

H-10617

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Hydrographic
Field No. RA-10-10-95
Registry No. H-10617

LOCALITY

State Alaska
General Locality ... Cook Inlet
Sublocality Kenai River Approach
..... and Vicinity

1995

CHIEF OF PARTY
CAPT D.R. Seidel

LIBRARY & ARCHIVES

DATE May 14, 1996

HYDROGRAPHIC TITLE SHEET

H-10617

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

RA-10-10-95

State Alaska

General locality Cook Inlet

Locality Kenai River Approach and Vicinity

Scale 1:10,000 Date of survey June 9 - July 20, 1995

Instructions dated April 11, 1995 Project No. OPR-P329-RA

Vessel RA-3(2123), RA-4(2124), RA-5(2125), RA-6(2126), RA-7(2127), RA-8(2128), RA-9(2129)

Chief of party CAPT Dean R. Seidel, NOAA

Surveyed by LT D.Haines, LT M.Larsen, ENS S.Smith, ENS S.Maenner, ENS J.Becker, ENS E.Christensen, ENS N.Bennett, CST F.Paranada, SST J.Fleischmann, ST J.Jacobson, ST B.Roraback, ST M.Frost

Soundings taken by echo sounder, hand lead, pots DSF-6000N, EG&G Model 260 SSS recorder Model 272-T towfish

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Evaluation by: I.Almacen, B.Mihailov Automated plot by HP Design Jet 650C

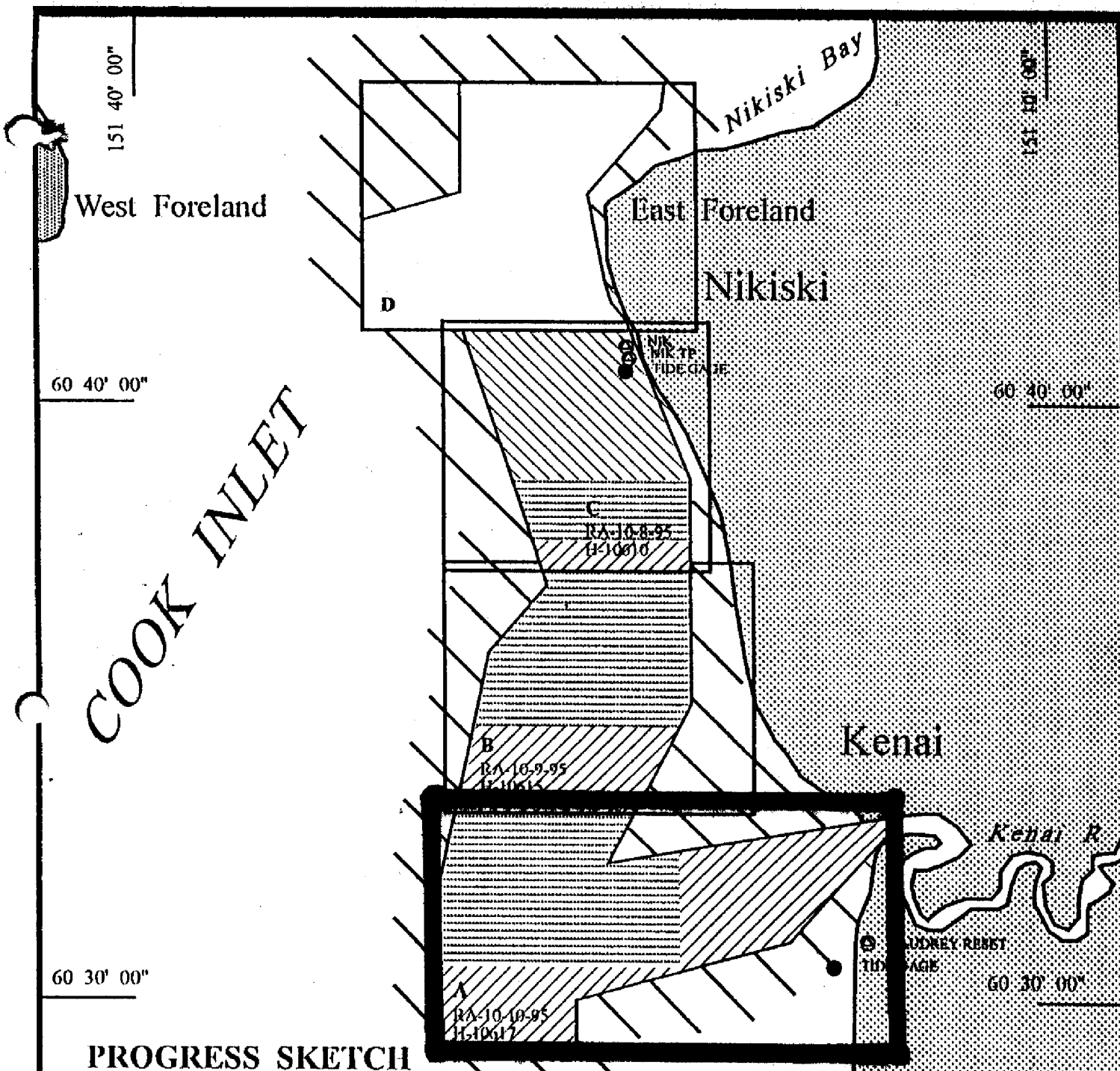
Verification by E. Domingo

Soundings in ~~fathoms~~ ~~feet~~ Fathoms and Tenths at MEW MLLW

REMARKS: All times in UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential. All depths listed in this report are referenced to mean lower low water unless otherwise noted.

AWOIS & SURF 6/4/96 mcr

MAY 14 1996 *[Signature]*



PROGRESS SKETCH

**OPR-P329-RA
HYDROGRAPHIC SURVEY
APPROACHES TO NIKISKI, ALASKA**

MAY 22 - JULY 27, 1995

**NOAA SHIP RAINIER
D. R. SEIDEL, CAPT, NOAA
COMMANDING**

**SCALE OF CHART 16662
1:100,000**

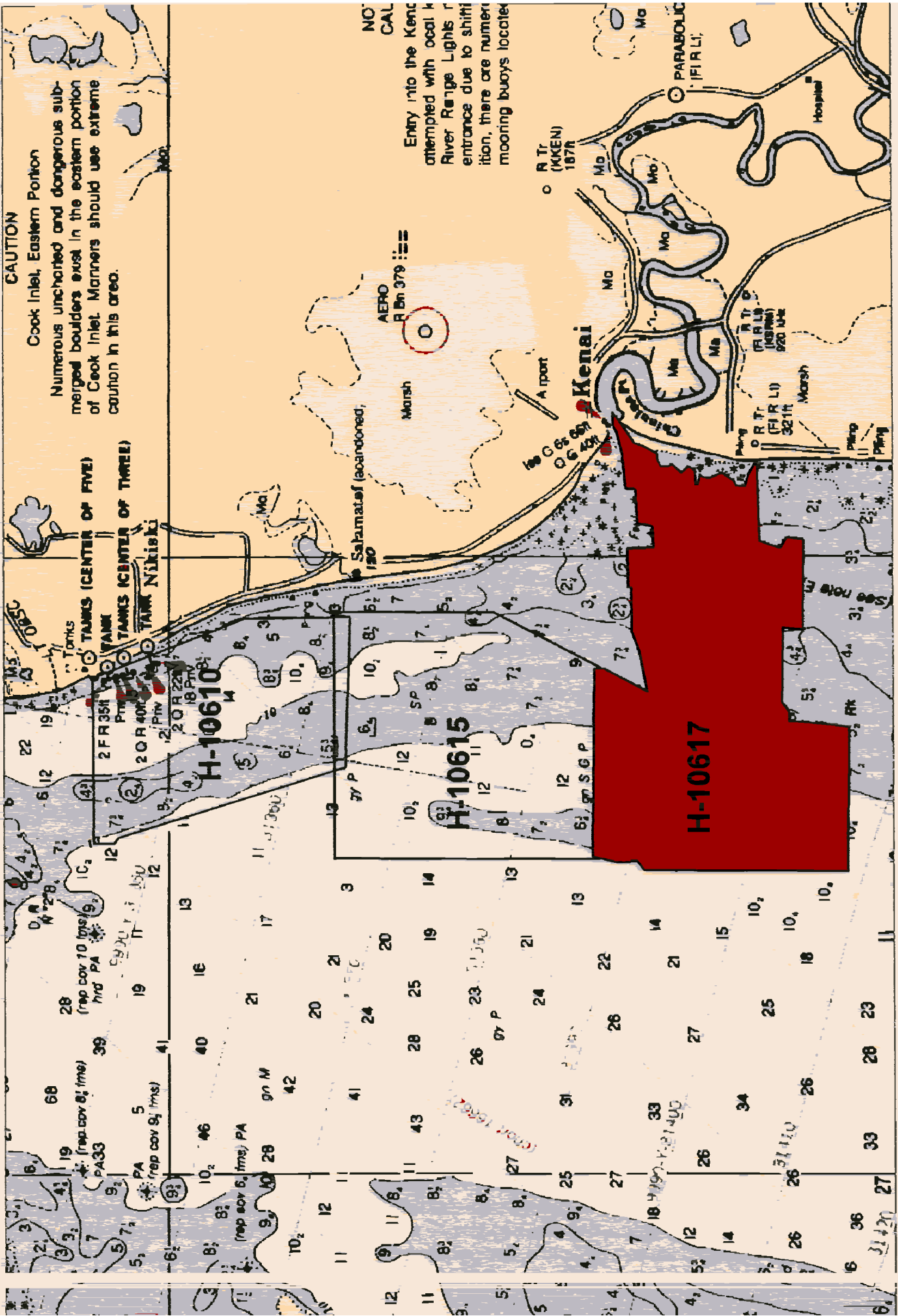
MAY JUN JUL			
9.0	21.6	10.8	SQ. NM. SOUNDINGS
26.7	703.1	222.0	LN.M. SOUNDINGS
12.7	22.7	6.0	SQ. NM. SIDE SCAN SONAR
248.5	675.5	1.3	LN.M. SIDE SCAN SONAR
0	66	93	BOTTOM SAMPLES (GRAB)
3	2	2	ELECTRONIC CONTROL STATIONS
2	3	3	CTD CASTS
2	2	2	TIDE GAGES
3	3	4	GEO. CONTROL STATIONS EST/REC
0	0	11	AWOIS ITEMS INVESTIGATED
			AREA SURVEYED

CAUTION

Cook Inlet, Eastern Portion

Numerous uncharted and dangerous submerged boulders exist in the eastern portion of Cook Inlet. Mariners should use extreme caution in this area.

