 m and the search radius was 30 m from the DP. The T-sheet position was inshore of the DP in depths too shallow to navigate the launch. ✓

The vicinity of the charted structure at 53°50'57"N, 166°34'29"W was inspected (Pos. No. 4374) and the structure was not seen. The rocky shoreline was 10 m from the DP. ✓

The vicinity of two charted rocks at 53°50'49"N, 166°34'45"W was inspected (Pos. No. 4499) and the rocks were not seen. Water visibility was 2 m and the search radius was 15 m from the DP. The launch was unable to navigate closer to the charted position due to shallow depths. ✓

The vicinity of the charted rock at 53°49'42"N, 166°35'58"W was inspected (Pos. No. 5846) and the rock was not seen. Water visibility was 2 m and the search radius was 25 m from the DP. ✓

The vicinity of the charted rock at 53°49'42"N, 166°36'05"W was inspected (Pos. No. 5847) and the rock was not seen. Water visibility was 2 m and the search radius was 15 m from the DP. ✓

The vicinity of the charted rock at 53°51'35"N, 166°35'28"W was inspected (Pos. No. 5858) and the rock was not seen. Water visibility was 1 m and the search radius was 20 m from the DP. ✓

The T-sheet rock at 53°50'20"N, 166°35'57"W was searched for visually and hydrographically, but not found. There was much kelp seen in the area that could have been misinterpreted on aerial photographs as a rock. A least depth of 5.0 m (Pos. No. 8260<sup>+4</sup>) was found at 53°50'20"N, 166°35'57"W. ✓

The T-sheet rock at 53°50'21"N, 166°35'55"W was searched for visually and hydrographically, but not found. There was much kelp seen in the area that could have been misinterpreted on aerial photographs as a rock. A least depth of 3.0 m (Pos. No. 6214<sup>+4</sup>) was found at 53°50'20"N, 166°35'56"W. ✓

The vicinity of the T-sheet islet at 53°51'16"N, 166°35'32"W was inspected (Pos. No. 5862) and the islet was not seen. Water visibility was 1-2 m and the search radius was 20 m from the DP. Kelp was present in the area. ✓

The vicinity of the charted rock at 53°51'16"N, 166°35'32"W was inspected (Pos. No. 5863) and the rock was not seen. Water visibility was 1 m and the search radius was 20 m from the DP. The launch was unable to get closer to the charted position due to shallow depths. The position of the charted rock is in the vicinity of T-sheet rock R4-60 (cov 0.4 MLLW) at 53°51'16"N, 166°35'33"W. The hydrographer believes the charted rock and T-sheet rock to be the same feature. *CONCUR*

The vicinity of the charted rock at 53°51'14"N, 166°35'32"W was inspected (Pos. No. 5864) and the rock was not seen. Water visibility was 1-2 m and the search radius was 15 m from the DP. ✓

The vicinity of the charted rock at 53°51'06"N, 166°35'35"W was inspected (Pos. No. 5865) and the rock was not seen. Water visibility was 1-2 m and the search radius was 25 m from the DP. ✓

The vicinity of the charted rock at 53°51'05"N, 166°35'36"W was inspected (Pos. No. 5868) and the rock was not seen. Water visibility was 1-2 m and the search radius was 20 m from the DP. ✓

The vicinity of the charted rock at 53°50'47"N, 166°36'03"W was inspected (Pos. No. 5872) and the rock was not seen. Water visibility was 1-2 m and the search radius was 20 m from the DP. ✓

The vicinity of the T-sheet rock at 53°50'39"N, 166°36'25"W was inspected (Pos. No. 5874) and the rock was not seen. Water visibility was 1-2 m and the search radius was 20 m from the DP. ✓

The vicinity of the charted rock at 53°49'52"N, 166°35'32"W was inspected (Pos. No. 8523) and the rock was not seen. Water visibility was 2 m and the search radius was 30 m from the DP. ✓

The vicinity of the charted rock at 53°49'52"N, 166°35'31"W was inspected (Pos. No. 8525) and the rock was not seen. Water visibility was 2 m and the search radius was 30 m from the DP. ✓

The vicinity of the charted rock at 53°50'01"N, 166°35'17"W was inspected (Pos. No. 8526) and the rock was not seen. Water visibility was 2 m and the search radius was 20 m from the DP. ✓

The vicinity of the charted rock at 53°50'37"N, 166°34'48"W was inspected (Pos. No. 8527) and the rock was not seen. The charted position is now covered with rock fill and adjoins Offshore Systems, Inc.'s (OSI) South Dock. ✓

The vicinity of the charted rock at 53°51'07"N, 166°35'34"W was inspected (Pos. No. 8530) and the rock was not seen. Water visibility was 2 m and the search radius was 15 m from the DP. ✓

The pier ruins charted at 53°51'03"N, 166°34'29"W were inspected with a recorded depth of 3.8<sup>8</sup> m (Pos. No. 4363) at 53°51'03"N, 166°34'28"W. The area was inspected visually, but no evidence of pier ruins were seen. Mainscheme hydrography was conducted in the area (Pos. Nos. 4820<sup>+8</sup>, 4820<sup>+8</sup>, 6548<sup>+8</sup>, and 6548<sup>+9</sup>) and showed evidence of shallower depths on the echogram than the surrounding area. Frank Blodgett, Crowley Maritime, Seattle, was contacted via telephone and verified that a pier existed at this position in the past. He also stated that the contract called for all pilings to be pulled up individually and removed. Several of the pilings were re-used in the modification of the current pier (Pos. Nos. 4358, 4360, 4362, and 4494). Kelp was noted in the area.

See EVAL RPT.  
Sec. 2

**Recommendation:** The hydrographer recommends that shoreline detail from this survey be used to supersede prior shoreline information. *Concur. The above listed features are considered disproven.*

#### New Features

The following are significant new features found during shoreline verification near mean lower low water. The following features are located in navigable areas and were not depicted on the T-sheet. All new features are as shown on the FFS. ✓

Position Numbers 4086-87 describe a concrete pier, owned by Westward Seafoods, at 53°51'<sup>29</sup>20"N, 166°33'15"W. The southern end of the pier is 3 m east of a charted T-shaped wooden pier (See Pos. Nos. 4087, 4089). The pier face is 684' long and the deck is 14' above MLLW. Information about Westward Seafoods outfall and intake pipes is included in Section P.

See EVAL RPT.  
Sec. 2 & 7 (2)

Position Numbers 4112-13 describe a rock covered 1.<sup>6</sup>8 m at 53°51'35"N, 166°33'34"W. The positions mark the northern and southern limits of the rock. The rock is 12 m long, and 8 m wide. ✓

Position Numbers 4121, 4123, and 4124 describe 3 submerged rocks in the area of 53°51'53"N, 166°33'55"W. Their depths are 0.8 m, 0.6 m, and 1.8 m respectively. The average size was 4 m in diameter. They lie in between the two islets in the Amaknak Rocks. ✓

Position Number 4125 describes a submerged rock covered 0.<sup>6</sup>8 m at 53°51'54"N, 166°33'58"W. It is 2 m x 3 m and just east of the largest islet in the Amaknak Rocks. ✓

Position Number 4361 describes a 5 post metal dolphin, with a small platform on top at 53°51'08"N, 166°34'20"W. It appears to be a breasting dolphin for Crowley Maritime, a division of Pacific Alaska Fuel Services, Inc. It is 10 m north of the Crowley Maritime pier and extends ~~5.5~~ m above the HWL. ✓

3.9

Position Number 4375 was taken at the center of the railway and describes a marine railway at 53°50'55"N, 166°34'29"W with a submerged cable running to the waterline. The railway is 12 m long extending into the water and 4 m wide. The railway and cable disappear into the water. ✓

Position Number 4376 describes a private mooring buoy at 53°50'57"N, 166°34'33"W. It may be connected to the railway cable described in Pos. No. 4375. ✓

Position Number 4495 describes a breasting dolphin at 53°51'04"N, 166°34'28"W near Crowley Maritime. It is 10 m south of the southwestern pier edge. The dolphin is 6 m long and extends ~~4~~ m above the HWL. ✓

3.1

Position Number 4500 describes a breasting dolphin with a catwalk extending to shore. The dolphin's position is 53°50'46"N, 166°34'46"W. It is 16 m east of the northern pier edge of OSI's North Dock. The dolphin extends 5.5 m above HWL. ✓

Position Number 4501 was taken at the northern end of the dock and describes OSI's North Dock at 53°50'46"N, 166°34'46"W. The dock is 6 m wide and extends ~~5.5~~ m above HWL. It extends 13 m from the shoreline and is connected to a breasting dolphin (Pos. No. 4502) by a catwalk. ✓

4.2

Position Number 4502 describes a breasting dolphin at 53°50'45"N, 166°34'46"W with a catwalk to OSI's North Dock. It is 16 m west of the southern pier edge of OSI's North Dock and extends ~~5.5~~ m above HWL. ✓

4.4

Position Number 4503 describes a breasting dolphin at 53°50'44"N, 166°34'46"W. It is between OSI's Main Dock and the breasting dolphin described by Pos. No. 4502. It extends ~~5.5~~ m above HWL. ✓

4.4

Position Numbers 4504 and 4506 describe OSI's Main Dock at  $53^{\circ}50'42''$ <sup>1</sup>N,  $166^{\circ}34'47''$ <sup>2</sup>W. The dockface is 440' long and  $8.5$ <sup>4.4</sup> m above HWL. The positions mark the northern end, and the middle of the Main Dock, respectively. The southern end was occupied by a vessel and a DP was unobtainable. ✓

Position Number 4509 describes OSI's 450 Dock at  $53^{\circ}50'38''$ <sup>7</sup>N,  $166^{\circ}34'42''$ <sup>5</sup>W. The dockface is 469' long and  $8.5$ <sup>4.4</sup> m above HWL. The position was taken at the eastern end of the dock where the shoreline and the dock meet. ✓

Position Number 5707 describes an unlit mooring buoy at  $53^{\circ}51'24''$ N,  $166^{\circ}35'03''$ W. The buoy is 5 m in diameter. ✓

**Note:** Diagrams are provided for OSI's facility by Robert Schasteen, Operations Manager, OSI, and are included in a separate accordion file with the data. DP's were not obtained for OSI's South Dock in the vicinity of  $53^{\circ}50'36''$ N,  $166^{\circ}34'51''$ W due to vessel blockage and bad control. However, using OSI's diagrams and information from Pos. No. 8527, an approximate position of South Dock and the two dolphins is shown on the FFS. ✓

**Recommendation:** The hydrographer recommends that shoreline detail from this survey be used to supersede prior shoreline information. *Concur.*

#### Unverified Features

The following unverified T-sheet feature was retained on the final field sheet and shown in blue. ✓

Due to depths less than 1 m, the shoreline at the southern end of Captains Bay was unapproachable by launch and remains unverified. ✓

**Recommendation:** The hydrographer recommends retaining the above feature on the chart until further investigation. *Do not concur. Chart according to shoreline map, unless a new current source is available.*

#### Changes

The following are changes to the T-sheet shoreline found during shoreline verification near lower low water. All changes are shown on the FFS in red.

Position Numbers ~~4512, 4514-17~~<sup>4509 4517</sup> describe a shoreline change from  $53^{\circ}50'38''$ <sup>7</sup>N,  $166^{\circ}34'54''$ W to  $53^{\circ}50'27''$ N,  $166^{\circ}34'54''$ W. The area is very close to the OSI facility, and has been filled in to extend farther out into the bay. ✓

Position Numbers 4087 and 4089 describe a pier change at  $53^{\circ}51'28''$ N,  $166^{\circ}33'20''$ W. The western part of the T-section is no longer there. The pier is now an L-shape with the eastern section approximately 3 m west of the new Westward Seafoods pier (Pos. No. 4086). No remains of the section were found by either visual or echosounder search. ✓

Position Number 4090 describes a shoreline change near the wooden pier at  $53^{\circ}51'27''$ N,  $166^{\circ}33'21''$ W. The shoreline appears to have been filled in and extended to accommodate the Westward Seafoods pier. ✓



Position Numbers 6060-61 describe a shoreline change at  $53^{\circ}52'20''\text{N}$ ,  $166^{\circ}35'04''\text{W}$ . The HWL is west about 8 m from the DP's. ✓

Position Number 6028 describes a shoreline change at  $53^{\circ}50'11''\text{N}$ ,  $166^{\circ}35'12''\text{W}$ . The high point is 2.7 m above the HWL. ✓

Position Numbers 4358, 4360, 4362, and 4494 describe a pier change at  $53^{\circ}51'06''\text{N}$ ,  $166^{\circ}34'24''\text{W}$ . The pier has been modified and extended in a southwestern direction approximately 40-50 m. The modification and addition to the pier was verified via telephone by Frank Blodgett of Crowley Maritime located in Seattle, WA.

**Recommendation:** The hydrographer recommends that shoreline detail from this survey be used to supersede prior shoreline information.