NO CAL
Entry into the Kenai River Range Lights entrance due to shifting ice, there are numerous mooring buoys located



Descriptive Report to Accompany Hydrographic Survey H-10617

Field Number RA-10-10-95

Scale 1:10,000

June-July 1995

NOAA Ship RAINIER

Chief of Party: Captain Dean R. Seidel, NOAA

A. PROJECT ✓

This basic hydrographic survey was completed in the Kenai River approach and vicinity, Alaska, as specified by Project Instructions OPR-P329-RA dated April 11, 1995.

Survey H-10617 corresponds to "sheet A" as defined in the Project Instructions.

This survey will provide contemporary hydrographic survey data to develop a corridor for the navigable approaches to the Port of Nikiski and the Kenai River. Requests for hydrographic surveys and updated charts have been received from the United States Coast Guard (USCG), Southwest Alaska Pilot's Association and the Alaska Department of Transportation.

B. AREA SURVEYED ✓ See Eval Rpt, section 8

The survey area is on the east side of Cook Inlet. The ~~eastern~~^{northeastern} side of the sheet originates from the mouth of the Kenai River and stretches west to join the southern approach for the Port of Nikiski. The survey's eastern limit is bounded by 151°15.5'W. The western limit is bounded by 151°30.3'W. The survey's northern limit is bounded by 60°33.3'N. The southern limit is bounded by 60°29.1'N.

The Project Instructions called for complete 200% side scan sonar coverage up to the five meter curve for H-10617. RAINIER collected 200% side scan coverage to longitude 151°22.6'W, which was the five fathom curve. The remainder of the sheet, which is shoal and rocky, was completed with standard hydrography with the exception of the southeastern portion because of a high concentration of drift nets.

C. SURVEY VESSELS ✓

Data were acquired by four survey launches and two skiffs as noted below:

<u>Vessel</u>	<u>EDP #</u>	<u>Operation</u>
RA-3	2123	Hydrography Side Scan Sonar Sound Velocity Cast

RA-4	2124	Hydrography
RA-5	2125	Hydrography Side Scan Sonar Sound Velocity Cast
RA-6	2126	Hydrography Side Scan Sonar
RA-8	2128	Bottom Samples
RA-9	2129	Hydrography Bottom Samples

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Data collected by vessels 2123-2126 were acquired and processed using HDAPS programs. Data collected from vessel 2128 was entered manually into HDAPS. A complete listing is included in Appendix VI.*

Data collected by vessel 2129 were acquired and processed using HYPACK for Windows ver 5.2. Post processing was conducted using the HDAPS HP system. HYPACK files were translated to a PC-DAS format using a Visual Basic program HYPMENU provided by N/CG24. The files were then loaded into HDAPS and processed in the same manner as HDAPS data.

In addition, the following batch routine, GPSINT.BAT (5/19/94), was used to initialize the Ashtech GPS receiver.

Velocity corrections were determined using:

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
VELOCITY	2.11	5 Mar 1995

Problems

None.

E. SONAR EQUIPMENT ✓

Side scan sonar (SSS) operations were conducted using an EG&G Model 260 image-corrected SSS recorder and a Model 272-T single frequency towfish. RA-3 and RA-5 were equipped with a thermal recorder and RA-6 was equipped with a multi-stylus

recorder. Serial numbers of the equipment used is located on the raw master printouts. *

The SSS towfish was configured with a 20° beam depression, the normal setting, which yields the best beam correction. The 100 kHz frequency was used throughout this survey. Primarily, the 100 meter range scale was used for this survey, but in cases where the bottom became very shoal on the eastern section of the sheet, 75 and 50 meter line spacing was used. The towfish was deployed exclusively from the stern of the launches.

Standard line spacing was used for 100m RS, 75m RS, and 50m RS (Side Scan Sonar Manual Sec 2.1.3.2). Overlap of SSS coverage was checked online using the real-time plot and the edited swath plot was employed to identify holidays.

Two hundred percent SSS coverage was achieved as required in the project instructions by conducting two separate 100% coverages wherein the vessel track lines during the second coverage split the distance between the tracklines of the first coverage (SSS Manual Sec. 1.2.2).

Confidence checks were also possible during SSS operations due to numerous rocks, obstructions and bottom features. The SSS traces were scanned for data quality and contacts.

In conjunction with Pacific Hydrographic Section and Hydrographic Surveys Branch, RAINIER developed the following selection criteria. Contacts were selected and entered into the contact table if an object had a connecting shadow and the shadow indicated a significant height above the bottom. Contacts with heights less than 10% of the total depth were labeled not significant and marked NS to show that it had been addressed. The corrected depth was listed on line in the margins of the sonargrams. The most significant contact was selected for each 300m x 200m area, which was every six selected soundings when using the 100m range scale. When two large contacts were within 300m of each other, they were both selected. Any contact within 10 to 15m of the track, unless obviously significant, was not selected due to the exaggeration of the height of the contact. These contacts showed up on the echosounder or on the 2nd 100% coverage of the area and were addressed. Contacts that were labeled as significant were entered into the contact tables in the HDAPS programs.

The contact tables were run through the "Sifter Program." The sifter program determines the significance of contacts based upon the surrounding selected sounding data. There are two parameters for which the hydrographer must enter values, the grid radius and the threshold depth. The grid radius determines the area that the estimated contact height will be compared against and the threshold depth is the controlling depth of the navigable area. Captain Eliassen, a Southwest Alaska Pilots Association representative, stated that presently the maximum draft of the vessels transiting the survey area is 40ft (12.2m) and that in the future the maximum may be as great as 50ft (15.2m). RAINIER used 20m as the threshold depth and a 100m grid radius.

* Filed with the hydrographic data.

According to the "Sifter Program," a contact is considered resolved if it meets one of the following criteria:

- 1) The contact is less 1m high in less than 20m of water.
- 2) The contact is less than 10% of the depth in depths greater than 20m.
- 3) The top depth is deeper than the threshold depth. The top depth is determined by subtracting the contact height from the base depth.
- 4) The top depth is within 0.7m of any selected sounding already collected within the grid radius.
- 5) The fake height of the contact must be greater than or equal to 70% of the computed contact height.

Each unresolved contact was then developed by intensive echo sounder investigation using 2-10m line spacing and in some cases drift searching. Once the developments were completed the contact tables were re-sifted using the 18m as the threshold depth. Contacts that were determined not to be resolved were further developed. This process was continued until all contacts were fully developed or resolved.

In many cases, extensive scouring occurred around boulders resulted in an exaggerated contact heights. This was obvious on the echograms showing a spike in a hole. To account for the total height the deep depth was inserted next to the high point on the echogram. In some cases the "Sifter Program" listed developed contacts as not yet being resolved. In these cases, the contacts were again investigated ensuring that echo sounder lines were run both in an east-west, and north-south direction, and that the least depth in the area was found.

Each contact remaining unresolved was examined individually and slated either for further development or manual designation as resolved based on one or more of the following reasons:

- 1) 100% coverage of the contact area by echosounder investigation in both directions.
- 2) Ambiguous sonagram.
- 3) Contact significantly distorted by small offset from towfish.
- 4) Un-recorded deep inserts would make another of the sifter criteria true. For instance, if height of the contact plus the depth of the adjacent scour was greater than 70% of the contact height.

The hydrographer considers no contacts unresolved by the above criteria.

Tables for contact/development correlation are located in "Separates to be Included with Survey Data, section VI." *

For further discussion of the "Sifter Program" see the HDAPS documentation.

* Filed with the hydrographic data.

Problems ✓

Apparent holidays on the SSS track plots were caused by GPS flyers. Since the GPS flyers only lasted momentarily, the tracklines were left as is and the data were not smoothed. In both cases the hydrographer does not believe that the quality of the data was affected. *Data was analyzed during office processing and found to contain no significant problems.*

The side scan sonar equipment experienced some difficulty with the recorder traces. In some cases, RAINIER noticed the picture was distorted along the outside of the range scales. This problem was most likely attributed to isotherms in the water column caused by the mixing of cold glacial fresh water coming from the mouth of the Kenai River, and warmer sea water during the large tidal shifts. When such problems were noticed, launches stopped running side scan sonar until the tide changed, and then returned to the effected area at a later time. In cases where the problem deteriorated the picture, the areas effected were rerun. *Data was analyzed during office processing and found to contain no significant problems.*

F. SOUNDING EQUIPMENT ✓

The Raytheon DSF-6000N is a dual frequency (100 kHz, 24 kHz), paper trace echo sounder, and was used on launches 2123 - 2126. Serial numbers are included on the headers of the daily Raw Master Printouts. *No problems which affect survey data were encountered. All DSF-6000N soundings were acquired using the High + Low, high frequency digitized setting or the low frequency digitized setting, depending on water depth.

Also, the INNERSPACE 448, Serial Number: 300, is a single frequency thermal depth sounder recorder (208 kHz), and was used on 2129.

Problems

None.

G. CORRECTIONS TO ECHO SOUNDINGS ✓

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

<u>Velocity</u> <u>Table #</u>	<u>Cast#</u>	<u>DN</u>	<u>Cast Position</u>	<u>Deepest</u> <u>Depth (m)</u>	<u>Applicable DN</u>
3	3	164	60° 31.9' N 151° 28.2' W	40.5	157-166

* Filed with the hydrographic data.

4	4	178	60° 40.4' N 151° 25.2' W	40.5	170-180	outside sheet limits
5	5	194	60° 40.8' N 151° 25.1' W	47.7	184-194	" "
6	6	200	60° 40.2' N 151° 25.2' W	59.8	196-202	" "

The sound velocity casts were acquired with SBE SEACAT Profiler (S/N 811), calibrated 03/31/95. Velocity correctors were computed using the PC program VELOCITY in accordance with Hydrographic Survey Guideline (HSG) No. 69. Because of the large tidal range, data from the cast had to be manually extrapolated beyond the program VELOCITY's normal limits to meet all depths in the survey area. The casts were all linear and thus were easy to extrapolate. A printout of the Sound Velocity Corrector Tables used in the HDAPS Post Survey program is included in the "Separates to be Included with Survey Data, IV. Sounding Equipment Calibrations and Corrections". *

Static Draft ✓

A transducer depth was determined using FPM Fig 2.2 for vessels 2123-2126, and 2129 in the spring of 1995. These values were entered into the offset tables* for each vessel.

Settlement and Squat ✓

Correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2., using FPM Fig. 2.3, and are included with project data for OPR-P329-RA. The data for 2123-2126, and 2129 was collected in Shilshole Bay, Washington in the Spring of 1995.

Offset Tables ✓

Offset tables contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables 3-6 and 9 correspond to the number of the launch. The offset tables were compiled with new measurements in the spring of 1995 and are contained in the "Separates to be Included with Survey Data". *Horizontal corrections were not applied for the HDAPS launches. Offset table 8 (2128) contain all zeros and was used for manually entered bottom sample data.

Heave ✓

The launches are not equipped with heave, pitch and roll sensors.

* Filed with the hydrographic data.

Bar Check ✓

Bar check lines were calibrated by RAINIER personnel during the winter inport 1994-1995. Calibration forms are included with project and data for OPR-P329-RA-95. Bar checks were performed weekly and served as a functional check of the DSF-6000N.

Tide Correctors ✓

Predicted tides for the project were provided on diskette by N/CG241 for the Nikiski, Alaska reference station (945-5760). Tidal correctors as provided in the project instructions for Zone VI are:

<u>Zone</u>	<u>Time Correction</u>	<u>Range Ratio</u>	<u>Longitude Boundries</u>
Zone V	-00:25	x 0.98	151° 32.0'W* to 151° 27.0'W
Zone VI	-00:25	x 1.00	151° 27.0'W to 151° 20.0'W
Zone VII	-00:25	x 1.03	151° 20.0'W to 151° 15.5'W**

* Sheet A's western boundary

** Sheet A's eastern boundary

Portions of this survey fall in tide zones V, VI, and VII. Because of processing constraints with HDAPS, the following zones were applied to the corresponding sheets: zone V was applied to sheet A(W), zone VI was applied to sheet A(C), and zone VII was applied to sheet A(W). While sheet's A(C) and A(W) tide zone's are correct, sheet A(W)'s tide zones will need to be reapplied in post processing. Sheet A(W) should have the following zones applied: zone V starting from the western limit of 151° 30.5'W to longitude 151° 27.0'W, and zone VI starting at longitude 151° 27.0'W to the sheet's eastern limit of longitude 151° 25.5'W.

A problem with the applied tides was noted on the northeast section of the sheet as seen from the final depth plot. This problem should be resolved when the final tides are applied at the Pacific Hydrographic Section. *The application of approved tides has resolved this problem.*

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

Seldovia, AK (945-5500) was used as the primary control station for datum determination.

RAINIER personnel installed 8200 digital gages at Nikiski, Alaska (945-5760) on May 22, 1995 and Chinulna Point (945-5735) on May 27, 1995. The staff was connected

* Filed with the hydrographic data.

to five benchmarks at both stations during opening and closing level runs. Opening levels completed May 22, 1995 at Nikiski and on May 28, 1995 at Chinulna Point. On June 17, 1995, the staff at Chinulna Point was found to be broken at the two meter mark, which was the portion above the top of the boulder and the staff stop was gone. It was determined that the staff was probably busted by the debris carried by the strong currents. Since the remainder of the staff was secured directly to the rock face and it was inevitable that the top of the staff would again be broken, a new staff stop was installed at the 1.3m mark on June 18, 1995. The new staff stop was leveled to bench mark 5735A. Both tide gages ran without problems during data acquisition. Closing levels were conducted at Nikiski on July 20, 1995 and at Chinulna Point on July 21, 1995. Both stations were removed on July 21, 1995.

The station descriptions, field tide records, field tide notes and data (Appendix V) have been forwarded to N/OES212 in accordance with HSG 50 and FPM 4.3. A request for approved tides was forwarded to N/OES2 in accordance with FPM 4.2.3. *Tide Note dated December 14, 1995 is attached.*

H. CONTROL STATIONS ✓ *See Eval Rpt, Section H.*

A listing of the geodetic stations used to control this survey is included in ~~Appendix III~~ of this report. The horizontal datum for this project is NAD83.

DGPS stations were installed on existing stations NIK and AUDRY RESET. A temporary station, NIK TP, was established to replace station NIK. Station NIK is located on the Kenai Pipeline Co. Wharf, and station AUDRY RESET is located on a bluff south of the Kenai River. Station NIK TP is on the south portion of the Kenai Pipeline Co. Wharf and was established to replace station NIK which is one meter from a bollard that the tankers use when docking.

These stations were recovered in accordance with methods stated in Section 5.2.4 of the FPM. For further information see the "Summer 1995 Horizontal Control Report".

I. HYDROGRAPHIC POSITION CONTROL ✓ *See Eval Rpt, Section I*

All soundings and features were positioned using differential GPS. Serial numbers for Ashtech GPS equipment are annotated on the data printouts.*

Ashtech GPS

Method of Position Control ✓

VHF differential shore stations were established at stations NIK and AUDRY RESET. The difference between the computed locations and station's published positions were recorded by the MONITOR 3.0 program on a PC. Unfortunately, only part of the data was recovered from the PC, both of the SUMMARY.SUM files and the scatterplot for

* Filed with the hydrographic data.

station AUDRY RESET. The scatterplot for station NIK was not recovered. Consequently, MONITOR 3.0 was rerun for station NIK, but the data was accidentally deleted.

The data lost was considered to be primarily graphical representations of the SUMMARY.SUM files; thus, upon further examination of the SUMMARY.SUM files for stations NIK and AUDRY RESET, it was determined not to rerun the MONITOR 3.0. Station NIK had no bad GGA records or outliers, while station AUDRY RESET had no bad GGA records and only 16 outliers.

When establishing station NIK TP on DN 145, the baseline between NIK and AUDRY RESET did not close. Investigating the problem revealed NGS's position for station AUDRY RESET was given in NAD 92. This caused a difference in position of 2.87 meters. Initially, station AUDRY RESET was not used for surveying, only for system checks which were within tolerance. When the position was converted to NAD 83 on DN 152 the baseline closed. ~~CANCEL~~

A temporary VHF differential shore station was established at station NIK TP. ASHTECH MXII geodetic receivers were set up over existing stations NIK, AUDRY RESET, and temporary station NIK TP. A single GPS observation was made by collecting data simultaneously over a 2 hour period. The position was recorded by the MONITOR 3.0 program on a PC. Data from a 24-hour period was recorded and examined for signs of multi-path signal reflection, which was not evident. Scatterplot results are included in the "Project related data for OPR-P329-RA".

Calibrations & Systems Check Methods ✓

System checks were performed in accordance with Section 3.4.4 of the FPM. Two launches observed their positions from two independent DGPS base stations. The results were transferred to forms which are included in the project data for OPR-P329-RA. An abstract of the system checks is included in the "Separates to be Included with Survey Data, III. Horizontal Position Control and Corrections to Position Data". *

Problems ✓

None

J. SHORELINE ✓ See Eval Rpt, Section J.

There are no photogrammetric source data for this project. Shoreline for field sheets was transferred from enlargements of Chart 16662 (1:100,000, 3rd Ed., 1993). These data are shown in brown for orientation purposes only and are so annotated. *Shoreline from Chart enlargements 16662 (1:100,000 3rd Ed, 1993) is shown on the smooth in brown for orientation purposes only.*

* Filed with the hydrographic data.

Method of Shoreline Verification - NO shoreline verification was done. For this survey, shoreline is from chart enlargement for orientation purposes only.

Shoreline verification was conducted near predicted mean lower low water in accordance with FPM 7.1. Shoreline verification was accomplished by taking detached positions (DPs), as explained later in this section. See statement above.

DPs taken during shoreline verification were recorded on the master printouts and on the DP forms. See statement above.

Detailed 1:10,000 "Bottom Sample and Detached Position Plots" are provided showing all DPs and notes relating to each feature. The information from these plots was transferred to a final field plot where possible. Where such information would interfere with the legibility of the final plot the appropriate cartographic symbol has been transferred, but height and position number information remains on the plot, which serves as an overlay (FPM 6.1.2.5). New features are depicted in black. Field cartographic codes were assigned using the HDAPS DP editor. Heights are recorded in meters and are corrected to predicted MLLW. Heights and depths on rocks have been corrected for approved tides. Heights shown on the smooth sheet are in feet.

Charted Features

Charted features were identified and their positions verified by taking detached positions with the launch. In some cases, foul limits around charted features were delineated using DPs, as denoted on the on the DP forms and "Bottom Sample and Detached Position Plots." There were no foul limit lines delineated during survey operations.