*Concur. The above features are shown in red on the smooth sheet.*

#### K. CROSSLINES

A total of 10.8 nautical miles of crosslines were run perpendicular or at a  $45^{\circ}$  angle to mainscheme lines, representing 10.4% of the mainscheme hydrography. Crossline soundings agree to within 2 meters with mainscheme soundings. The vessel acquiring crossline data did not always collect the corresponding mainscheme data. Agreement between soundings acquired by different echo sounders in a common area is as stated above. ✓

#### L. JUNCTIONS

This survey junctions with H-10389 (1:5,000; 1991) to the northeast. The survey is bounded by shoreline to the south, west, and east. There are no other contemporary surveys junctioning with this survey to the north. No irregularities were found when comparing soundings and depth contours. Agreement between overlapping soundings is excellent, with all junction soundings agreeing to within 1 meter. ✓

#### M. COMPARISON WITH PRIOR SURVEYS

All changes and disprovals to charted shoreline features that originated from prior surveys are discussed in Section J. Disagreement between H-10391 and the prior surveys may be due to less accurate positioning and sounding techniques used on the prior surveys. All positions cited in this section are NAD83. This survey was compared to the following prior surveys: *See EVAL RPT. Sec. 6*

##### H-5684 (1:5,000; 1934, 1937):

Agreement between H-10391 and a 1:5,000 copy of H-5981 is good, with soundings agreeing to within 1 m. Shallower depths were found on the present survey near the South Amaknak Rocks. Discrepancies due to shoaling are as follows: ✓

A 1 fm (1.8 m) depth at  $53^{\circ}51'54''\text{N}$ ,  $166^{\circ}33'21''\text{W}$  on H-5684 corresponds to a 1.8<sup>7</sup> m depth (Pos. No. 6960<sup>+0</sup>) on this survey at  $53^{\circ}51'53''\text{N}$ ,  $166^{\circ}33'21''\text{W}$ . ✓

A 4 3/4 fm (8.6 m) depth at 53°51'58"N, 166°33'16"W on H-5684 corresponds to a 3.<sup>7</sup><sub>8</sub> m depth (Pos. No. 6478<sup>+0</sup>) on this survey at 53°51'58"<sub>9</sub>N, 166°33'17"<sub>9</sub>W. ✓

A 9 fm (16.4 m) depth at 53°51'45"N, 166°33'03"W on H-5684 corresponds to a 16.1 m depth (Pos. No. 6874<sup>+2</sup>) on this survey at 53°51'45"N, 166°33'04"W. ✓

**Recommendation:** The hydrographer recommends the soundings and least depths acquired from the present survey be used to supersede those of H-5684 within their common areas. *See EVAL RPT., Sec. 6.*

**H-5980 (1:5,000; 1935):**

Agreement between H-10391 and a 1:5,000 scale copy of H-5980 is good, with soundings agreeing to within 2 m. The hydrographer noticed shoaling south of the western point at the entrance to Captains Bay. Discrepancies due to shoaling are as follows: ✓

A 7 fm (12.7 m) depth at 53°52'37"N, 166°34'44"W on H-5980 corresponds to a 6.<sup>8</sup><sub>7</sub> m depth (Pos. No. 5091<sup>+6</sup>) on this survey at 53°52'37"N, 166°34'44"W.

A 3 fm (5.5 m) depth at 53°52'39"N, 166°34'39"W on H-5980 corresponds to a 4.<sup>1</sup><sub>0</sub> m depth (Pos. No. 5094<sup>+1</sup>) on this survey at 53°52'39"N, 166°34'39"W.

A 7 fm (12.7 m) depth at 53°52'37"N, 166°34'39"W on H-5980 corresponds to a 6.<sup>7.0</sup><sub>9</sub> m depth (Pos. No. 5091<sup>+3</sup>) on this survey at 53°52'37"N, 166°34'40"W.

**Recommendation:** The hydrographer recommends the soundings and least depths acquired from the present survey be used to supersede those of H-5980 within the common areas. *Concur.*

**H-5981 (1:5,000; 1935):**

Agreement between H-10391 and a 1:5,000 copy of H-5981 is good, with soundings agreeing to within 2 m. The hydrographer noticed that in depths less than 40 m, agreement was within 1 m. Discrepancies are as follows: ✓

A 4 1/4 fm (7.7 m) depth at 53°49'49"N, 166°36'10"W on H-5981 corresponds to a 5.<sup>2</sup><sub>3</sub> m depth (Pos. No. 5490<sup>+0</sup>) on this survey at 53°49'48"N, 166°36'11"W.

A 10 fm (18.2 m) depth at 53°49'51"N, 166°36'20"W on H-5981 corresponds to a 14.<sup>8</sup><sub>9</sub> m depth (Pos. No. 5532<sup>+2</sup>) on this survey at 53°49'51"N, 166°36'21"W.

A 2 1/4 fm (4.1 m) depth at 53°49'53"N, 166°36'09"W on H-5981 corresponds to a 2.<sup>6</sup><sub>8</sub> m depth (Pos. No. 5508<sup>+0</sup>) on this survey at 53°49'53"N, 166°36'09"W.

A 10 fm (18.2 fm) depth at 53°49'52"N, 166°36'14"W on H-5981 corresponds to a 14.<sup>0</sup><sub>7</sub> m depth (Pos. No. 5516<sup>+3</sup>) on this survey at 53°49'52"N, 166°36'13"W.

A 10 fm (18.2 fm) depth at 53°49'51"N, 166°36'10"W on H-5981 corresponds to a 15.<sup>6</sup><sub>8</sub> m depth (Pos. No. 5507<sup>+4</sup>) on this survey at 53°49'51"N, 166°36'11"W.

A 10 fm (18.2 fm) depth at 53°49'58"N, 166°35'52"W on H-5981 corresponds to a 13.2 m depth (Pos. No. 8578<sup>+6</sup>) on this survey at 53°49'58<sup>7</sup>"N, 166°35'52"W.

A 7 fm (12.7 m) depth at 53°49'59"N, 166°35'55"W on H-5981 corresponds to a 12.0<sup>1</sup> m depth (Pos. No. 8586<sup>+6</sup>) on this survey at 53°49'59"N, 166°35'56"W.

A 9 fm (16.4 m) depth at 53°49'49"N, 166°36'26"W on H-5981 corresponds to a 15.4 m depth (Pos. No. 5570<sup>+5</sup>) on this survey at 53°49'49"N, 166°36'26"W.

A 1 1/4 fm (2.3 m) depth at 53°49'55"N, 166°36'02"W on H-5981 corresponds to a 2.2 m depth (Pos. No. 8616<sup>+6</sup>) on this survey at 53°49'55"N, 166°36'04"W.

A 9 fm (16.4 m) depth at 53°50'16"N, 166°35'58"N on H-5981 corresponds to a 14.0 m depth (Pos. No. 8248<sup>+4</sup>) on this survey at 53°50'17"N, 166°35'57"W.

A 5 1/2 fm (10 m) depth at 53°50'21"N, 166°35'48"N on H-5981 corresponds to a 9.7<sup>5</sup> m depth (Pos. No. 6732<sup>+8</sup>) on this survey at 53°50'22"N, 166°35'52"W.

A 2 1/2 fm (4.5 m) depth at 53°50'20"N, 166°35'56"N on H-5981 corresponds to a 3.0 m depth (Pos. No. 6214<sup>+4</sup>) on this survey at 53°50'20"N, 166°35'56"W.

A 9 fm (16.4 m) depth at 53°50'34"N, 166°35'55"N on H-5981 corresponds to a 13.1 m depth (Pos. No. 8156<sup>+3</sup>) on this survey at 53°50'35"N, 166°35'58"W.  
(Pos 8154, 13 meters depth @ 53°50'35"N, 166°35'58"W.)

A 7 1/2 fm (13.6 m) depth at 53°50'23"N, 166°35'37"N on H-5981 corresponds to a 13.0 m depth (Pos. No. 8196<sup>+2</sup>) on this survey at 53°50'24"N, 166°35'37"W.

A 4 1/4 fm (7.7 m) depth at 53°50'28"N, 166°35'45"N on H-5981 corresponds to a 5.8<sup>8</sup> m depth (Pos. No. 8128<sup>+5</sup>) on this survey at 53°50'28"N, 166°35'46"W.

A 7 1/2 fm (13.6 m) depth at 53°50'31"N, 166°35'42"N on H-5981 corresponds to a 9.8<sup>7</sup> m depth (Pos. No. 8085<sup>+3</sup>) on this survey at 53°50'31"N, 166°35'43"W.

Additional areas of shoaling are listed below:

The following least depths were developed with 5 m line spacing:

4.3 m at 53°50'36"N, 166°35'37"W (Pos. No. 6311<sup>+9</sup>)  
5.2<sup>0</sup> m at 53°50'24"N, 166°35'53"W (Pos. No. 5805<sup>+5</sup>)

The following least depths were developed with 25 m line spacing:

16.2<sup>1</sup> m at 53°50'15"N, 166°36'04"W (Pos. No. 5367<sup>+5</sup>)  
16.8<sup>8</sup> m at 53°50'06"N, 166°36'08"W (Pos. No. 8352<sup>+1</sup>)  
16.3 m at 53°51'21"N, 166°35'23"W (Pos. No. 6798<sup>+6</sup>)  
18.0 ~~17.9~~ m at 53°50'06"N, 166°36'05"W (Pos. No. 8564<sup>+3</sup>)  
18.8 m at 53°50'07"N, 166°36'11"W (Pos. No. 8576<sup>+7</sup>)  
18.9 ~~19.0~~ m at 53°50'08"N, 166°35'59<sup>8</sup>"W (Pos. No. 8552<sup>+1</sup>)  
5330<sup>+4</sup>

**Recommendation:** The hydrographer recommends the soundings and least depths acquired from the present survey be used to supersede those of H-5981 within their common areas.

*Concur.*

H-6761a (1:2,000; 1941):

Agreement between H-10391 and a 1:2,000 copy of H-6761a is good, with soundings agreeing to within 2 m in depths less than 20 m, and to within 1 m in depths greater than 20 m. Soundings from H-10391 were plotted at a 1:2,000 scale for direct comparison to H-6761a. The hydrographer noticed that most soundings (<20 m depth) close to the shoreline on the present survey are 2-3 fms (3.6-5.5 m) shallower than H-6761a. This shoaling is likely due to the road construction along the shore. In several areas the road has been built up or filled in. A 4 1/2 fm (8.2 m) depth at 53°51'38"N, 166°33'33"W on H-6761a corresponds to a ~~7.2~~<sup>7.2</sup> m depth (Pos. No. 5286<sup>+8</sup>) on this survey at 53°51'36"N, 166°33'34"W. <sub>1.2</sub>

**Recommendation:** The hydrographer recommends the soundings and least depths acquired from the present survey be used to supersede those of H-6761a within their common areas. *Concur.*

H-6761b (1:2,000; 1941):

Agreement between H-10391 and a 1:2,000 copy of H-6761b is good, with soundings agreeing to within 2 m. Soundings from H-10391 were plotted at a 1:2,000 scale for direct comparison to H-6761b. The hydrographer noticed that most soundings on the present survey are 0.5 m shallower than H-6761b. Discrepancies are as follows:

A 5 fm (9.1 m) depth at 53°49'47"N, 166°36'06"W on H-6761b corresponds to a 8.5 m depth (Pos. No. 8644<sup>+3</sup>) on this survey at 53°49'47"N, 166°36'05"W.

A 5 3/4 fm (10.5 m) depth at 53°49'49"N, 166°36'06"W on H-6761b corresponds to a 8.8<sup>7</sup> m depth (Pos. No. 8439<sup>+0</sup>) on this survey at 53°49'49"N, 166°36'06"W.

A 4 1/2 fm (8.2 m) depth at 53°49'51"N, 166°35'58"W on H-6761b corresponds to a 7.5 m depth (Pos. No. 5598<sup>+2</sup>) on this survey at 53°49'51"N, 166°35'58"W.

A 11 fm (20 m) depth at 53°49'51"N, 166°36'02"W on H-6761b corresponds to a 18.7<sup>17.6</sup> m depth (Pos. No. ~~8431~~<sup>8431</sup><sub>5473 + 5</sub><sup>+0</sup>) on this survey at 53°49'51"N, 166°36'02"W.

A 7 1/2 fm (13.6 m) depth at 53°49'59"N, 166°35'59"W on H-6761b corresponds to a 12.4<sup>12.4</sup> m depth (Pos. No. ~~8598~~<sup>8598</sup><sub>8586 + 6</sub><sup>+5</sup>) on this survey at 53°49'58"N, 166°35'59"W.

A 9 fm (16.4 m) depth at 53°49'51"N, 166°35'55"W on H-6761b corresponds to a 15.6 m depth (Pos. No. 8414<sup>+1</sup>) on this survey at 53°49'51"N, 166°35'56"W.

**Recommendation:** The hydrographer recommends the soundings and least depths acquired from the present survey be used to supersede those of H-6761b within the common areas. *Concur.*

**N. COMPARISON WITH THE CHART**

The hydrographer compared all of the soundings from a 1:5,000-scale enlargement of NOS chart 16530, 5th Edition, August 26/89, 1:10,000 (NAD83) to this survey.

*See EVAL RPT.  
Sec. 7.*

### Comparison of Sounding Features

Overall agreement between this survey and the chart is good, with agreement to within 2 m. Some discrepancies were found near shoal areas, where this survey revealed shallower than charted depths. All soundings on the chart originate from prior surveys H-5981, H-5980, H-5684, H-6761a, and H-6761b and their comparisons are discussed in Section M. ✓

**Recommendation:** The hydrographer recommends sounding data from this survey be used to update the chart. *Concur.*

### Comparison of Non-Sounding Features

Position Numbers 5568-69 describe a sunken steel-hulled wreck at 53°49'50"N, 166°36'38"W. The wreck's bow above the HWL is described by the DPs and has a height of 8.8 m above MLLW. The wreck is at an angle of 30° to the waterline with the bow extending out of the water. The portion of the wreck above water is approximately 15 m wide and 50 m long. (*Hulk shown on SS based on shoreline map.*) AWOIS 52008 ✓

Reference Number R4-33 describes a stranded barge at 53°49'49"N, 166°36'45"W. The barge is on a mud flat with less than 1 m of water around it. The height is 8.0 m above MLLW. It appears to be a steel barge with several items on top, along with grass growing on the deck. (*Hulk shown on SS based on shoreline map.*) AWOIS 52009 ✓

Position Number 4372 describes an anchored line off the Crowley Maritime pier at 53°51'03"N, 166°34'27"W. According to Bob Reeves, Terminal Manager at the Crowley Maritime pier, there is a mooring line at either end of the dock that is attached to the shore. The ends of the lines are anchored offshore with a small anchor so that a skiff can pick up the end and use it to help moor a larger vessel to the dock. They are not permanent and have been there about a year. The position number marks the line on the southern end of the Crowley Maritime pier. The lines were not present the last week of the project. The hydrographer recommends that the lines not be added to the chart. *Concur.* ✓

Comparison of charted shoreline with this survey is discussed in Section J.

### AWOIS Items

The following AWOIS item was listed as an obstruction.