Disprovals

There were no charted rock disprovals. Concur

New Features

Three new rocks were found (DP 10183, DP 10184, and DP 10185), and are plotted and denoted on the "Bottom Sample and Detached Position Plots." These features are shown in black on the smooth sheet at the following locations

K. **CROSSLINES** ✓

DP	latitude	longitude
10183	60°31'46.750	151°18'12.027
10184	60°31'38.210	151°18'33.642
10185	60°31'46.005	151°18'56.066

Crosslines are within 0.3 meter agreement with mainscheme hydrography. Crosslines totaled 36.9 nautical miles, representing 12.1% of the total mainscheme hydrography

L. **JUNCTIONS** ✓ See Evaluation Report Section L.

This survey junctions with survey H-10615 (1:10,000, 1995) at the northern limit. Soundings were found to be in general agreement. The final comparisons will be made at Pacific Hydrographic Section (PHS).

M. COMPARISON WITH PRIOR SURVEYS ✓ See Eval Report Section M.

Charted soundings originated from the following USC&GS prior surveys: H-3196 (1:~~2~~, 40,000) 1910)*, H-3197 (1:~~2~~, 1910)*, H-8617WD (1:20,000, 1961), H-8789 (1:10,000, 1964), H-8790 (1:10,000, 1964), H-9545 (1:20,000, 1975), H-9707 (1:10,000, 1977), FE-226 (1:5,000, 1979)*, and H-10252 (1:5,000, 1987).

Due to higher density of sounding data, many least depths were found to be shoaler and several new features were located. Preliminary comparisons revealed a few prior least depths which were slightly shoaler than the current survey. In no cases were the prior least depths more than one foot shoaler than the current survey. Final comparisons will be done at PHS.

*RAINIER was not provided with the following surveys, and in the case of the 1910 surveys, information on the chart mark-up did not state the scale of the survey.

N. ITEM INVESTIGATIONS ✓

There were six AWOIS investigations for survey H-10617.

AWOIS ITEM 50175 ✓

1. Area of Investigation

State: Alaska
Locality: Kenai River Approach and Vicinity
Reported Latitude: 60° 31' 12.64"N
Reported Longitude: 151° 20' 08.97"W
Datum: NAD 83
Depth: 9ft (2.7m)
Feature: Obstruction

2. Description of Source Item

During field investigation survey FE226 (1979), NOAA Ship RAINIER located an unidentified obstruction by echo sounder at a depth of 9ft (MLLW). The obstruction does not rise abruptly nor is there any scour. It was positioned by mini-ranger.

3. Survey Requirements

Verify or disprove, determine least depth and position using echo sounder, side scan sonar or dive investigation.

4. Method of Investigation

Five and ten meter echo sounder hydrography was used to determine the high point.

5. Results of Investigation

Date: DN 201
Time (UT): 19 01 44
Measured Depth: 6.5m
Predicted tide corrector: -4.8m
Corrected Least Depth:* 2.2m (1fm 1ft)
Position Number 2803 +4
Latitude 60° 31' 12.547"N
Longitude 151° 20' 08.826"W
Datum: NAD 83

The least depth of 2.2m (1fm 1ft) was determined with an echo sounder. * Corrected least depth after application of approved tide is 1.6 fathoms.

6. Comparison with Prior Surveys

The chart mark-up shows a depth of 1fm 3ft, but RAINIER was not provided with survey FE-226 (1:5,000, 1979). Survey H-8789 (1:10,000, 1964) did not have comparable depths in the area which can be attributed to the line spacing that was used, 100 meters.

7. Comparison with the Chart and Charting Recommendations

The sounding is charted as 1fm 3ft (2.2m) on NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, NAD 83.

This item was not reported as a Danger to Navigation.

Recommendation

Delete the charted 1fm 3ft sounding and associated obstruction note, and chart a 1fm 1ft (2.2m) sounding at latitude 60° 31' 12.547"N, longitude 151° 20' 08.826"W. Do not concur,
Upon application of smooth tides retain 1fm 3ft sounding and obstrn note
as charted. Present survey confirms least depth as found on
AWOIS ITEM 50176 ✓ FE-226.

1. Area of Investigation

State: Alaska
Locality: Kenai River Approach and Vicinity
Reported Latitude: 60° 31' 12.71"N

Reported Longitude: 151° 20' 19.30"W
Datum: NAD 83
Depth: 15ft (4.5m)
Feature: Obstruction

2. Description of Source Item

During field investigation FE-226 (1979), NOAA Ship RAINIER located an unidentified obstruction at a depth of 15ft (MLLW). The obstruction does not rise abruptly nor is there any scour. It was positioned by mini-ranger.

3. Survey Requirements

Verify or disprove, determine least depth and position using echo sounder, side scan sonar or dive investigation.

4. Method of Investigation

Five and ten meter echo sounder hydrography was used to determine the high point.

5. Results of Investigation

Date: DN 201
Time (UT): 19 12 30
Measured Depth: 8.0m
Predicted tide corrector: -4.8m
*Corrected Least Depth:** 3.7m (2fm 0ft)
Position Number 2813 +3
Latitude 60° 31' 12.492"N
Longitude 151° 20' 19.117"W
Datum: NAD 83

The least depth of 3.7m (2fm 0ft) was determined with an echo sounder. * Corrected least depth after application of approved tides is 2.2 fathoms.

6. Comparison with Prior Surveys

The chart mark-up shows a clear depth of 2fm 0ft, but RAINIER was not provided with survey FE-226 (1:5,000, 1979). Survey H-8789 (1:10,000, 1964) did not have comparable depths in the area which can be attributed to the line spacing that was used, 100 meters.

7. Comparison with the Chart and Charting Recommendations

The sounding charted for AWOIS 5017⁶ as noted above with the charted boundary as

depicted on NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, NAD 83 will cover this item.

This item was not reported as a Danger to Navigation.

Recommendation

Chart AWOIS 5017⁶ as the shoal depth in the area. ~~Delete 2³ fms charted~~ sounding. ~~and~~
~~chart area~~ ^{shown on inset} ~~is shown on smooth sheet. (2₁) and~~
AWOIS ITEM 50385 ✓

1. Area of Investigation

State: Alaska
Locality: Kenai River Approach and Vicinity
Reported Latitude: 60° 30' 57.67"N
Reported Longitude: 151° 20' 47.95"W
Datum: NAD 83
Depth: 19ft (5.8m)
Feature: Unknown

2. Description of Source Item

In 1973 the Coast Guard reported an 80-100 ft landing craft sunk 1200 yards SW of Salmo Rock. During field investigation FE-226 (1979), NOAA Ship RAINIER at the request of the Coast Guard in response to a report by Everett Collins of Salamotof Seafood who said the 110-120 ft wreck had moved to SE of the Kenai Entrance Channel Buoy, "IKE," located an object by echo sounder in 19ft of water. The object was steep sided, rising 7ft off the bottom, and had a significant scour. It was positioned by mini-ranger.

3. Survey Requirements

Verify or disprove, determine least depth and position using echo sounder, side scan sonar or dive investigation.

4. Method of Investigation

Five and ten meter echo sounder hydrography was used to determine the high point.

5. Results of Investigation

Date: DN 160

Time (UT): 18 07 29
 Measured Depth: 6.8m
 Predicted tide corrector: -1.6m
 Corrected Least Depth:* 5.7m (3fm 0ft)
 Position Number 1034 +7
 Latitude 60° 30' 58.288"N
 Longitude 151° 20' 49.590"W
 Datum: NAD 83

The least depth of 5.7m (3fm 0ft) was determined with an echo sounder. * Corrected least depth after application of approved tides is 3 fathoms.

6. Comparison with Prior Surveys

The chart mark-up shows a clear depth of 3fm 1ft, but RAINIER was not provided with survey FE-226 (1:5,000, 1979). Survey H-8789 (1:10,000, 1964) did not have comparable depths in the area which can be attributed to the line spacing that was used, 100 meter.

7. Comparison with the Chart and Charting Recommendations

The sounding is charted on NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, NAD 83.

This item was not reported as a Danger to Navigation.

Recommendation

~~Delete~~ ^{and WK notation}
~~Replace~~ the charted 3fm 1ft depth with a 3fm 0ft depth at position 60° 30' 58.288"N, 151° 20' 49.590"W and ~~retain~~ wreck notation. ^{CONCUR (3WK)}

AWOIS ITEM 51216 ✓

1. Area of Investigation

State: Alaska
 Locality: Kenai River Approach and Vicinity
 Reported Latitude: 60° 29' 33.89"N
 Reported Longitude: 151° 26' 18.33"W
 Datum: NAD 83
 Depth: 4.3fm (7.9m)
 Feature: Obstruction

2. Description of Source Item

In 1978, the Coast Guard reported the tanker Glacier Bay struck a submerged object while attempting to anchor in position 60° 29.4'N, 151° 26.4'W, which was obtained by two radar range/bearing lines of position. In 1987, during survey H-10252 the NOAA Ship FAIRWEATHER located a submerged rock with a least depth of 4.3fm by echo sounder and side scan sonar, 425m NE of the reported position. The high point of the rock was determined by divers in zero visibility searching by feel.

3. Survey Requirements

Verify or disprove, determine least depth and position using echo sounder, side scan sonar or dive investigation.

4. Method of Investigation

Two hundred percent coverage of the area was completed using side scan sonar. Next, 5 and 10 meter echo sounder hydrography used to determine the high point.

5. Results of Investigation

<i>Date:</i>	DN 189
<i>Time (UT):</i>	18 29 41
<i>Measured Depth:</i>	10.0m
<i>Predicted tide corrector:</i>	-2.5m
<i>Corrected Least Depth.*</i>	8.0m (4fm 2ft)
<i>Position Number</i>	7977 +1
<i>Latitude</i>	60° 29' 34.003"N
<i>Longitude</i>	151° 26' 18.086"W
<i>Datum:</i>	NAD 83

The least depth of 8.0m (4fm 2ft) was determined with an echo sounder. * Least depth after application of approved tides 4.3 fathoms.

6. Comparison with Prior Surveys

Prior survey H-10252 (1:5,000, 1987) shows a sounding of 7.8m (4fm 3ft).
Prior survey H-8789 (1:10,000, 1964) shows a depth of 9.6m (5fm 1ft) in the area.

7. Comparison with the Chart and Charting Recommendations

The sounding is charted on NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, NAD 83.