AWOIS 51948 "Unexploded Ordnance" at 53°51'08"<sup>6</sup>N, 166°34'19"<sup>26</sup>W (NAD27) <sup>88</sup> was added to the chart in 1982 when artillery shells were discovered in the vicinity of the Crowley Maritime pier in Captains Bay. Adak Naval Air Station was contacted via telephone and verified that their Explosive Ordnance Disposal Unit removed ordnance from Crowley Maritime pier in August, 1985. The telephone number for Adak Naval Air Station is included in Appendix VI.\*According to Bob Reeves, Terminal Manager of the Crowley Maritime pier in Unalaska, and Craig Magone, Partial Owner of Magone Marine Services in Dutch Harbor, live munitions are still present on the harbor bottom near the Crowley Dock. Sources reported that 20 mm, 30.06, and 4" shells of Nerve gas were found near the Crowley Maritime pier within the past few years. The hydrographer recommends retaining "Unexploded Ordnance" on the chart. *Concur.* See E/M/R RPT. Sec. 7(b)

\* Filed with the hydrographic data.

### Dangers to Navigation

Eighteen dangers to navigation within the limits of this survey were reported by radio message and hard copy to the Seventeenth Coast Guard District and DMAHTC. Copies of the correspondence are included in Appendix I of this report. Position numbers associated with each reported danger are included on the copy of the radio message. ✓

### O. ADEQUACY OF SURVEY

This survey is complete and adequate to supersede the areas common to the prior surveys listed in Section 6.10 of the Project Instructions. *Concur, with the transfer of feature noted on section 6. of the Evaluation Report.*

### P. AIDS TO NAVIGATION

One fixed aid to navigation lies within the limits of the survey. Its field position was reported to the U.S. Coast Guard in accordance with the Project Instructions Section 4.2.4 (See Appendix VI) \*

<u>Navigational Aid Light List No.</u>	<u>Published Position*</u>	<u>Charted Position**</u>	<u>Field Position</u>
Bailey Ledge Daybeacon #27505	53°51.6'N 166°33.6'W	53°51.6'N 166°33.6'W	53°51.6'N 166°33.6'W <i>35.797</i> <i>33.468</i>

\* Source: United States Coast Guard Light List (NAD83), Volume VI, 1991.

\*\* Scaled

The light adequately serves the apparent purpose for which it was established.

One floating aid to navigation lies within the limits of the survey.

<u>Navigational Aid Light List No.</u>	<u>Published Position*</u>	<u>Charted Position**</u>	<u>Hydrographic Position</u>
Swallow Reef Buoy 2 #27508	53°50.6'N 166°35.6'W	53°50.6'N 166°35.6'W	53°50.6'N 166°35.6'W <i>35.84"</i> <i>33.18"</i>

This buoy adequately serves the apparent purpose for which it was established. *Concur.*  
*@ Lat 53°51'28"N, Long. 166°33'20"W.*

An outfall pipe extends out from between Westward Seafoods concrete pier and the wooden pier. It is a 16" polyethelene pipe that extends across the harbor bottom and curves to the west side of Bailey Ledge. The end of the outfall is marked by a white bag buoy. Westward Seafoods plans to dive on the outfall and the old wooden pier remains in September, 1991. Two 24" steel intake pipes lie on the harbor bottom extending approximately 60' seaward of the pier on the northern end. They are also marked by a white bag buoy, and the ends of the intake pipes turn upward for approximately 7'. Several warehouse type buildings have also been built on the pier face. A diagram of the concrete pier and wooden pier, a schematic of the intake pipes, and a chartlet showing the approximate positions of the outfall and intake

*See EVAL RPT,  
Sec. 7 (a)*

\* Filed with the hydrographic data.

pipes have been included in a separate accordion file with the data. DPs were not obtained on either the outfall or the intakes. An approximate position of the outfall and intakes is shown on the FFS. This information was provided by Marcus Alden, Chief Engineer, at Westward Seafoods. An address and phone number are provided with the chartlet and diagram.

Three markers, <sup>along the coast</sup> to the east of the Amaknak Rocks, were verified by visual observation in the charted positions. *Retain as charted.*

*See EVAL RPT.  
Sec. 7(a)*

There are no bridges, overhead cables, or ferry routes within the limits of the survey.

## Q. STATISTICS

<u>Vessel:</u>	<u>2124</u>	<u>2125</u>	<u>2126</u>	<u>Total</u>
# of Pos	2498	1016	1	3515
NM Hydro	148.34	67.43	0	215.77
NM <sup>2</sup> Hydrography	2.79	Velocity Casts		1
Detached Positions	207	Tide Stations		1
Reference Numbers	100	Current/Magnetic Stations		0
Bottom Samples	86			

## R. MISCELLANEOUS

Approximately half of the bottom samples were given to Ounalashka Corporation in Unalaska. The remaining bottom samples were not retained. ✓

RAINIER personnel measured heights of several piers above the waterline and are included in a separate accordion file with the data. ✓

Survey launch 2126 used an uncalibrated RT/Console for a sounding investigation (Pos. No. 8503) by divers. The position was rejected due to unacceptable maximum residual and ECR. The sounding was adequately investigated before the dive operations with a calibrated RT/Console by echosounder using a line spacing of 10 m. ✓

The Alaska Marine Pilots Association, the Dutch Harbor Harbormaster and the Unalaska City Manager have expressed concern over the large percentage of Iliuliuk Bay and Captains Bay which are designated on our charts as "CABLE AREA". Ships are restricted from anchoring in these extensive cable areas. These cable areas were charted from 1956 documentation by the U.S. Army Corps of Engineers (COE). To date, COE has not responded with the information necessary to make changes to the charts. The Nautical Charting Division recommended that interested parties contact the COE. *See EVAL RPT.  
Sec. 7(g)*

At the request of the Alaska Marine Pilots, RAINIER positioned a steel bolt set in the top of Arch Rock to assist in positioning a possible, future aid to navigation. To better facilitate recovery of the station, a position and description have been forwarded to the Seventeenth U.S. Coast Guard District in Juneau, Ak, and are enclosed in Appendix VI. \* (Copy also attached.)

#### S. RECOMMENDATIONS

As stated in section J, the aerial photography flown in 1983 does not accurately portray the current shoreline. Additional time was spent redefining changes to the shoreline to accurately depict it on the FFS. The hydrographer strongly recommends that revision aerial photography be flown to better depict the current shoreline, or use the aerial photography flown by Aeromap U.S., Inc. in 1990. Information concerning Aeromap U.S., Inc.'s photography is included in Appendix VI. \*

*CONCUR.  
See EVAL RPT.  
Secs. 2 & 9.*  
(Copy also attached)

#### T. REFERRAL TO REPORTS

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

<u>Title</u>	<u>Date Sent to N/CG245</u>
Summer 1991 Horizontal Control Report for OPR-Q181-RA	September 1991
Summer 1991 Electronic Control Data Package for OPR-Q181-RA	September 1991
Summer 1991 Corrections to Echo Soundings Data Package for OPR-Q181-RA	September 1991
Summer 1991 Coast Pilot Report for OPR-Q181-RA	September 1991

Respectfully Submitted,

*Heidi L. Johnson*

Heidi L. Johnson  
Ensign, NOAA

Approved and Forwarded,

*Thomas W. Richards*

Thomas W. Richards  
Captain, NOAA  
Commanding Officer

\* Filed with the hydrographic data.



No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name	Quad No.
<del>101</del>	F	<del>053:52:29.535</del>	<del>166:33:05.101</del>	<del>15</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>C</del>	<del>08/06/91</del>	<del>AQUA 1991</del>	
<del>102</del>	F	<del>053:52:52.223</del>	<del>166:33:04.001</del>	<del>26</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>B</del>	<del>08/01/91</del>	<del>BONE 1941</del>	
103	F	053:52:05.430	166:33:31.871	29	250	0.0	0.0	0	08/07/91	REBAR 1991	531664
<del>104</del>	F	<del>053:53:19.312</del>	<del>166:31:38.849</del>	<del>23</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>1</del>	<del>07/30/91</del>	<del>DUTCH NO. 1 1934</del>	
<del>105</del>	F	<del>053:53:26.890</del>	<del>166:29:52.785</del>	<del>3</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>2</del>	<del>07/30/91</del>	<del>FOUL 1991</del>	
106	F	053:49:41.460	166:35:45.898	13	250	0.0	0.0	9	08/10/91	GRASS 2 1934	531664
<del>107</del>	F	<del>053:52:23.369</del>	<del>166:31:19.744</del>	<del>18</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>3</del>	<del>07/30/91</del>	<del>GRAVE 1901</del>	
<del>108</del>	F	<del>053:53:52.494</del>	<del>166:34:27.174</del>	<del>14</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>HOG NO. 1</del>	
109	F	053:50:13.462	166:36:12.040	22	250	0.0	0.0	5	08/17/91	ISLE 1934	531664
<del>110</del>	F	<del>053:55:33.561</del>	<del>166:26:26.949</del>	<del>3</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>4</del>	<del>07/30/91</del>	<del>MORRIS 1951</del>	
111	F	053:51:54.409	166:35:07.251	4	250	0.0	0.0	7	08/07/91	NECK 2 1934	531664
<del>112</del>	F	<del>053:51:21.930</del>	<del>166:33:48.109</del>	<del>39</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>6</del>	<del>08/07/91</del>	<del>OBER 3 1991</del>	
<del>113</del>	F	<del>053:53:50.824</del>	<del>166:30:54.457</del>	<del>3</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>1</del>	<del>08/20/91</del>	<del>SOUTH BASE 2 1934</del>	
<del>114</del>	F	<del>053:53:50.635</del>	<del>166:30:55.085</del>	<del>1</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>SOUTH BASE 2 U.S.E. 1943</del>	
<del>115</del>	F	<del>053:53:50.666</del>	<del>166:30:55.139</del>	<del>10</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>SPITHEAD LIGHT 1934</del>	
<del>216</del>	Z	<del>053:52:32.188</del>	<del>166:32:10.436</del>	<del>22</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>UNALASKA CH LOWER CR 1901</del>	
117	F	053:52:30.022	166:33:22.015	131	250	0.0	0.0	A	07/30/91	1369-3 1991	531664
<del>202</del>	Z	<del>053:52:52.223</del>	<del>166:33:04.001</del>	<del>26</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>07/31/91</del>	<del>07/31/91</del>	<del>BONE 1991 R/AZ</del>	
118	F	053:52:38.230	166:32:36.324	30	250	0.0	0.0	C	08/01/91	1126E 1991	531664
<del>119</del>	F	<del>053:52:55.567</del>	<del>166:32:45.552</del>	<del>9</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>E</del>	<del>08/01/91</del>	<del>WCIMCI 1991</del>	
120	F	053:52:27.818	166:32:39.312	14	250	0.0	0.0	E	08/06/91	DOWL 1991	531664
201	Z	053:52:29.535	166:33:05.101	15	250	0.0	0.0		00/00/00	AQUA 1991 R/AZ	531664
<del>219</del>	Z	<del>053:52:55.567</del>	<del>166:32:45.552</del>	<del>9</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>WCIMCI 1991 R/AZ</del>	
217	Z	053:52:30.022	166:33:22.015	131	250	0.0	0.0		00/00/00	1369-3 1991 R/AZ	531664
<del>218</del>	Z	<del>053:52:38.230</del>	<del>166:32:36.324</del>	<del>30</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>1126E 1991 R/AZ</del>	
121	F	053:51:47.542	166:32:47.778	2	250	0.0	0.0		00/00/00	ALLUVIAL 1991	531664
122	F	053:50:03.568	166:36:46.574	2	250	0.0	0.0	5	08/18/91	EGG 1991	531664
123	F	053:50:26.897	166:36:26.678	18	250	0.0	0.0		00/00/00	LEV 1991	531664
<del>221</del>	Z	<del>053:51:47.542</del>	<del>166:32:47.778</del>	<del>4</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>ALLUVIAL 1991 R/AZ</del>	
222	Z	053:50:03.568	166:36:46.574	2	250	0.0	0.0		00/00/00	EGG 1991 R/AZ	531664
223	Z	053:50:26.897	166:36:26.678	18	250	0.0	0.0		00/00/00	LEV 1991 R/AZ	531664
<del>124</del>	F	<del>053:53:32.127</del>	<del>166:37:13.297</del>	<del>1</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>KIN 1934</del>	
<del>125</del>	F	<del>053:52:54.206</del>	<del>166:36:00.738</del>	<del>1</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>NAT 1934</del>	
206	Z	053:49:41.460	166:35:45.898	13	250	0.0	0.0		08/15/91	GRASS 2 1991 R/AZ	531664
209	Z	053:50:13.462	166:36:12.040	22	250	0.0	0.0		08/15/91	ISLE 1991 R/AZ	531664
<del>126</del>	F	<del>053:53:50.824</del>	<del>166:30:54.457</del>	<del>3</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>1</del>	<del>08/19/91</del>	<del>SOUTH BASE 2 1934</del>	
<del>203</del>	Z	<del>053:52:05.430</del>	<del>166:33:31.871</del>	<del>29</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>REBAR 1991 R/AZ</del>	
<del>212</del>	Z	<del>053:51:21.930</del>	<del>166:33:48.109</del>	<del>39</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>OBER 3 1991 R/AZ</del>	
<del>220</del>	Z	<del>053:52:27.818</del>	<del>166:32:39.312</del>	<del>14</del>	<del>250</del>	<del>0.0</del>	<del>0.0</del>	<del>00/00/00</del>	<del>00/00/00</del>	<del>DOWL 1991 R/AZ</del>	