This item was not reported as a Danger to Navigation.

Recommendation

Move the charted depth of 4fm 2ft from position 60° 29' 33.89"N, 151° 26' 18.33"W to position 60° 29' 34.003"N, 151° 26' 18.086"W. Delete 42 fm sounding and chart area as shown on smooth sheet. (42Rk)
AWOIS ITEM 52188 ✓

1. Area of Investigation

State: Alaska
Locality: Kenai River Approach and Vicinity
Reported Latitude: 60° 31' 32.62"N
Reported Longitude: 151° 24' 10.82"W
Datum: NAD 83
Depth: 16ft (4.8m)
Feature: Obstruction

2. Description of Source Item

In 1919, the Ship St. Paul swinging at a flood tide while at anchor, struck a pinnacle rock with an estimated depth of 16ft over it at position 60° 31' 24"N, 151° 24' 30"W (Valdez Datum). This position was obtained using bearings and was charted as "PD." In 1964, survey H-8789 failed to locate the rock. In 1974, NOAA Ship FAIRWEATHER conducted a special rock investigation using standard hydrography, and failed to locate the rock. In 1975, NOAA Ship DAVIDSON conducted a special rock investigation using wire drag which was greatly affected by the "excessively strong currents," and failed to locate the rock. In 1980, NOAA Ship PATHFINDER, reviewed the survey H-8789 (1964), along with the 1974 FAIRWEATHER and 1975 DAVIDSON surveys, were reviewed in May 1980 and determined that the rock not be deleted from the chart.

3. Survey Requirements

Verify or disprove, determine least depth and position using echo sounder, side scan sonar or dive investigation.

4. Method of Investigation

Two hundred percent coverage of the area was completed using side scan sonar. Next, 5 and 10 meter echo sounder hydrography used to determine the high point.

5. Results of Investigation

Date: DN 175
Time (UT): 16 58 46
Measured Depth: 3.4m
Predicted tide corrector: -0.3m
Corrected Least Depth:* 3.6m (1fm 5ft)
Position Number 1884 +5
Latitude 60° 31' 06.771"N
Longitude 151° 24' 40.637"W
Datum: NAD 83

The least depth of 3.6m (1fm 5ft) was determined with an echo sounder. *least depth after application of approved tide is 2.1 Fathoms.*

6. Comparison with Prior Surveys

Prior survey H-9619 (1:20,000, 1976) shows a sounding of 7.3 to 7.5 meters in the surrounding area.

7. Comparison with the Chart and Charting Recommendations

The sounding is charted on NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, NAD 83.

This item was reported as a Danger to Navigation.

Recommendation

Chart a 1fm 5ft rock at position 60° 31' 06.771"N, 151° 24' 40.637"W. *Delete rock symbol and PD notation. Upon application of smooth tides, chart 2 fm RK as shown on smooth sheet. Position is approximately 800 meters southwest of the charted PD rock.*

1. Area of Investigation

State: Alaska
Locality: Kenai River Approach and Vicinity
Reported Latitude: 60° 30' 21.00"N
Reported Longitude: 151° 27' 09.00"W
Datum: NAD 83
Depth: 6 1/4fm (11.4m)
Feature: Obstruction

2. Description of Source Item

The 17th Coast Guard reported a rock in May of 1993, "Local Notice to Mariners," at a depth of 6 1/4 fathom. Survey H-10252 (1987) shows 9.3 fathom depths exist in the vicinity.

3. Survey Requirements

Verify or disprove, determine least depth and position using echo sounder, side scan sonar or dive investigation.

4. Method of Investigation

Two hundred percent coverage of the area was completed using side scan sonar. Next, 5 and 10 meter echo sounder hydrography used to determine the high point.

5. Results of Investigation

Date:	DN 189
Time (UT):	19 39 20
Measured Depth:	15.2m
Predicted tide corrector:	-3.9m
Corrected Least Depth:*	11.7m (6fm 2ft)
Position Number	8009 +2
Latitude	60° 29' 34.358"N
Longitude	151° 27' 00.616"W
Datum:	NAD 83

The least depth of 11.7m (6fm 2ft) was determined with an echo sounder. * Last depth of 6.5 fathoms after application of approved tide was found 1,500 meters south of reported 6 fm 2ft sounding. A 7 fm 5ft sounding was found one hundred meters west of reported rock (May 1993.)

6. Comparison with Prior Surveys

Prior survey H-10252 (1:5,000, 1987) shows depths of 8fm 0ft to 9fm 3ft in the area.

7. Comparison with the Chart and Charting Recommendations

The sounding is charted on NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, NAD 83.

This item was reported as a Danger to Navigation.

Recommendation

The shoalest depth in the search radius was 6fm³ 2ft (11⁹ m) and was found at position

60° 29' 34.358"N, 151° 27' 00.616"W at the southern boundary of the search radius. Taking into consideration the 1500 meter search radius, RAINIER discovered numerous shoals in the area. In all cases, the depths should be charted. *Concur, chart area as shown on survey.*

O. COMPARISON WITH THE CHART ✓ *See Evaluation Report O.*

This survey was compared to NOS chart 16662, 3rd edition, July 10, 1993, 1:100,000, (NAD83). Charted soundings were found to be in general agreement. Due to higher density of sounding data and side scan sonar coverage, many new features were located. Non-sounding charted features are discussed in Section J, Shoreline. Final comparisons to be made at PHS.

Dangers to Navigation

Two dangers to navigation within the limits of H-10617 were reported to the Seventeenth Coast Guard District, July 28, 1995.

Thirty-four additional dangers to navigation within the limits of H-10617 were reported to the Seventeenth Coast Guard District, August 10, 1995. Copies of the correspondence can be found in ~~Appendix I~~ *of this report.*
attached to

P. ADEQUACY OF SURVEY ✓

Survey H-10617 is complete and adequate to supersede charted depths and features in their common areas.

Q. AIDS TO NAVIGATION ✓

There was one floating aid to navigation on H-10617, Kenai River Entrance ^{channel} Buoy, "1KE," (Light List #: 26320). Also, there were two fixed aids to navigation, the Kenai River Front and Back Ranges (Light List #'s: 26325 & 26330).

On DN 166, Green Buoy, "1KE," was positioned with two independent detached positions, one from station NIK TP and one from station AUDRY RESET. The detached positions plotted right on top of each other and were in general agreement with the position scaled from NOS chart 16662 (3rd edition, July 10, 1993). A summary is ~~provided in Appendix VI.~~ *attached to this report.*

On July 11, 1995, a MAGELLAN hand held GPS receiver equipped for differential GPS was used to take detached positions for checking the charted position the Kenai River's Front and Back Range. Unfortunately, the VHF antenna on the mobile backpack was having difficulty picking up the correctors which was indicated on the MAGELLAN's readout; consequently, this position should not be used to replace the charted position. Also, the 049° range was confirmed by driving the range with a launch and observing the

bearing of the range on the HDAPS display. This checked out to be 049°. A summary of the differential positions compared to the scaled off charted positions are below (accuracy of +/- 0.6 second. Originally, the positions were scaled from the chart with an accuracy of +/- 0.1minute. This was converted to seconds for comparison purposes):

<u>DETACHED DESCRIPTION</u>	<u>CHARTED POSITION</u>	<u>POSITION</u>
*Forward Range (Light List #: 26325)	60° 33' 00"N 151° 15' 42"W	60° 33' 00.0"N 151° 15' 46.8"W
Back Range (Light List #: 26330)	60° 33' 02"N 151° 15' 39"W	60° 33' 03.6"N 151° 15' 39.0"W

* The Light List's published position of the forward range is 60° 33.0'N, 151° 15.7'W. The back range is "153 yards at 049° from the front light."

Third order positioning was not used because the range is in very poor condition. The top range sits on the edge of a bluff which has been receding. It will probably fall down in the very near future. The foundation of the bottom range is being damaged by the tidal currents. RAINIER contacted the Coast Guard and they stated they would like to replace the range with seasonal buoys based on survey H-10617. Because of the difficulty with DGPS, as well as the condition of the range and the fact that the Coast Guard does not have any immediate plans to fix the range, it will not be addressed in Section Q of this report.

R. STATISTICS ✓

# Selected Soundings	46122
NM Hydrography	933.6
Velocity Casts	4
Detached Positions	16
Bottom Samples	52
Tide Stations	2
NM ² Hydrography	18.7

S. MISCELLANEOUS ✓

Bottom samples were collected in accordance with Project Instructions and in accordance with Sections 1.6.3 and 4.7.1 of the Hydrographic Manual.

Strong tidal currents were observed (maximum 8 knots). Currents flood generally north and ebb south. Current predictions are available within the sheet limits. Currents were

generally observed as predicted. *Strong tidal currents are noted on Chart 16662 and should be retained.*

No unusual magnetic variations were noted.