AS OF 4 SEPT 91

DUTCH HARBOR SUMMER 1991 OPR-Q181-RA

## LIST OF GEOGRAPHIC POSITIONS

SPN	STATION NAME	GPN CODE	LATITUDE			LONGITUDE			G-NBR
			K	DEG	MN	SEC	DEG	MN	
30	ALLUVIAL	5	53	51	47.54183	166	32	47.77820	
4	APL N. DOLPHIN LIGHT	5	53	53	4.37433	166	31	45.76016	
10	APL S. DOLPHIN LIGHT	2	53	52	57.55063	166	31	59.01559	
11	AQUA	5	53	52	29.53472	166	33	5.10110	
36	ARCH ROCK BOLT	5	53	52	37.13936	166	33	58.33380	
29	BAILEY LEDGE DAYBEACON	5	53	51	35.79738	166	33	33.46855	
1941	19 BONE	9	53	52	52.22341	166	33	4.00053	7912
	24 DOWL	5	53	52	27.81750	166	32	39.31220	
1934	16 DUTCH NO. 1	5	53	53	19.31187	166	31	38.84922	
	3 EGG	5	53	50	3.56816	166	36	46.57399	
	12 FOUL	5	53	53	26.88984	166	29	52.78522	
1934	1 GRASS 2	9	53	49	41.45981	166	35	45.89818	7912
1901	15 GRAVE	5	53	52	23.36941	166	31	19.74433	
	35 GREEN BRIDGE LIGHT	5	53	52	27.68678	166	32	49.42503	
1934	2 ISLE	9	53	50	13.46155	166	36	12.03995	7912
1934	33 KIN	9	53	53	32.12694	166	37	13.29715	7912
	7 LEV	5	53	50	26.89708	166	36	26.67803	
1951	17 MORRIS	9	53	55	33.56123	166	26	26.94940	9114
1934	32 NAT	9	53	52	54.20629	166	36	.73788	7912
1934	6 NECK 2	9	53	51	54.40912	166	35	7.25106	7912
	21 NORTH FAA ANTENNA LIGHT	5	53	54	19.68776	166	32	48.99142	
	28 NW PILING UNALASKA BRIDGE	5	53	52	27.79666	166	32	49.59066	
	5 OBER 3	5	53	51	21.93009	166	33	48.10917	
	8 REBAR	5	53	52	5.42996	166	33	31.87105	
	34 RED BRIDGE LIGHT	5	53	52	27.48899	166	32	46.33703	
1934	13 SOUTH BASE 2	9	53	53	50.82372	166	30	54.45726	7912
1943	20 SOUTH BASE 2 U.S.E.	9	53	53	50.63499	166	30	55.08467	9114
	22 SOUTH FAA ANTENNA LIGHT	5	53	54	17.35550	166	32	54.44483	
1934	14 SPITHEAD LIGHT	5	53	53	50.66558	166	30	55.13917	
	27 S. RADIO MAST, EXPEDITION ISL	5	53	52	38.00211	166	33	3.94037	
1901	18 UNALASKA CHURCH LOWER CROSS	9	53	52	32.18846	166	32	10.43575	7911
	9 UNALASKA RADIO TOWER	5	53	52	32.24761	166	32	32.27523	
	31 USCG MONUMENT	5	53	52	21.78051	166	31	24.08558	
	25 WC1MC1	5	53	52	55.56658	166	32	45.55218	
	26 1126E	5	53	52	38.23047	166	32	36.32378	
	23 1369-3	5	53	52	30.02208	166	33	22.01522	

DUTCH HARBOR SUMMER 1991 OPR-Q181-RA  
LIST OF ELEVATIONS & GEOID HGT

SPN	STATION NAME	HGT CODE K	ELEVATION (M)	GEOID HGT (M)	ELEVATION SOURCE
30	ALLUVIAL	5	2.1028		NOS
4	APL N. DOLPHIN LIGHT	4	5.7380		NOS
10	APL S. DOLPHIN LIGHT	4	5.8087		NOS
11	AQUA	5	14.8280		NGS
36	ARCH ROCK BOLT	5	7.2501		NOS
29	BAILEY LEDGE DAYBEACON	4	4.3916		NOS
19	BONE	5	25.8191		NGS
24	DOWL	5	14.2635		NOS
16	DUTCH NO. 1	5	22.9928		NOS
3	EGG	5	1.6452		NOS
12	FOUL	5	2.5876		NGS
1	GRASS 2	5	13.2508		NGS
15	GRAVE	5	17.9771		NGS
35	GREEN BRIDGE LIGHT	4	6.8889		NOS
2	ISLE	5	21.6551		NGS
33	KIN	2	1.0000		NGS
7	LEV	5	17.7345		NOS
17	MORRIS	5	2.5698		NGS
32	NAT	2	1.0000		NGS
6	NECK 2	5	3.6526		NGS
21	NORTH FAA ANTENNA LIGHT	4	102.4861		NOS
28	NW PILING UNALASKA BRIDGE	4	1.4086		NOS
5	OBER 3	5	38.9414		NGS
8	REBAR	5	29.3175		NGS
34	RED BRIDGE LIGHT	4	6.9068		NOS
13	SOUTH BASE 2	9	3.4321		OTHER FEDERAL
20	SOUTH BASE 2 U.S.E.	2	1.0000		NGS
22	SOUTH FAA ANTENNA LIGHT	4	106.1275		NOS
14	SPITHEAD LIGHT	4	9.9236		NOS
27	S. RADIO MAST, EXPEDITION ISL	4	47.1038		NOS
18	UNALASKA CHURCH LOWER CROSS	4	21.6374		NGS
9	UNALASKA RADIO TOWER	4	115.4823		NOS
31	USCG MONUMENT	4	16.9344		NOS
25	WC1MC1	5	9.0439		NOS
26	1126E	5	30.4895		NOS
23	1369-3	5	130.9399		NOS

Now the left margins are set to 15 spaces.

-----  
\*\*\*\*\* ORIGINAL DESCRIPTION \*\*\*\*\*

SSN: 0036  
Designation: ARCH ROCK BOLT

PID:

Latitude: 535237N (53/52/37.13936)  
Longitude: 1663358W (166/33/58.33380)  
Elevation: 7M  
Stamping: ARCH

State: AK  
County: ALEUTIAN ISLANDS  
Disk From:

Surface Mark-  
Type: Reference Mark disk  
Magnetic code: N  
Setting: SET IN A DRILL HOLE IN BEDROCK

Set by NOS in 1991, Chief of party TWR.

-----  
STATION IS LOCATED ON THE WESTERN MOST POINT OF AMAKNAK ISLAND, 1.2 NM SOUTH OF THE SOUTHERN MOST TIP OF HOG ISLAND, AT THE NORTHERN END OF CAPTAINS BAY. STATION IS 1.0 NM NORTHEAST OF STATION NECK 2.

TO REACH STATION PROCEED BY SMALL BOAT TO ROCKS AT THE NORTH END OF WESTERN MOST POINT OF AMAKNAK ISLAND OR BY ROAD FROM THE AMAKNAK SIDE OF DUTCH HARBOR/UNALASKA BRIDGE ALONG SOUTHERN CHANNEL SOUTHWARD, TURN WEST ACROSS ISLAND AND THEN NORTH ALONG CAPTAINS BAY SHORE. ROAD ENDS 50M SOUTHEAST OF STATION. STATION IS ON A LARGE ROCK AT THE WATERLINE, APPROXIMATELY 30M WEST OF CLIFF FACE. ROCK IS TOPPED WITH GRASS, 4M LONG BY 5M WIDE, CLIMBABLE ON ITS NORTHEAST SIDE.

STATION IS A STEEL BOLT STAMPED "ARCH" AND CENTERPUNCHED, SET IN A DRILL HOLE IN HOLE DUG IN GRASS. STATION IS APPROXIMATELY 7M ABOVE WATERLINE.

DESCRIBED BY J.M.KLAY.



DR  
UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS  
NOAA Ship RAINIER S221  
1801 Fairview Avenue East  
Seattle, Washington 98102-3767

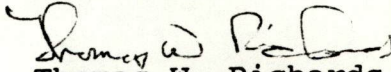
September 26, 1991

Director  
DMAHTC  
Attn: MCNM  
6500 Brookes Lane  
Washington, D.C. 20315-0030

Dear Sir:

While conducting hydrographic survey operations in Dutch Harbor, Alaska, NOAA Ship RAINIER discovered 18 dangers to navigation. They have been reported to DMAHTCNAVWARN and the Seventeenth Coast Guard District. A copy of the correspondence describing the dangers is enclosed.

Sincerely,

  
Thomas W. Richards  
Captain, NOAA  
Commanding Officer

Enclosures



ZCZC  
 NC  
 NC DE OA  
 P 241535Z SEP 91  
 FM NOAAS RAINIER  
 TO CCGDSEVENTEEN JUNEAU AK  
 DMAHTCNAVWARN JUNEAU AK  
 INFO ZEN/NOAAMOP SEATTLE WA  
 ACCT CM-VCAA  
 BT

UNCLAS

## SECTION 1 OF 2

NOAA SHIP RAINIER HAS FOUND 18 DANGERS TO NAVIGATION IN DUTCH HARBOR, ALASKA (PROJECT DPR-Q181-RA) WITHIN THE LIMITS OF THE HYDROGRAPHIC SURVEY H-10391 (CAPTAINS BAY). THE FOLLOWING INFORMATION IS PROVIDED FOR PUBLICATION IN LOCAL NOTICE TO MARINERS:

CHARTS AFFECTED: 16528 14TH ED MAR. 17/84 1:40,000 NAD27  
 16529 12TH ED MAR. 2/91 1:10,000 NAD83  
 16530 5TH ED AUG. 26/91 1:10,000 NAD83

DEPTHS ARE REDUCED TO MLLW BASED ON PREDICTED TIDES.

ITEM	DANGER	CHART	DEPTH	DATUM	LATITUDE	LONGITUDE	Ass. No.
I.	SHOAL	16528	4 FM	NAD27	53-51-40.73N	166-33-25.82W	8295+5
	COV	16529 16530		NAD83	53-51-37.63N	166-33-32.63W	
B.	SHOAL	16530	7 1/2 FM	NAD83	53-51-21.74N	166-35-26.55W	6798+7
	COV						
C.	SHOAL	16530	6 3/4 FM	NAD83	53-51-05.90N	166-34-25.08W	6545+0
	COV						
D.	SHOAL	16530	7 FM	NAD83	53-50-34.58N	166-35-57.52W	8156+3
	COV						
E.	SHOAL	16528	5 1/4 FM	NAD27	53-50-34.51N	166-35-36.47W	8085+3
	COV	16530		NAD83	53-50-31.41N	166-35-43.26W	
F.	SHOAL	16528	3 1/4 FM	NAD27	53-50-31.70N	166-35-39.05W	8128+5
	COV	16530		NAD83	53-50-28.60N	166-35-45.84W	
G.	SHOAL	16528	7 FM	NAD27	53-50-27.54N	166-35-30.12W	8198+3
	COV	16530		NAD83	53-50-24.44N	166-35-36.91W	
H.	SHOAL	16530	2 3/4 FM	NAD83	53-50-24.23N	166-35-53.63W	8292+8+H 8291+8
	COV						
I.	SHOAL	16530	5 1/4 FM	NAD83	53-50-21.70N	166-35-48.58W	8293+6
	COV						
J.	SHOAL	16530	5 FM	NAD83	53-50-04.63N	166-36-42.00W	8475+0
	COV						
K.	SHOAL	16530	5 FM	NAD83	53-50-06.05N	166-36-32.60W	5691+2
	COV						
L.	SHOAL	16528	6 1/2 FM	NAD27	53-50-01.80N	166-35-48.90W	8586+6
	COV	16530		NAD83	53-49-58.70N	166-35-55.69W	
M.	SHOAL	16530	7 1/4 FM	NAD83	53-49-57.51N	166-35-51.70W	8578+6
	COV						

BT  
 NNNN

ZCZC  
 NC  
 NC DE OA  
 P 241535Z SEP 91  
 FM NOAA S RAINIER  
 TO CCGDSEVENTEEN JUNEAU AK  
 DMAHTCNAYWARN JUNEAU AK  
 INFO ZEN/NOAAMOP SEATTLE WA  
 ACCT CM-VCAA  
 BT  
 UNCLAS  
 SECTION 2 OF 2

- N. AN UNCHARTED BARGE AT 53-49-52.10N, 166-36-38.21W (NAD27);  
 53-49-49.00N, 166-36-45.00W (NAD83) WAS FOUND UNCOVERED 9  
 3/4 FT. THE BARGE LIES PARALLEL TO THE WATERLINE IN A MUD  
 FLAT IN LESS THAN 1 METER OF WATER. THIS BARGE APPLIES TO  
 CHARTS 16528 AND 16530.
- O. AN UNCHARTED WRECK AT 53-49-52.99N, 166-36-29.17W (NAD27);  
 53-49-49.89N, 166-36-35.96W (NAD83) WAS FOUND UNCOVERED 28  
 3/4 FT. THE WRECK IS AT AN ANGLE OF 30 DEGREES TO THE  
 WATERLINE WITH ONLY THE BOW EXPOSED ABOVE WATER. THIS  
 PORTION OF THE WRECK IS APPROXIMATELY 50 FEET WIDE BY 155  
 FEET LONG AND APPLIES TO CHARTS 16528 AND 16530.
- F SHOAL 16530 7 1/2 FM NAD83 53-49-52.64N 166-36-13.24W  
 COV
- G. SHOAL 16528 4 FM NAD27 53-49-53.92N 166-35-52.10W  
 COV 16530 NAD83 53-49-50.82N 166-35-58.89W
- R. NUMEROUS DEPTHS INSHORE OF THE 10 FM CURVE IN CAPTAINS BAY  
 ARE SHOALER THAN THOSE CHARTED. MARINERS SHOULD EXERCISE  
 CAUTION WHEN NAVIGATING CLOSE INSHORE IN THIS AREA.

THIS IS ADVANCE INFORMATION SUBJECT TO OFFICE REVIEW. QUESTIONS  
 CONCERNING THIS MESSAGE SHOULD BE DIRECTED TO THE CHIEF, PACIFIC  
 HYDROGRAPHIC SECTION AT (206) 526-6835. A LETTER WITH ATTACHED  
 CHARTLET IS BEING MAILED TO CONFIRM THIS MESSAGE.

BT  
 NNNN

Pos. No.

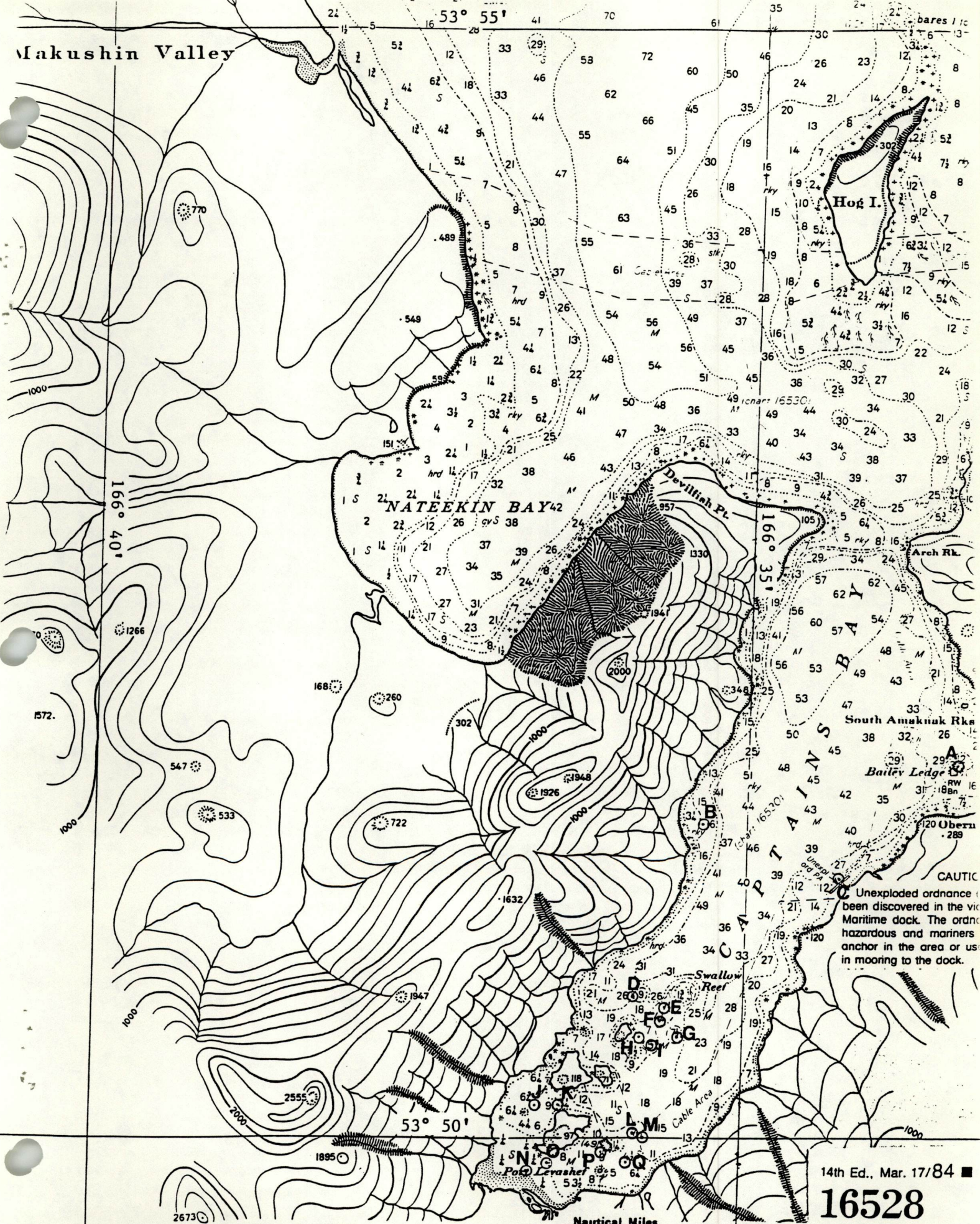
R4-33  
 (REFERENCE  
 NUMBER)

5568-69

5516<sup>r2</sup>

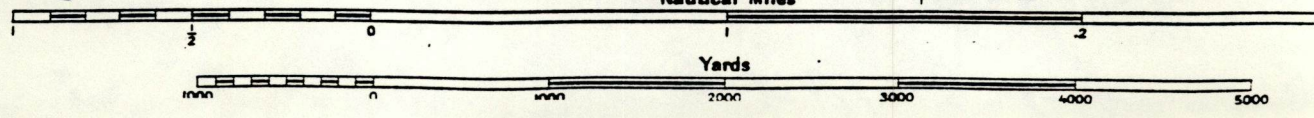
8422<sup>r3</sup>

Makushin Valley



CAUTION  
 Unexploded ordnance has been discovered in the vicinity of the Maritime dock. The ordnance is hazardous and mariners should avoid anchoring in the area or using the dock in mooring to the dock.

14th Ed., Mar. 17/84 ■  
**16528**







UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS  
NOAA Ship RAINIER S221  
1801 Fairview Avenue East  
Seattle, Washington  
98102-3767

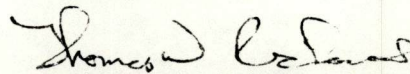
September 26, 1991

Commander  
Seventeenth Coast Guard District  
Post Office Box 3-5000  
Juneau, Alaska 99802

Dear Sir:

Attached is a confirmation copy of the radio message sent to your office regarding the dangers to navigation which I recommend for inclusion in the Local Notice to Mariners for the Seventeenth Coast Guard District. A copy of the chart showing the areas in which the dangers exist is also attached.

Sincerely,

  
Thomas W. Richards  
Captain, NOAA  
Commanding Officer

Enclosures

cc: DMAHTC  
N/CG221  
PMC





FOO copy  
UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS  
NOAA Ship RAINIER  
1801 Fairview Ave. E.  
Seattle, Washington 98102

September 9, 1991

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

Dear Sir:

In conjunction with survey operations OPR-Q181-RA, Unalaska and Kalekta Bays, Alaska, personnel from NOAA Ship RAINIER have determined positions of landmarks near Dutch Harbor as requested by the Coast Guard to aid in setting aids to navigation. Specifically, positions were determined for the NW Piling, of the Dutch Harbor/Unalaska Bridge and the South Radio Mast, Expedition Island.

At the request of the Alaska Marine Pilots, RAINIER also positioned a steel bolt set in the top of Arch Rock to assist in positioning a possible, future aid to navigation. Enclosed is a description of Arch Rock Bolt to facilitate recovery of the station. The position for Spithead Light (Light List no. 27460) was found to differ by 1.817 meters from the NGS published position and a new position was determined for the light. RAINIER also positioned the APL Dolphin Lights (Light List no. 27467). All positions meet Third-order, Class 1 specifications and are based on the North American Datum of 1983 and the GRS Ellipsoid of 1980. The positions listed below are field positions and are not adjusted:

<u>Navigation Aid</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
NW Piling, Unalaska/ Dutch Harbor Bridge	53°52'27.797"	166°32'49.591"
South Radio Mast, Expedition Isl	53°52'38.002"	166°33'03.940"
Arch Rock Bolt	53°52'37.139"	166°33'58.334"
Spithead Light	53°53'50.666"	166°30'55.139"
APL North Dolphin Light	53°53'04.374"	166°31'45.760"
APL South Dolphin Light	53°52'57.551"	166°31'59.016"
Green Bridge Light	53°52'27.687"	166°32'49.425"
Red Bridge Light	53°52'27.489"	166°32'46.337"

Questions concerning these data may be directed to: Commanding Officer, NOAA Ship RAINIER, 1801 Fairview Avenue East, Seattle, Washington 98102-3767, telephone (206) 553-4794.

Sincerely,

Thomas W. Richards  
Captain, NOAA  
Commanding Officer

Enclosure





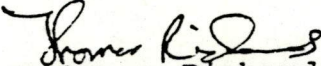
UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS  
NOAA Ship RAINIER S221  
1801 Fairview Avenue East  
Seattle, WA 98102

October 4, 1991

MEMORANDUM FOR: CAPT John C. Albright, NOAA  
Chief, Nautical Chart Division

FROM:

  
CAPT Thomas Richards, NOAA  
Commanding Officer, NOAA Ship RAINIER

SUBJECT: Revision Aerial Photography in Dutch Harbor

During the Dutch Harbor survey, RAINIER noted that the aerial photography flown in June, 1983 was already out of date and no longer accurately portrays the current shoreline. Much time was spent during RAINIER's survey in redefining the shoreline to depict it on the final field sheet as accurately as possible using hydrographic detached position techniques. Detached position techniques are extremely limited in their ability to depict the complex shoreline changes RAINIER observed in Dutch Harbor. Due to the rapid growth of the area, revision photography is needed to clearly depict man-made features such as processing plants, docks, barges, and roads. RAINIER strongly suggests revision aerial photography be flown to better depict the current shoreline.

RAINIER obtained information from Aeromap U.S., Inc. in Anchorage, Alaska concerning aerial photography they flew in Sept, 1990 over the Dutch Harbor area. The area they covered is depicted on the included chartlet. Stephen Sparks, Aeromap U.S., Inc., provided a price of \$646.00 for a set of 88 60% overlapping color photos (1:7200) of the area. The phone and address of Aeromap U.S., Inc. are noted on the attached Aeromap transmittal.

Until such time as C&GS can obtain modern revision photography, RAINIER suggests the photography from Aeromap U.S., Inc. be used as revision photography, provided the photos meet the C&GS revision mapping standards.

Attachments

cc N/CG245





# 1990 Photo Coverage

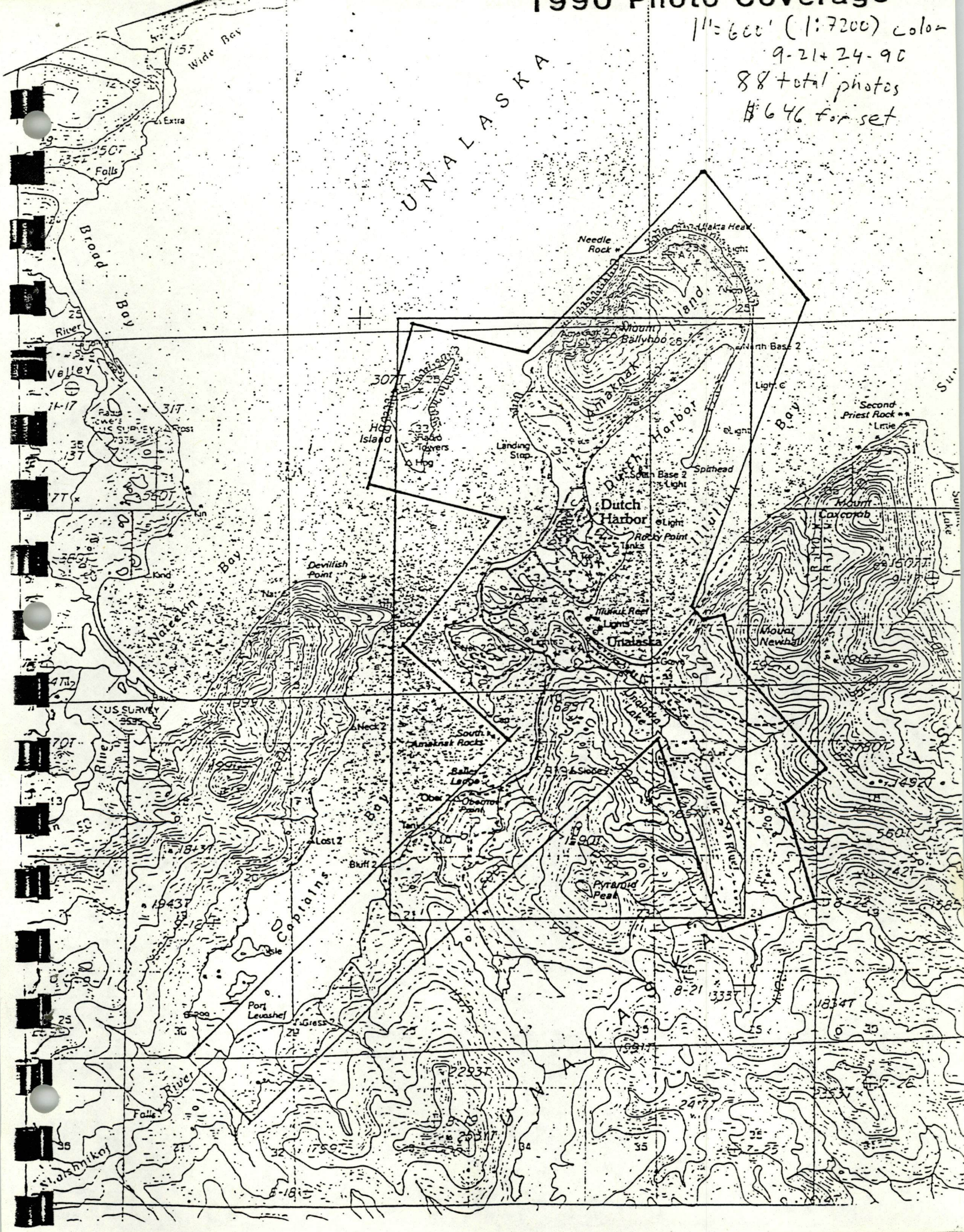
1" = 600' (1:7200) color

9-21+24-90

88 total photos

\$646 for set

UNALASKA





F.O.O.

UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS  
NOAA Ship RAINIER S221  
1801 Fairview Avenue East  
Seattle, Washington 98102

3 July 1991

MEMORANDUM FOR: Rear Admiral J. Austin Yeager, NOAA  
Director, Coast & Geodetic Survey

FROM: Rear Admiral R. L. Speer, NOAA  
Director, Pacific Marine Center  
*Thomas W. Richards*  
Captain Thomas W. Richards, NOAA  
Commanding Officer, NOAA Ship RAINIER

SUBJECT: Charted Cable Areas, Dutch Harbor, Alaska

The Alaska Marine Pilots Association, the Dutch Harbor Harbormaster and the Unalaska City Manager have expressed concern over the large percentage of Iliuliuk Bay and Captains Bay which are designated on our charts as "CABLE AREA". Ships are restricted from anchoring in these extensive cable areas. RAINIER requests N/CG241 research the source of the charted cable areas shown on the attached chartlets.