T. RECOMMENDATIONS ✓

None

U. REFERRAL TO REPORTS ✓

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

Title	Date Sent	Office
Summer 1995 Horizontal Control Report for OPR-P329-RA-95	August 1995	N/CG245
Summer 1995 Coast Pilot Report for OPR-P329-RA-95	August 1995	N/CG245
Summer 1995 Secchi Disk Report for OPR-P329-RA-95	June 1995	N/CG211
Project related data for OPR-P329-RA-95	Incremental	N/CG245

Respectfully Submitted,



Joel R. Becker
Ensign, NOAA

Approved and Forwarded,



Dean R. Seidel
Captain, NOAA
Commanding Officer



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

NOAA Ship RAINIER

June 28, 1995

**ADVANCE
INFORMATION**

Commander
Seventeenth Coast Guard District
Post Office Box 25517
Juneau, Alaska 99802

Dear Sir:

Attached is a confirmation copy of the radio messages 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,

Dean R. Seidel
Captain, NOAA
Commanding Officer

Enclosures

cc: DMAHTC
N/CG221
PMC



PTTUZYUW RUHPTEF1781 1781615-UUUU--RUHPSUU.
 ZNR UUUUU
 P 271615Z JUN 95
 FM NOAA S RAINIER
 TO CCGDSEVENTEEN JUNEAU AK
 DMAHTCCNAVWARN WASHINGTON DC//MCNM//
 INFO NOAA MOP SEATTLE WA
 ACCT CM-VCAA
 BT
 UNCLAS

**ADVANCE
 INFORMATION**

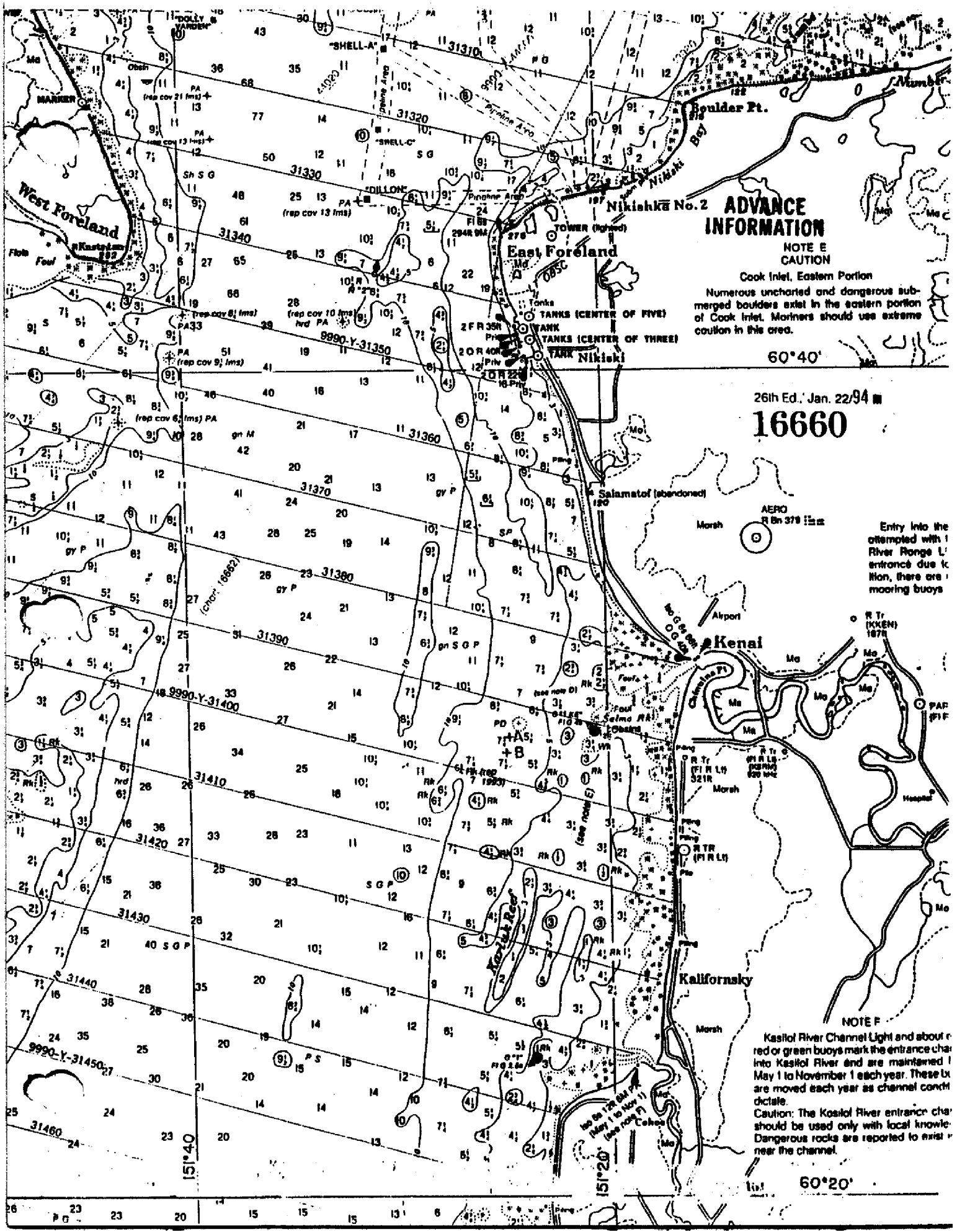
NOAA SHIP RAINIER HAS LOCATED 2 DANGERS TO NAVIGATION IN
 COOK INLET, ALASKA (PROJECT OPR-P329-RA) WITHIN THE LIMITS
 OF HYDROGRAPHIC SURVEY H-10617. THE FOLLOWING INFORMATION IS
 PROVIDED FOR PUBLICATION IN LOCAL NOTICE TO MARINERS:

CHART AFFECTED: 16660 26TH ED JAN 22/94 1:194,154 (NAD83)
 16662 3RD ED JUL 10/93 1:100,000 (NAD83)

DEPTHS ARE REDUCED TO MLLW BASED ON PREDICTED TIDES.

ITEM	DANGER	DEPTH	LATITUDE	LONGITUDE	Pos	Depth(m)
A.	SHOAL	COVERS 1FM 5FT	60/31/06.8N	151/24/40.6W	1884 ⁺⁵	3.6
B.	SHOAL	COVERS 4FM 3FT	60/30/48.3N	151/24/48.6W	1898 ⁺¹	8.6

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 WILL BE MAILED TO CONFIRM
 THIS MESSAGE.
 BT



ADVANCE INFORMATION
NOTE E
CAUTION

Cook Inlet, Eastern Portion
Numerous uncharted and dangerous submerged boulders exist in the eastern portion of Cook Inlet. Mariners should use extreme caution in this area.

26th Ed., Jan. 22/94
16660

Entry into the
River Range L
entrance due to
flow, there are
mooring buoys

NOTE F
Kasilof River Channel Light and about a
red or green buoys mark the entrance chan-
nel into Kasilof River and are maintained from
May 1 to November 1 each year. These buoys
are moved each year as channel conditions
dictate.
Caution: The Kasilof River entrance chan-
nel should be used only with local knowledge.
Dangerous rocks are reported to exist
near the channel.

60°20'



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

NOAA Ship RAINIER

August 10, 1995

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

**ADVANCE
INFORMATION**

Dear Sir:

During the processing of hydrographic survey H-10617 in Cook Inlet, 34 additional dangers to navigation have been discovered. These dangers affect the following charts:

<u>Chart</u>	<u>Edition/Date</u>	<u>Datum</u>
16660	26th Ed., Jan 22/94	NAD83
16662	3rd Ed., Jul 10/93	NAD83

It is recommended that these additional dangers to navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Section at (206) 526-6835.

Sincerely,

Dean R. Seidel
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

Enclosure

cc: DMA/HTC
PMC
N/CG221
Capt Eliassen, SWAPA



Hydrographic Survey Registry Number: H-10617

**ADVANCE
INFORMATION**

Survey Title: State: Alaska
Locality: Cook Inlet
Sublocality: Kenai River Approach and Vicinity

Project Number: OPR-P329-RA

Survey Date: May-July, 1995

Features are reduced to Mean Lower Low Water using predicted tides.

Affected Nautical Charts:

<u>Chart</u>	<u>Edition/Date</u>	<u>Datum</u>
16660	26th Ed., Jan 22/94	NAD83
16662	3rd Ed., Jul 10/93	NAD83

<u>Item</u>	<u>Danger</u>	<u>Depth</u>	<u>Latitude(N)</u>	<u>Longitude (W)</u>		
A.	SOUNDING	6FM 4FT	60/32/54.2	151/29/08.4	6642+2	12.4m
B.	SOUNDING	7FM 3FT	60/32/13.5	151/29/25.5	5783+1	13.9m
C.	SOUNDING	6FM 3FT	60/29/40.1	151/28/06.4	8073+2	12.1
D.	SOUNDING	6FM 1FT	60/29/34.4	151/27/00.6	8009+2	11.7
E.	SOUNDING	6FM 5FT	60/30/09.6	151/27/38.1	92759+1	12.8
F.	SOUNDING	7FM 2FT	60/30/26.0	151/27/38.0	8661+3	13.6
G.	SOUNDING	7FM 0FT	60/30/27.0	151/26/04.7	8804+4	13.1
H.	SOUNDING	6FM 3FT	60/30/45.1	151/26/28.1	3956+2	12.2
I.	SOUNDING	7FM 4FT	60/30/55.8	151/25/42.8	3866+4	14.3
J.	SOUNDING	7FM 4FT	60/32/29.8	151/25/41.4	8539+3	14.2
K.	SOUNDING	7FM 1FT	60/32/42.6	151/25/33.5	9218+2	13.3
L.	SOUNDING	6FM 2FT	60/32/14.5	151/24/08.0	2008+5	11.8
M.	SUBM RK	1FM 4FT	60/32/12.8	151/22/12.7	19267+1	3.3
N.	SUBM RK	1FM 4FT	60/32/22.3	151/20/05.2	19317+1	3.1
O.	SOUNDING	3FM 0FT	60/31/54.7	151/22/59.6	1936+8	5.7
P.	SOUNDING	7FM 2FT	60/31/54.7	151/25/21.9	2115+2	13.6
Q.	SOUNDING	7FM 2FT	60/31/30.3	151/24/27.2	1936+8	5.7
R.	SOUNDING	6FM 2FT	60/31/40.3	151/24/48.5	1969+2	11.8
S.	SOUNDING	5FM 1FT	60/31/40.1	151/23/17.4	4942+0	9.6
T.	SUBM RK	1FM 2FT	60/31/31.8	151/22/42.4	1920+3	2.6
U.	SOUNDING	2FM 3FT	60/31/24.3	151/21/37.7	18136+1	4.9
V.	SOUNDING	5FM 1FT	60/31/18.6	151/24/17.7	4448+3	9.6
W.	SOUNDING	5FM 1FT	60/30/55.7	151/24/11.9	4538+2	9.7
X.	SOUNDING	2FM 3FT	60/30/47.5	151/22/31.3	4257+3	4.8
Y.	SOUNDING	5FM 1FT	60/30/38.9	151/23/22.5	1914+0	9.8
Z.	SOUNDING	5FM 5FT	60/30/33.2	151/24/04.6	8846+3	11.1

**ADVANCE
INFORMATION**

<u>Item</u>	<u>Danger</u>	<u>Depth</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>		
AA.	SOUNDING	5FM 4FT	60/30/21.0	151/24/17.9	8836+3	10.7
AB.	SUBM RK	1FM 5FT	60/30/35.6	151/21/57.9	17275+0	3.6
AC.	SOUNDING	3FM 0FT	60/30/19.6	151/21/27.3	17431+1	5.7
AD.	SUBM RK	1FM 5FT	60/32/09.3	151/19/38.8	11536+1	3.6
AE.	SUBM RK	0FM 4FT	60/31/58.2	151/18/33.6	10184+0	1.3
AF.	SUBM RK	0FM 4FT	60/31/46.6	151/18/56.1	10185+0	1.5
AG.	SOUNDING	3FM 1FT	60/30/47.0	151/19/15.3	11787+1	5.9
AH.	SUBM RK	0FM 5FT	60/30/44.4	151/19/03.0	13963+1	1.0

Questions concerning this report should be directed to the Pacific Hydrographic Section at (206) 526-6835.



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

August 25, 1995

**ADVANCE
INFORMATION**

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

Dear Sir:

Four additional dangers to navigation have been identified by Pacific Hydrographic Branch regarding Project OPR-P329-RA (NOAA Ship RAINIER, July, 1995) within the limits of hydrographic survey H-10617. In addition, a position was mis-reported on the RAINIER's original letter dated August 10, 1995. These dangers, and corrections, affect the following charts:

<u>Chart</u>	<u>Edition/Date</u>	<u>Scale</u>	<u>Datum</u>
16660	26th Ed./Jan 22, 1994	1:194,154	NAD83
16662	3rd Ed./Jul 10, 1993	1:100,000	NAD83

The attached information is provided for publication in the Local Notice to Mariners. A copy of chart 16662 showing the area in which the dangers exist is also attached.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6853.

Sincerely,

Kathryn Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Enclosures

cc: DMAHTC
N/CS261
PMC



Hydrographic Survey Registry Number: H-10617

**ADVANCE
INFORMATION**

Survey Title: State: Alaska
Locality: Cook Inlet
Sublocality: Kenai River Approach and Vicinity

Project Number: OPR-P329-RA

Survey Date: June 9 - July 20, 1995

Features are reduced to Mean Lower Low Water using predicted tides.

Charts Affected: 16660 26th Edition/January 22, 1994 1:194,154 NAD83
16662 3rd Edition/July 10, 1993 1:100,000 NAD83

New Dangers to Navigation:

<u>ITEM</u>	<u>DANGER</u>	<u>DEPTH</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
A.	Sounding	2 fms 2 ft	60°30'25.8"	151°20'44.7"
B.	Sounding	4 fms 3 ft	60°32'00.6"	151°23'21.0"
C.	Sounding	7 fms 0 ft	60°32'34.7"	151°29'17.3"
D.	Sounding	6 fms 5 ft	60°29'58.3"	151°27'49.0"

Correction to Reported Danger to Navigation Letter, dated August 10, 1995:

ORIG.

<u>ITEM</u>	<u>DANGER</u>	<u>DEPTH</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
Q.	Sounding	7 fms 2 ft	60°31'30.3"	151°24'27.2"
		Incorrect	60°31'30.3"	151°25'27.2"
		Correct	60°31'30.3"	151°25'27.2"

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 526-6853.

Chart 16660
1:100,000

**ADVANCE
INFORMATION**

Marsh



AERO R Bn
579 ft

Salamatof
(abandoned)

KENAI

Airport

(use inset)

Chinulna Pt

Marsh

Marsh

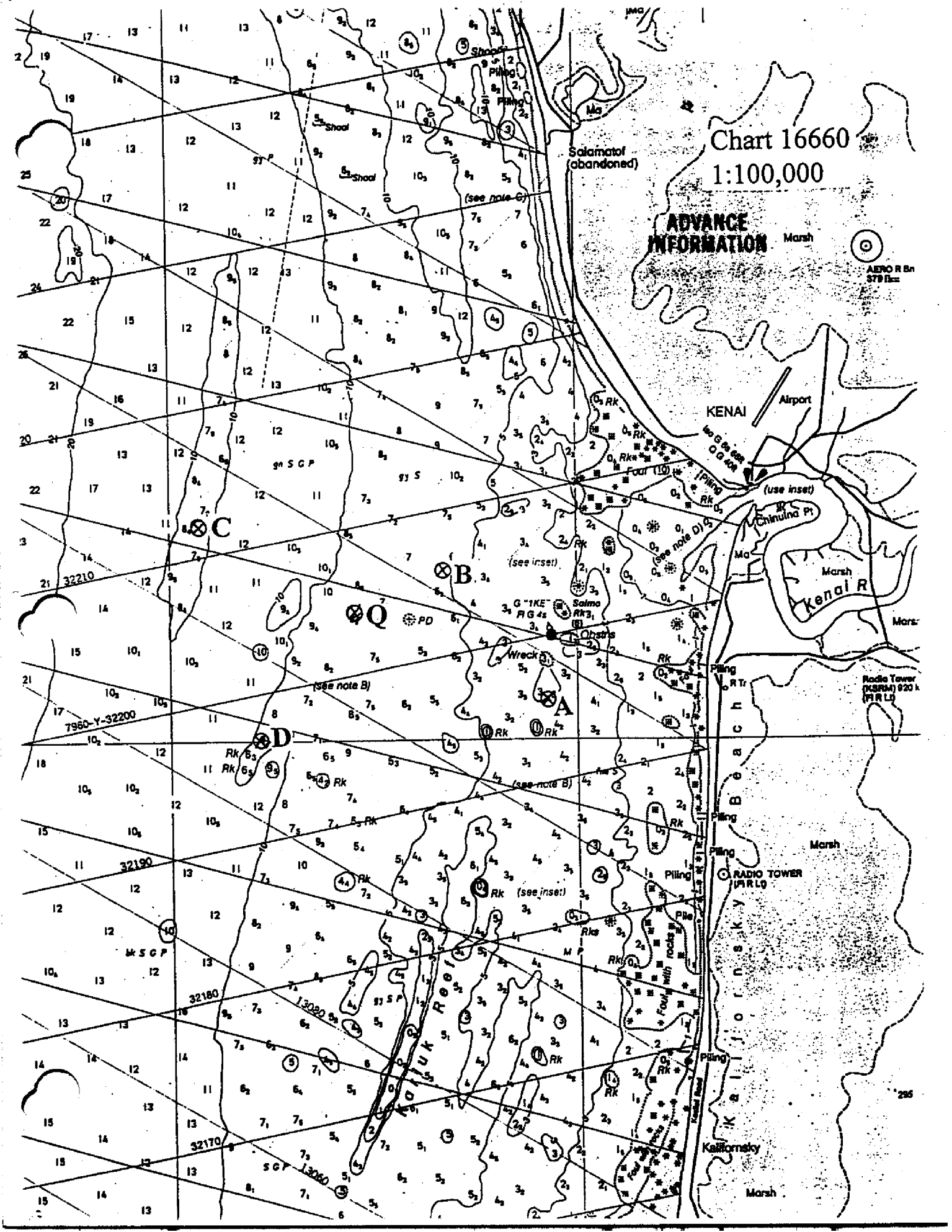
Radio Tower
(MSPM) 920 ft
(MRL)

RADIO TOWER
(MRL)

Marsh

Kalifornsky

Marsh



CONTROL STATIONS as of 23 Jul 1995 ✓

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
100	F	060:30:48.421	151:16:45.362	20	250	0.0	0.0		05/23/95	AUDREY RESET 1972(GPS STATION)
101	F	060:40:58.707	151:23:57.351	17	250	0.0	0.0		05/23/95	NIK 1984(GPS STATION)
102	F	060:40:57.891	151:23:56.403	19	250	0.0	0.0		05/27/95	NIK 1P(GPS STATION)

NOAA FORM 76-40
(6-74)

Replaces C&GS Form 567

TO BE CHARTED
 TO BE REVISITED
 TO BE DELETED

REPORTING UNIT
 (Field Party, Ship or Office)
 NOAA Ship RAINIER

STATE
 Alaska

LOCALITY
 Cook Inlet

DATE
 #####

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

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY

- HYDROGRAPHIC PARTY
- GEODETIC PARTY
- PHOTO FIELD PARTY
- COMPILATION ACTIVITY
- FINAL REVIEWER
- QUALITY CONTROL & REVIEW GRP.
- COAST PILOT BRANCH

(See reverse for responsible personnel)

The following objects HAVE HAVE NOT BEEN INSPECTED FROM SEAWARD TO DETERMINE THEIR VALUE AS LANDMARKS.

OPR PROJECT NO.
 OPR-P329-RA

JOB NUMBER

H-10617

DATUM

NAD 83

CHARTING NAME

KPEN's Radio Tower

DESCRIPTION

(Record reason for deletion of landmark or aid to navigation.
 Show triangulation station names, where applicable, in parentheses)

POSITION

LATITUDE

LONGITUDE

°	'	°	'
60	30	151	16
D.M. Meters		D.P. Meters	
37.051		20.991	
1143.6		847.92	

METHOD AND DATE OF LOCATION

OFFICE

FIELD

F-GPD-L
 11-Jul-95

CHARTS AFFECTED

16662
 16660

RESPONSIBLE PERSONNEL

TYPE OF ACTION		NAME		ORIGINATOR	
OBJECTS INSPECTED FROM SEAWARD		CAPT D. R. Seidel		<input type="checkbox"/> PHOTO FIELD PARTY	
				<input checked="" type="checkbox"/> HYDROGRAPHIC PARTY	
				<input type="checkbox"/> GEODEIC PARTY	
				<input type="checkbox"/> OTHER	
POSITIONS DETERMINED AND/OR VERIFIED		CAPT D. R. Seidel		FIELD ACTIVITY REPRESENTATIVE	
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW				OFFICE ACTIVITY REPRESENTATIVE	
				<input type="checkbox"/> REVIEWER	
				<input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE	

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'
(Consult Photogrammetric Instructions No. 64)

OFFICE

1. OFFICE IDENTIFIED AND LOCATED OBJECTS
Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

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

FIELD

1. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

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

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

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

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

FIELD (Cont.)