U.S. fishermen are landing more fish by weight in Dutch Harbor-Unalaska than in any other port in the United States. There were 510 million pounds landed in 1990 and 504 million pounds in 1989. Existing anchorage areas are frequently full of ships. Because of the cable area restrictions, pilots are having to anchor ships very close together. This is particularly dangerous considering typical Aleutian weather conditions. Other ships are required to anchor considerable distances from Dutch Harbor. If the cable areas could be eliminated because they are no longer active, or if the designated cable area size could be reduced, the efficiency and effectiveness of Dutch Harbor as the United States leading fishing port would be enhanced.

Please provide Pacific Marine Center and RAINIER whatever background information you can regarding these cable areas before the Dutch Harbor survey begins on July 26, 1991. In addition, any action you can take to help reduce the charted cable areas and thereby increase the area available for vessel anchorage would be gratefully appreciated by local authorities in Dutch Harbor-Unalaska.

Enclosures



# DUTCH HARBOR

Meridian Projection  
 Scale 1:10,000 at Lat. 53° 54'  
 North American Datum of 1983  
 (World Geodetic System 1984)  
 SOUNDINGS IN FATHOMS  
 AT MEAN LOWER LOW WATER

**HORIZONTAL DATUM**  
 The horizontal datum of this chart is the North American Datum of 1983 (NAD 83), which for practical purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic coordinates referred to the North American Datum of 1983 shall be compared to the datum of 1911 (measured and 1917) and converted to the datum of 1983.

ART #16529  
 4th Ed.; Mar. 2/91  
 1:10,000 scale  
 NAD 83

## CHART REDUCTION

### NOTE & CAUTION

It has been assumed that special sounds plotting in the soundings area of Dutch Harbor have been done and are shown on the chart. The user is cautioned that the soundings shown on this chart are based on the data provided by the U.S. Coast and Geodetic Survey and are not necessarily the most current data available.

TIDE INFORMATION	
Height referred to datum of sounding (MLLW)	
Time	Height
Low Water	0.0
High Water	1.0
Mean High Water	1.5
Mean Low Water	0.5
Mean Higher High Water	2.0
Mean Lower Low Water	0.0

### EXPLANATIONS (For complete list of Symbols and Abbreviations, see Chart No. 1)

- 1. Soundings: Depth in fathoms, meters, or other units as indicated.
- 2. Underway lights: As shown on the chart.
- 3. Daymarks: As shown on the chart.
- 4. Buoys: As shown on the chart.
- 5. Obstructions: As shown on the chart.
- 6. Rocks: As shown on the chart.
- 7. Shoals: As shown on the chart.
- 8. Sandbars: As shown on the chart.
- 9. Bars: As shown on the chart.
- 10. Channels: As shown on the chart.
- 11. Harbors: As shown on the chart.
- 12. Rivers: As shown on the chart.
- 13. Lakes: As shown on the chart.
- 14. Swamps: As shown on the chart.
- 15. Forests: As shown on the chart.
- 16. Cultivated land: As shown on the chart.
- 17. Pasture: As shown on the chart.
- 18. Meadows: As shown on the chart.
- 19. Pasture: As shown on the chart.
- 20. Forests: As shown on the chart.
- 21. Cultivated land: As shown on the chart.
- 22. Pasture: As shown on the chart.
- 23. Meadows: As shown on the chart.
- 24. Pasture: As shown on the chart.
- 25. Forests: As shown on the chart.
- 26. Cultivated land: As shown on the chart.
- 27. Pasture: As shown on the chart.
- 28. Meadows: As shown on the chart.
- 29. Pasture: As shown on the chart.
- 30. Forests: As shown on the chart.
- 31. Cultivated land: As shown on the chart.
- 32. Pasture: As shown on the chart.
- 33. Meadows: As shown on the chart.
- 34. Pasture: As shown on the chart.
- 35. Forests: As shown on the chart.
- 36. Cultivated land: As shown on the chart.
- 37. Pasture: As shown on the chart.
- 38. Meadows: As shown on the chart.
- 39. Pasture: As shown on the chart.
- 40. Forests: As shown on the chart.
- 41. Cultivated land: As shown on the chart.
- 42. Pasture: As shown on the chart.
- 43. Meadows: As shown on the chart.
- 44. Pasture: As shown on the chart.
- 45. Forests: As shown on the chart.
- 46. Cultivated land: As shown on the chart.
- 47. Pasture: As shown on the chart.
- 48. Meadows: As shown on the chart.
- 49. Pasture: As shown on the chart.
- 50. Forests: As shown on the chart.

### NOTES

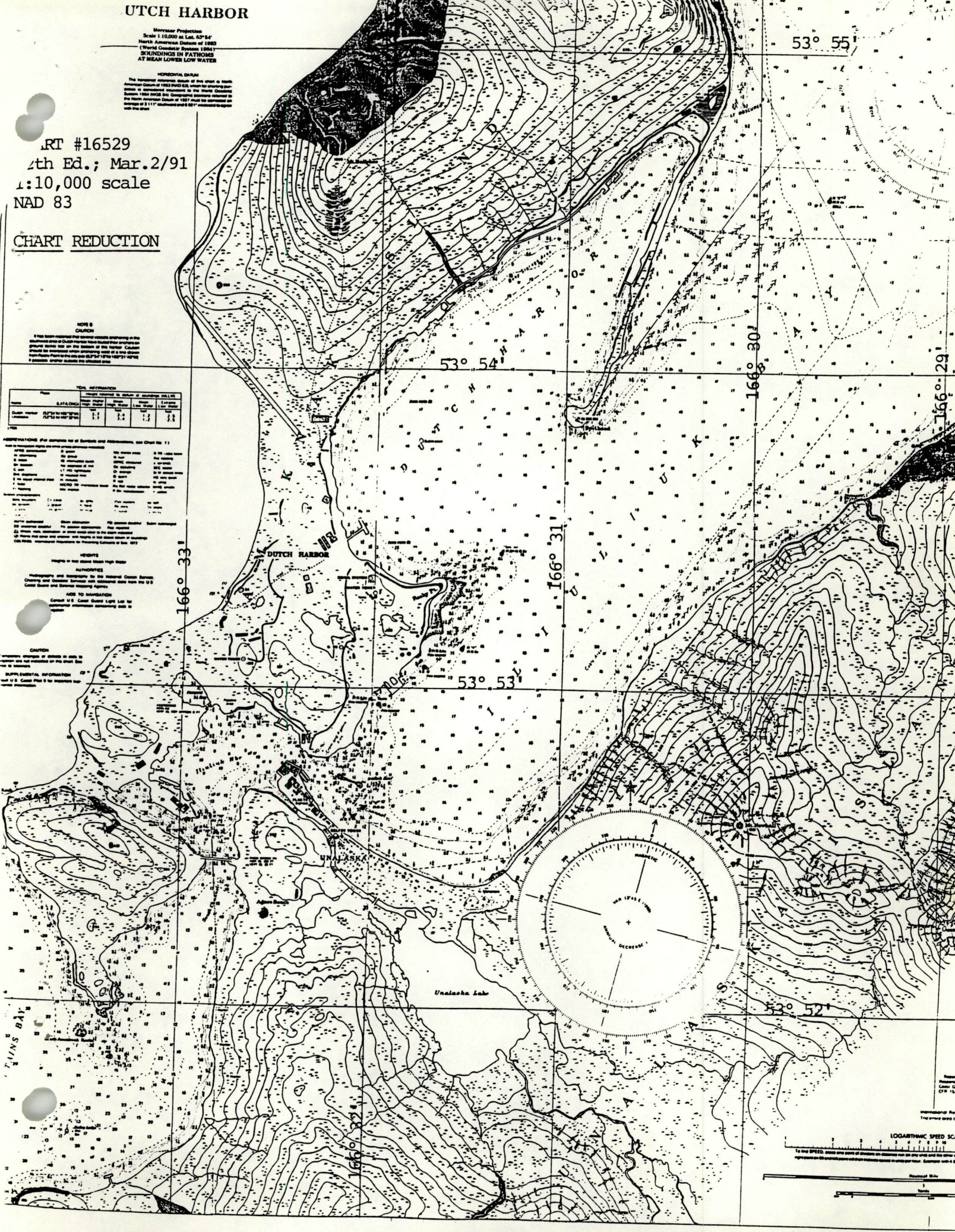
1. Charts in this series show High Water.  
 2. Hydrographic and nautical charts are published by the National Ocean Service, Office of Coast Survey, and are available from the U.S. Coast and Geodetic Survey.  
 3. U.S. Coast and Geodetic Survey.  
 4. U.S. Coast and Geodetic Survey.  
 5. U.S. Coast and Geodetic Survey.

### CAUTION

1. The user is cautioned that the soundings shown on this chart are based on the data provided by the U.S. Coast and Geodetic Survey and are not necessarily the most current data available.  
 2. The user is cautioned that the soundings shown on this chart are based on the data provided by the U.S. Coast and Geodetic Survey and are not necessarily the most current data available.

### SUPPLEMENTAL INFORMATION

1. U.S. Coast and Geodetic Survey.  
 2. U.S. Coast and Geodetic Survey.



53° 55'

53° 54'

53° 53'

166° 30'

166° 31'

166° 33'

166° 29'

52° 52'

LOGARITHMIC SPEED SCALE  
 To find SPEED, draw one point of dividers on distance run in any unit and the other on representation of time and read speed in same unit. Example: with 4 mi.



CHART # 1653Q  
5th Ed., Aug. 26/89  
1:10,000 scale  
NAD 83

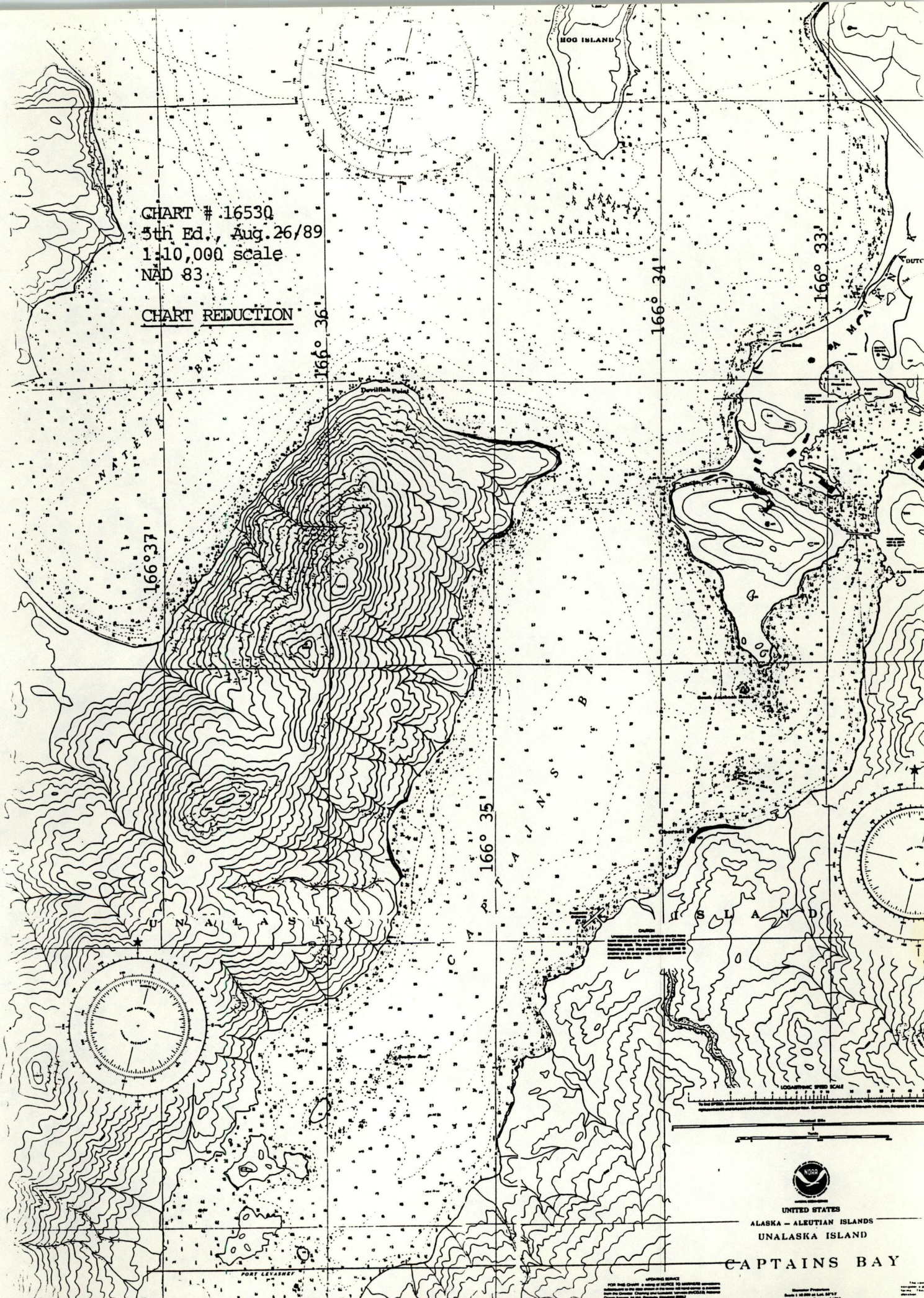
CHART REDUCTION

3° 53'

30

° 51'

° 50'



FOR THIS CHART, THE UNITED STATES GOVERNMENT ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF THE DATA OR THE RESULTS OF ANY USE THEREOF. THE UNITED STATES GOVERNMENT IS NOT RESPONSIBLE FOR ANY DAMAGE TO PERSONS OR PROPERTY THAT MAY BE CAUSED BY THE USE OF THIS CHART.



UNITED STATES  
ALASKA - ALUTIAN ISLANDS  
UNALASKA ISLAND

CAPTAINS BAY

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

1653Q  
Aug. 26/89  
1:10,000 scale  
NAD 83





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

JUL 30 1991

MEMORANDUM FOR: Rear Admiral R. L. Speer, NOAA  
Director, Pacific Marine Center

FROM: *Richard L. Shell*  
Rear Admiral J. Austin Yeager, NOAA  
Director, Coast and Geodetic Survey

SUBJECT: Charted Cable Areas, Dutch Harbor, Alaska

In reference to the July 3, 1991, memorandum from you and Captain Thomas W. Richards, the Coast and Geodetic Survey is aware of the cable area dilemma in Alaskan waters. The Nautical Charting Division (NCD) contacted the Alaska Marine Pilot Association and the NOAA Anchorage Liaison Officer about the areas.

These cable areas were charted from 1956 documentation provided by the U.S. Army Corps of Engineers (COE). NCD has had several discussions about Dutch Harbor with COE offices in Washington, D.C., and in Anchorage. To date, COE has not responded with the information necessary to make changes to our charts.

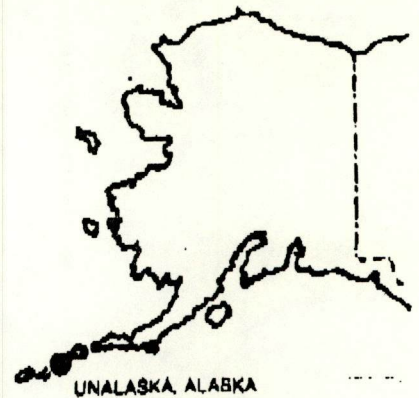
We recommend you advise the interested local parties to contact COE.

cc: PMC RA - T. Richards ✓



**CITY OF UNALASKA**

P.O. BOX 89  
UNALASKA, ALASKA 99585  
(907) 581-1251  
FAX (907) 581-1417



August 09, 1991

Honorable Ted Stevens  
United States Senate  
522 Hart Building  
Washington, D.C. 20510

RE: Unnecessary limiting of anchoring area  
in the Port of Dutch Harbor

Dear Senator Stevens:

The anchoring area in this Port is being limited because the U.S. Army Corps of Engineers has not responded to a request from NOAA and the Pacific Marine Center. The problem for the Port is the continued designation of "CABLE AREAS" on the navigation charts.

The Communication cables used in World War II were last documented in 1956 by COE as needing protection from anchors. NOAA and the Pacific Marine Center has asked the COE to elimination that designation from the charts; but, COE has not responded.

I am asking your assistance to have COE eliminate "CABLE AREAS" from the charts used for this Port. The increased usage of this Port makes it most important that every possible area is available for vessels.

Enclosed are copies of the correspondence between the Directors of the Pacific Marine Center and the Coast and Geodetic Survey that restate our problems.

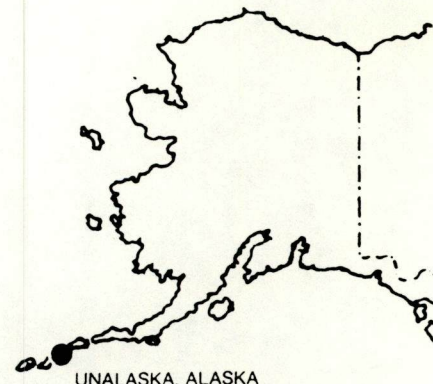
Senator Stevens, your help in this important matter would be greatly appreciated.

Respectfully,  
CITY OF UNALASKA

Polly Prchal  
City of Unalaska

**CITY OF UNALASKA**

P.O. BOX 89  
UNALASKA, ALASKA 99685  
(907) 581-1251  
FAX (907) 581-1417



September 13, 1991

George Zieler, Chief  
Construction Operations Division  
Alaska District  
U.S. Army Corps of Engineers  
P.O. Box 898  
Anchorage, Alaska 99506-0898

SUBJECT: Request for Removal of "CABLE AREA: Designations on  
Nautical Charts

Dear Mr. Zieler:

The City of Unalaska has been advised that you are the appropriate official within the Alaska District, Army Corps of Engineer to receive this request. A copy is being sent to Col. Pierce for his information.

At the request of the City of Unalaska the National Oceanic and Atmospheric Administration this summer conducted an inquiry into the "CABLE AREA" designations on the nautical charts for the Unalaska area. Numerous designations of this type overlay substantial portions of Dutch Harbor, Iliuliuk Bay and Captains Bay.

NOAA determined that an August 13, 1956 communication from the Corps of Engineers to NOAA transmitted 27 overlays of Alaska Communication System submarine cables and requested that the overlays be reproduced on nautical charts and designated "CABLE AREAS". The communication asserted that thte action had been approved by appropriate authorities in both the Army and the Navy. In communication with a City of Unalaska respresentative, NOAA staff observed that no other documentation of the recommendation was available. Hence, we have no way of knowing whether the "CABLE AREA" designations were overly generous in terms of area. We have no information on the number of cables or other pertinent information.

MR. GEORGE ZIELER - PAGE 2

The "CABLE AREA" designations have a negative impact on the Port of Dutch Harbor and its users. In 1956 maritime activity in the area was extremely limited. Today the opposite is true. Dozens of ships and large boats are anchored in Dutch Harbor, Iliuliuk Bay and Captains Bay daily. The designated cable areas are avoided by vessels seeking an anchorage. As a result harbor congestion is often extreme.

Adding to the importance of the issue is the November planned opening of the Unalaska Marine Center, a 731-foot addition to the City's Ballyhoo Dock. Beginning with the dock's opening, Sea-Land container ships and Petro Petroleum barges will be using the expanded facilities, requiring clear approach channels. Establishment of an official docking fairway has been suggested. The available anchorages, already limited by the "CABLE AREA" designations, will be under additional pressure by increased shipping to the Ballyhoo Dock area. The urgency of removing the "CABLE AREA" designations is obvious.

Five specific actions by the Corps of Engineers are hereby requested by the City of Unalaska. They are:

Formal involvement in the problem and its resolution including designation of a project officer with whom the City of Unalaska can work to resolve this problem expeditiously.

Coordination with NOAA to insure to the degree possible that the chart designation areas are minimized as far as they safely can be. We have found NOAA contacts in Rockville, MD to be both forthcoming and helpful.

Quantification of the hazard to navigation represented by the "CABLE AREAS"

Removal of the cables from the area

Coordination with NOAA of the removal of the "CABLE AREA" designations from the nautical charts

We recognize this is a tall order and one which will not be completed overnight. At the same time we presume that the area's significance and continued efficiency as the nation's most active fishing port is of critical importance to the Corps. Further, we understand that funds for remediation of World War II military impacts are available in Alaska. We sincerely encourage the commitment of such funds on an emergency basis to resolve the harbor congestion problem created by the NOAA nautical chart "CABLE AREA" designations.

MR. GEORGE ZIELER - PAGE 3

Any questions concerning this matter should be addressed to me or to Tyler Jones, the City of Unalaska's Port Consultant in Anchorage at 274-9559.

Respectfully,  
CITY OF UNALASKA

*Polly Prchal*

Polly Prchal  
City Manager

cc: Honorable Ted Stevens, U.S. Senate  
✓ Captain Thomas W. Richards, NOAA Ship RAINIER  
Col. John W. Pierce, District Engineer  
Lt. Cdr. John Wilder, NOAA - Rockville MD  
Mike Riddle, NOAA -Rockville MD  
Mark Larsen, NOAA Anchorage Liaison  
Alaska Marine Pilots Association

## APPROVAL SHEET

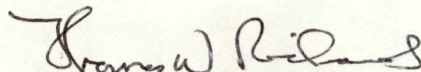
for

**H-10391**

(RA-5-4-91)

Standard procedures were followed in accordance with the Hydrographic Manual (Fourth Edition), the Hydrographic Survey Guidelines, and the Field Procedures Manual in producing this survey. The data were examined daily during data acquisition and processing.

The field sheets and accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved.



Thomas W. Richards  
Captain, NOAA  
Commanding Officer



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Rockville, Maryland 20852

ORIGINAL

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE:** November 14, 1991

**MARINE CENTER:** Pacific

**OPR:** Q181-RA

**HYDROGRAPHIC SHEET:** H-10391

**LOCALITY:** Captains Bay, Unalaska, Alaska

**TIME PERIOD:** August 7 - August 21, 1991

**TIDE STATIONS USED:** 946-2620 (746-2620) Unalaska, Alaska  
Lat.  $53^{\circ} 52.8'N$  Lon.  $166^{\circ} 32.3'W$

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 2.7 ft.

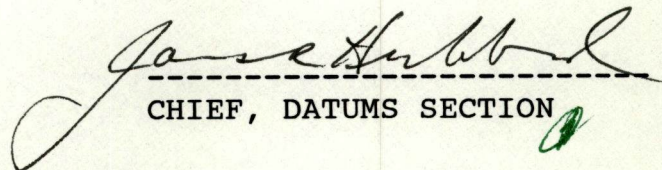
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.5 ft.

**REMARKS:** RECOMMENDED ZONING

Times and heights are direct on Unalaska.

Notes: 1. The Unalaska station # is 946-2620, however, the data used is from the Next Generation Water Level Measurement System Gauge which is temporarily stored as #746-2620.

2. Times are tabulated in Greenwich Mean Time.

  
CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

Name on Survey	ON CHART NO. 16530 TP-011358 CON U.S. QUADRANGLE MAPS FROM LOCAL INFORMATION ON LOCAL MAPS P.O. GUIDE OR MAP GRAND McNALLY ATLAS U.S. LIGHT LIST										
	A	B	C	D	E	F	G	H	K		
ALASKA (title)	X	X									1
AMAKNAK ISLAND	X										2
ARCH ROCK	X	X									3
BAILEY LEDGE	X										4
CAPTAINS BAY	X	X									5
LEVASHEF, PORT	X	X									6
OBERNOI POINT	X	X									7
SOUTH AMAKNAK ROCKS	X	X									8
SOUTH CHANNEL	X	X									9
SWALLOW REEF	X										10
UNALASKA ISLAND	X	X									11
											12
											13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25

Approved:

*Charles E. Hovington*  
Chief Geographer -N/CG2x5

MAR - 5 1992



NOAA FORM 77-27(H) (9-83)		U.S. DEPARTMENT OF COMMERCE		REGISTRY NUMBER	
HYDROGRAPHIC SURVEY STATISTICS				H-10391	
RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.					
RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		7
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		4
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	3				
ENVELOPES					
VOLUMES	2				
CAHIERS					
BOXES					
SHORELINE DATA					
SHORELINE MAPS (List):					
PHOTOBATHYMETRIC MAPS (List):					
NOTES TO THE HYDROGRAPHER (List):					
SPECIAL REPORTS (List):					
NAUTICAL CHARTS (List):					
OFFICE PROCESSING ACTIVITIES					
The following statistics will be submitted with the cartographer's report on the survey					
PROCESSING ACTIVITY			AMOUNTS		
			VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET					3,308
POSITIONS REVISED					
SOUNDINGS REVISED					
CONTROL STATIONS REVISED					
			TIME-HOURS		
			VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION					
VERIFICATION OF CONTROL					
VERIFICATION OF POSITIONS			93.0		93.0
VERIFICATION OF SOUNDINGS			354.0		354.0
VERIFICATION OF JUNCTIONS					
APPLICATION OF PHOTOBATHYMETRY					
SHORELINE APPLICATION/VERIFICATION					
COMPILATION OF SMOOTH SHEET			139.5		139.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS				14.0	14.0
EVALUATION OF SIDE SCAN SONAR RECORDS					
EVALUATION OF WIRE DRAGS AND SWEEPS					
EVALUATION REPORT				73.5	73.5
GEOGRAPHIC NAMES					
OTHER* Digitizing			20.5		20.5
*USE OTHER SIDE OF FORM FOR REMARKS					
			<b>TOTALS</b>	<b>607.0</b>	<b>87.5</b>
Pre-processing Examination by LT M. Brown			Beginning Date 10/07/91	Ending Date 10/18/91	
Verification of Field Data by T. Jones, M. Sanders			Time (Hours) 586.5	Ending Date 9/16/92	
Verification Check by J. Stringham, J. Green			Time (Hours) 72.0	Ending Date 10/16/92	
Evaluation and Analysis by I. Almacen			Time (Hours) 87.5	Ending Date 2/18/93	
Inspection by J. Green			Time (Hours) 7	Ending Date 4/21/93	

# EVALUATION REPORT

H-10391

## 1. INTRODUCTION

Survey H-10391 is a basic hydrographic survey accomplished by the NOAA Ship RAINIER, under the following Project Instructions.

OPR-Q181-RA, dated May 29, 1991  
CHANGE NO. 1, dated June 17, 1991  
CHANGE NO. 2, dated July 12, 1991

This survey was conducted in Alaska, along the northern coast of Unalaska Island and south of Amaknak Island. It covers the area of Captains Bay from the vicinity of Arch Rock and South Amaknak Rocks to Port Levashef. The coast is mostly rocky with scattered small islands and islets particularly in the vicinity of Port Levashef. The bottom generally consists of mud and silt. Depths range from 0.4 to 115.0 meters.

Predicted tides for Dutch Harbor, Alaska, gage 946-2109, were used for the reduction of soundings during field processing. Approved hourly heights zoned direct from Unalaska, Alaska, gage 946-2620, were used during office processing.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. Sound velocity correction table No.4 was updated to provide correctors for deeper depths not covered by the correction tables generated in the field. The TRA and electronic control correctors are adequate. An accompanying computer printout contains the revised data.

A digital file has been generated for this survey as required by the specifications contained in Hydrographic Survey Guideline No.52, Standard Digital Data Exchange Format, April 15, 1986. Certain descriptive information, however, may not be in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete depiction of survey data.

## 2. CONTROL AND SHORELINE

Sections H and I of the hydrographer's report and the Summer 1991 Horizontal and Electronic Control Reports for OPR-Q181-RA, contain adequate discussions of horizontal control and hydrographic positioning.

Positions of horizontal control stations used during hydrography are 1934 published values and 1991 field values based on NAD 83. These values were used during office processing for the computation of positions. The smooth sheet and accompanying overlays are annotated with NAD 27 adjustment ticks 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: -3.100 seconds (-95.834 meters)  
Longitude: 6.800 seconds (124.309 meters)

The year of establishment of control stations shown on the smooth sheet originates with NGS listings and the previously referenced horizontal control report.

During this survey, a station marked "Arch" was set on top of the area of Arch Rock at latitude 53/52/37N, longitude 166/33/58W. It was positioned by RAINIER personnel as requested by the Alaska Marine Pilots Association, for the proposed location of an aid to navigation.

Some of the fixes in this survey exceeded the specification in terms of the maximum allowable limits of error circle radius (ECR) and residual values or have angles of intersection less than 30 degrees or more than 150 degrees. However, a review of the data indicates that the positioning of soundings were consistent with the surrounding areas and none of these fixes were used to locate dangers to navigation. These fixes are considered acceptable.

The following shoreline map was compiled on NAD 83 datum and applied to this survey.

	<u>Photo Date</u>	<u>Class</u>	<u>Scale</u>
TP-01358	June 1983	III	1:10,000

The following shoreline changes, depicted on the smooth sheet with a solid red line, are supported with positional information. These revisions are considered adequate to supersede the photogrammetrically delineated shoreline within the common area.

<u>Feature</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
Dock/blkhd	53/50/40	166/34/41
Piers	53/50/46	166/34/46
Pier	53/51/11	166/34/24
Wharf	53/51/29	166/33/15

The following shoreline changes, depicted on the smooth sheet with a dashed red line, were transferred from the final field sheet without supporting positional information. These revisions are approximate but are considered adequate to supersede the photogrammetrically delineated shoreline within the common area.

<u>Feature</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
MHWL/Pier	53/50/35	166/34/52
MHWL	53/51/22	166/33/52
MHWL	53/51/27	166/33/22
MHWL	53/52/12	166/35/12
MHWL	53/52/20	166/35/05

The pier ruins compiled on the 1983 shoreline map TP-01358 at latitude 53/51/03N, longitude 166/34/29W, were investigated during this survey and no remaining evidence of the ruins were discovered. The charted pier ruins should be deleted from the shoreline map of the area.

The shoreline at the head of Port Levashef was not verified during this survey due to the shallow condition of the area which prevented launches from approaching the beach.

The 1983 aerial photography of Captains Bay does not portray the current changes in the shoreline. The rapid growth of the area has added new significant features such as piers, docks and processing plants that were not yet constructed in 1983. More recent photography is needed to update the shoreline map of the area.

### 3. HYDROGRAPHY

With the exceptions noted below, hydrography is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the standard 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.

In most areas of this survey the inshore depth curves were not defined with some of the sounding lines ending before the 5-meter curves were reached, particularly around the group of small islands north of Port Levashef. The low water area around Port Levashef was also not adequately developed during this survey.

### 4. CONDITION OF SURVEY

Except as follows, 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, January 1990 Edition.

In section I the hydrographer discusses procedures used to verify the adequacy of positioning when using two LOP's. The explanation that this type of hydrography was bracketed with multiple LOP positioning fails to address the potential for significant deviations from assumed launch locations in situations other than those involving dead reckoning. Randomly located detached positions must be independently checked with multiple LOP's. A review of the survey data did not disclose any such deficiencies in positioning, however, descriptive reports should be very specific in identifying positioning problems and their potential effect on the quality of the survey.

The hydrographer's comparison with prior surveys in section M lacks a discussion of the general trends such as shoaling or deepening noted during this survey. Instead, the section consists of detailed discussion of individual prior soundings as compared to the survey. Detailed discussions should be restricted only to significant discrepancies in depths or features. (FPM, Figure 6.1)

Other than those areas mentioned in the report, the hydrographer did not specifically address the reasons for not adequately developing the other inshore areas of the survey as specified in section 1.8 of the Project Instructions.

### 5. JUNCTIONS

Survey H-10391 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10389	1991	1:5,000	Northeast

The junction with survey H-10389 is complete. Comparison reveals good agreement with the present survey.

## 6. COMPARISON WITH PRIOR SURVEYS

H-5684(1934, 1937) 1:5,000  
H-5980(1935) 1:5,000  
H-5981(1935) 1:5,000  
H-6761a(1941) 1:2,000  
H-6761b(1941) 1:2,000

Survey H-5684 covers the area in the vicinity of South Amaknak Rocks. Comparison is good, with the present soundings agreeing to within one meter and generally shoaler than the prior survey, except for the 1 1/2-fathom (2.7 meters) prior sounding at latitude 53/51/49.5N, longitude 166/33/17.5W. This shoal sounding was not adequately developed during this survey and was carried forward on the smooth sheet.

Surveys H-5980 and H-5981 of 1935 cover the area in the vicinity of Arch Rock and the entire area of Captains Bay respectively. Sounding agreement is good, with the present soundings generally shoaler than the prior surveys by as much as 2.0 meters.

Surveys H-6761a and H-6761b were accomplished in 1941, to supplement the previously mentioned prior surveys in areas closer to the coast and investigate offshore rocks not adequately covered during the 1935 surveys. Comparison is good. The present survey appears to be generally shoaler by about 2.0 meters, especially in areas closer to the shore.

Additional detailed comparisons with these prior surveys can be found in section M of the hydrographer's report.

With the transfer of the feature noted above, survey H-10391 is adequate to supersede the prior surveys within the common area.

There are no AWOIS items originating from the prior surveys applicable to the present survey.

## 7. COMPARISON WITH CHART

Chart 16530, 5th edition, dated August 26, 1989; scale 1:10,000  
Chart 16529, 12th edition, dated March 2, 1991, scale 1:5,000  
Chart 16529, 13th edition, dated May 23, 1992, scale 1:5,000

### a. Hydrography

The charted hydrography on charts 16529 (12th edition) and 16530 (5th edition) originates from prior surveys mentioned in section 6 of this report and from miscellaneous sources which require no further discussion. The 13th edition of chart 16529 has been updated from the final field sheet of the present survey.

The submerged intake pipes extending seaward from the north end of the pier in the vicinity of latitude 53/51/32N, longitude 166/33/11W, were not adequately investigated. The hydrographer reports that the ends of the pipes rise approximately 7.0 feet off the bottom. The actual depth of the pipes is unknown due to the inability to convert this height off the bottom to an accurate depth and the lack of reduction to true MLLW. The depth of the pipes, however, is approximately 10.9 meters. This depth is based on the assumption that the actual seafloor depth is approximately 13.0 meters which is further reduced by the height of the pipes which is 2.1 meters. The pipes are displayed on the smooth sheet accompanied by a note describing their approximate depths. The pipes should be charted as submerged intakes.

The submerged outfall pipe, extending out from the southwest corner of Westward Seafoods pier at latitude 53/51/28N, longitude 166/33/20W, across the bottom of the harbor and curving to the west side of Bailey Ledge, was not adequately investigated during this survey. The approximate location of this outfall shown on the smooth sheet was based on the information provided by Mr. Marcus Alden, Chief Engineer of Westward Seafoods. It is recommended that this approximate location of the outfall be charted, until an accurate position determination of the feature is accomplished in the future.

The existence of the three markers depicted on charts 16529 and 16530 at latitude 53/51/47.0N, longitude 166/32/43.0W; latitude 53/51/53.0N, longitude 166/32/46.0W; and latitude 53/51/59.5N, longitude 166/32/46.5, were verified during this survey. These markers still exist and should be retained as charted.

Except for the markers mentioned above, the unexploded ordnance warning note (AWOIS item 51948, and with the transfer of the charted sounding mentioned in the preceding section of this report, survey H-10391 is adequate to supersede charted hydrography within the common area.

b. AWOIS

AWOIS Item 51948 (Unexploded Ordnance) charted at latitude 53/51/06N, longitude 166/34/26W, was not actually investigated on site during this survey. However, Mr. Bob Reeves of Crowley Maritime and Mr. Craig Magone of Magone Marine Services were contacted in the field for information concerning this item and it was discussed in section N of the hydrographer's report. A follow-up inquiry concerning the reported unexploded ordnance including the rumored "nerve gas" shells in Captains Bay and Iliuliuk Bay, was conducted by PHS during the office processing of the survey. The following additional information was compiled thru telephone conversations with the same individuals mentioned above.

Mr. Reeves previously reported that ".50-cal" ammunition still exists on the bottom of Crowley Maritime pier and divers were able to recover 15 to 20 live shells. He does not consider the situation hazardous and reports that new piles have been emplaced within the last five years without any problems.

Mr. Magone reported that small caliber shells exist throughout the area of Captains Bay and Iliuliuk Bay with some places containing heavier concentrations than the others. According to his observation, half of the ammunition still fires but the situation is not hazardous. The reported gas shells were actually ampules and the type of gas was not definitively identified, however, it was rumored to be "nerve gas". All known gas ampules were removed from the Crowley Maritime pier area by the Navy, although some may still remain buried.

Based on the reliability of the above information gathered by the hydrographer and the processing office, it could be construed that the area had been cleared of all known dangerous materials beneath the Crowley Maritime Pier. However, the unknown live shells and gas containers left behind could still be considered potentially dangerous in nature. I concur with the hydrographer's recommendation that because there are still unknown hazardous materials left behind in the area, particularly the suspected "nerve gas", the charted note should be retained, until such time when a thorough and accurate assessment of the hazards have been accomplished.

c. Controlling Depths

There are no charted channels with controlling depths within the area of this survey.

d. Aids to Navigation

The following aids to navigation are located within the area of this survey. These aids were found to be in good condition and adequately serve their intended purpose.

<u>Aid Name</u>	<u>Lt.List#</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
Bailey Ledge DBN	27505	53/51/35.797	166/33/33.468
Swallow Rf. Buoy 2	27508	53/50/35.84	166/35/33.18

e. Geographic Names

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer.

f. Dangers to Navigation

Eighteen (18) dangers to navigation were reported to the USCG and DMAHTC on September 26, 1991. Copies of the reports are attached. No additional dangers were discovered during office processing.

g. Miscellaneous

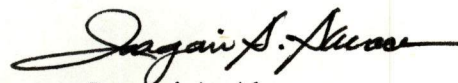
The Alaska Marine Pilots Association, the Dutch Harbor Harbormaster and the City of Unalaska have expressed concern over the charted limits of cable areas running along the eastern coast of Captains Bay and Iliuliuk Bay. Because of the cable area restrictions, fishing vessels have to anchor at the harbor closer together or are required to anchor at considerable distances away to avoid congestion. The Commanding Officer, thru the Director of Pacific Marine Center, has requested from the Director, Coast and Geodetic Survey, information concerning these charted cable areas. The City of Unalaska has also sent out a request concerning these cable area limits to Senator Ted Stevens of Alaska and the Corps of Engineers. Copies of these letters and the Director's reply are attached to this report.

**8. COMPLIANCE WITH INSTRUCTIONS**

Survey H-10391 adequately complies with the Project Instructions.

**9. ADDITIONAL FIELD WORK**

This is an adequate hydrographic survey. However, additional field work is required on a non-priority basis to adequately assess the existence of the remaining unexploded ordnance in the area of Crowley Maritime pier and to determine the location and extent of the submerged outfall and intake pipes at Westward Seafood pier. Also, because of the rapid commercial growth around Captains Bay, recent aerial photography of the area is needed to compile the new shoreline features mentioned in section 2 of this report.

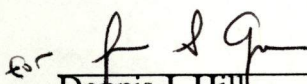


Isagani A. Almacén  
Cartographer

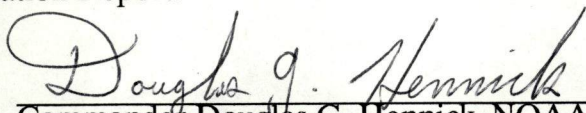
APPROVAL SHEET  
H-10391

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 digital data have been completed and all revisions and processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts have been made and are included with the survey records. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

 Date: 4/21/93  
Dennis J. Hill  
Chief, Hydrographic Processing Unit  
Pacific Hydrographic Section

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.

 Date: 4/21/93  
Commander Douglas G. Hennick, NOAA  
Chief, Pacific Hydrographic Section

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Final Approval

Approved:

 Date: 10/27/94  
J. Austin Yeager  
Rear Admiral, NOAA  
Director, Coast and Geodetic Survey



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

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10391

**INSTRUCTIONS**

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

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

CHART	DATE	CARTOGRAPHER	REMARKS
16529	12-02-91	Almacén	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Partial application</i> Drawing No. <i>from final field sheet.</i>
16528	12-05-91	Almacén	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Partial application</i> Drawing No. <i>from final field sheet.</i>
16522	12-06-91	Almacén	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>No soundings or</i> Drawing No. <i>corrections applied.</i>
16011	5-4-93	Almacén	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Applied</i> Drawing No. <i>39 fms (17.1 m) sdg @ 53°51'32"N, 166°34'45"W from ss.</i>
16529	8-24-93	R. Davies	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Full application</i> Drawing No. <i>of sndgs from smooth sheet.</i>
16528	8-24-93	R. Davies	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Full application</i> Drawing No. <i>of sndgs from smooth sheet.</i>
<del>16530</del>	<del>3-25-96</del>		
16530	3-25-96	W.B. Harper	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Full Application</i> Drawing No. <i>OF SOUNDINGS FROM SMOOTH SHEET.</i>
16522	5-4-96 8-8-96	W.D. Chappell D. Harper	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>No Corr - No Hydro</i> Drawing No. 7 <i>on chart</i>
16520	10-19-94	Ashley Chappell W.D. Chappell	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Fully app'd thru</i> Drawing No. 18 <i>Chart 16528</i>
16500	5-4-96 6-8-96	W.D. Chappell D. Harper	<del>Full Part Before</del> After Marine Center Approval Signed Via <i>Fully app'd thru</i> Drawing No. 13 <i>Ch't 16520</i>
16011	5-10-96 6-8-96	W.D. Chappell D. Harper	<i>Full application after signed approval - No corrections</i> <i>due to scale</i> <i>Dwg # 32</i>