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

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

II. TRIANGULATION STATION RECOVERED

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

EXAMPLE: Triang. Rec.
8 - 12 - 75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8 - 12 - 75

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

Section Q: Descriptive Report Insert ✓

Name of Aid: Kenai ~~River~~ Entrance **Lighted**
Channel Buoy 1KE

Light List #: 26320

Method of Positioning: DGPS

Positioning Info

	Latitude N	Longitude W
Charted Pos.	60° 31' 18.0"	151° 20' 36.0"
Survey Pos.	60° 31' 15.0"	151° 20' 36.0"

Difference between Survey/Charted position: 93 meters, 180°T

Characteristics

Do Characteristics Match Light List? (y/n) YES (Fl G 4s)

If NO, what are the characteristics?

New/Uncharted Aids (if info is known or easily obtained)

Date Established:

Maintained By: Coast Gaurd Private (No)

Frequency of Maintenance: Maintained from May 1 to Nov. 1

Purpose: Marks a shoal area to the entrance of the Kenai River

Section Q: Descriptive Report Insert

Name of Aid: Kenai River Range Front
Light

Light List #: 26325

Method of Positioning: DGPS

Positioning Info

	Latitude N	Longitude W
Charted Pos.	60°33' 00.0"	151°15' 46.8"
Survey Pos.	60°33' 00"	151°15' 42"

Difference between Survey/Charted position: 73 meters, 90° T

Characteristics

Do Characteristics Match Light List? (y/n) YES (Q G)

If NO, what are the characteristics?

New/Uncharted Aids (if info is known or easily obtained)

Date Established:

Maintained By: Coast Guard

Private (No)

Frequency of Maintenance:

Purpose: Forward Range Marker

Section Q: Descriptive Report Insert

Name of Aid: Kenai River Range Rear
Light

Light List #: 23330

Method of Positioning: DGPS

Positioning Info

	Latitude N	Longitude W
Charted Pos.	60° 33' 03.6"	151° 15' 39.0"
Survey Pos.	60° 33' 02"	151° 15' 39"

Difference between Survey/Charted position: 49 meters, 248° T

Characteristics

Do Characteristics Match Light List? (y/n) YES (Iso G 6s)

If NO, what are the characteristics?

New/Uncharted Aids (if info is known or easily obtained)

Date Established:

Maintained By: Private (No)

Frequency of Maintenance:

Purpose: Kenai River ~~Forward~~ Range Light
Rear

APPROVAL SHEET

for

H-10617
RA-10-10-95

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



Dean R. Seidel
Captain, NOAA
Commanding Officer

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 16662 B ON PREVIOUS SURVEY C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K										
	A	B	C	D	E	F	G	H	K		
ALASKA (title)	X		X								1
COOK INLET	X		X								2
KALIFORNSKY BEACH	X		X								3
KENAI (popl)	X		X								4
KENAI RIVER	X		X								5
SALMO ROCK	X		X								6
											7
											8
											9
											10
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											12
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											25

Approved

Chris Coley

Chief Geographer

MAR 29 1996



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

ORIGINAL

DATE: December 14, 1995

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR P329-RA

HYDROGRAPHIC SHEET: H-10617 (amended)

LOCALITY: Kenai River Approach and Vicinity, Cook Inlet, Alaska

TIME PERIOD: June 9 - July 21, 1995

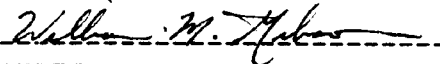
TIDE STATION USED: 945-5735 Chinulna Point, Alaska
Lat. $60^{\circ} 30.2'N$ Lon. $151^{\circ} 17.0'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): -4.40 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 19.90 ft.

REMARKS: RECOMMENDED ZONING

1. In Cook Inlet, south of $60^{\circ} 33.5'N$, north of $60^{\circ} 28.0'N$, east of $151^{\circ} 37.0'W$, and west of $151^{\circ} 27.0'W$, times are direct, and apply a X0.97 range ratio to heights using Chinulna Point, Ak. (945-5735).
2. In Cook Inlet, south of $60^{\circ} 33.5'N$, north of $60^{\circ} 28.0'N$, east of $151^{\circ} 27.0'W$, and west of $151^{\circ} 20.0'W$, times are direct, and apply a X0.99 range ratio to heights using Chinulna Point, Ak. (945-5735).
3. In Cook Inlet, south of $60^{\circ} 33.5'N$, north of $60^{\circ} 28.0'N$, and east of $151^{\circ} 20.0'W$, times and heights are direct using Chinulna Point, Ak. (945-5735).

Note: Hourly heights are tabulated in Greenwich Mean Time.


CHIEF, DATUMS SECTION



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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	

DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS
ACCORDION FILES	5				
ENVELOPES					
VOLUMES					
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			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	101		101
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		31	31
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS			
TOTALS	101	31	132

Pre-processing Examination by L.P. Haines	Beginning Date 8/16/95	Ending Date 8/16/95
Verification of Field Data by E. Domingo, I. Almacen, D. Doles	Time (Hours) 101	Ending Date 3/31/96
Compilation Check by B. Olmstead	Time (Hours) 2	Ending Date 4/4/96
Evaluation and Analysis by I. Almacen, B. Mihailov	Time (Hours) 31	Ending Date 4/4/96
Inspection by B.A. Olmstead	Time (Hours) 14	Ending Date 4/12/95

EVALUATION REPORT

H-10617

A. PROJECT

Project information is discussed in the hydrographer's report.

B. AREA SURVEYED

This survey was conducted along the eastern coast of Cook Inlet, south of Nikiski and northwest of the entrance to Kenai river. This survey is bounded on the north by latitude 60/33/20N and on the south by latitude 60/29/00N. It is bounded in the east by longitude 151/15/20W and extend westward up to longitude 151/30/30W. The bottom is made up of sand, mud, gravel and pebble. Depths range from 0 to 12.8 fathoms.

C. SURVEY VESSELS

Survey vessel information is found in the hydrographer's report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using the same Hydrographic Data Acquisition/Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS) and AutoCad, Version 12.

At the time of the survey certification the format for transmission of digital data had not been formally approved. In the interim, digital data for this survey exists in the standard HPS format which is a database format using the .dbf extension. In addition, the sounding plot, created with .dbf (extension) and enhanced using the AutoCad system, is filed both in the AutoCad drawing format, i.e., .dwg (extension); and in the more universally recognized graphics transfer format, .dxf (extension). Copies of these files will be retained at PHS until data transfer protocols are developed and improved.

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

The field sheet parameters have been revised to center the hydrography on the office plot. Data is plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was used on survey H-10617. The side scan sonar equipment, the method of operation and the application of the "Sifter" program used in the determination and disposition of significant sonar contacts are adequately discussed in the hydrographer's report.

F. SOUNDING EQUIPMENT

Sounding equipment is discussed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

The sounding data have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for actual tide, dynamic draft, and sound velocity. These reducers have been reviewed and are consistent with present NOS specifications. Actual tide reduction is derived from Chinulna Point, Alaska, gage (945-5735). Refer to the tide note attached to this report concerning recommended tidal zoning.

H. CONTROL STATIONS

Sections H and I of the hydrographer's descriptive report contain adequate discussions of horizontal control and the hydrographic positioning. The positions of horizontal control stations used during hydrographic operations are field and published values based on NAD 83. The geographic positions of all survey data are also based on NAD 83. The AutoCAD generated smooth sheet is annotated with an NAD27 adjustment tick based on values determined with NGS program NADCON

Data based on NAD 27 may be referenced to this survey by applying the following corrections:

Latitude: -2.070 seconds (-64.058 meters)

Longitude: 8.037 seconds (122.613 meters)

The year of establishment of the control stations shown on the smooth sheet originates with the horizontal control record and the hydrographer's signal list.

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. There are a few positions where the maximum allowable horizontal dilution of precision (HDOP) limits of 3.75 have been exceeded during this survey. A review of the data, however, shows that the positioning of soundings located by these fixes is consistent with the surrounding information and is considered acceptable. None of these survey positions are used to locate dangers to navigation. Daily DGPS performance checks were conducted in the field and found adequate.

J. SHORELINE

There are no photogrammetric shoreline source data for this survey. The shoreline depicted on the smooth sheet originates from a 1:10,000 enlargement of chart 16662 (3rd Edition/1993, 1:100,000 scale) and shown in brown for orientation purposes only.

K. CROSSLINES

Crosslines are discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10617 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10615	1995	1:10,000	North

The junctions with surveys H-10615 is complete and the soundings are in satisfactory agreement. There are no contemporary surveys to the south and west of this survey.

M. COMPARISON WITH PRIOR SURVEYS

H-3196 (1910) 1:40,000
H-3197 (1910) 1:10,000

Prior surveys H-3196 (1910) and H-3197 (1910) are the source documents for eight charted rocks. These rocks have been satisfactorily addressed and disposed of by the hydrographer, except for the two charted rocks from prior survey H-3196, which have been brought forward to the smooth sheet at the following locations.

<u>Feature</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
subm rock(1 <i>Rk</i>)	60/30/05	151/22/15
subm rock(1 <i>Rk</i>)	60/30/10	151/21/05

With the exception of the features listed above, H-10617 is adequate to supersede the prior surveys within the common area.

H-8789 (1964) 1:10,000
H-8790 (1965) 1:10,000
H-9545 (1975) 1:20,000

FE-226 (1979) 1:5,000
H-10252 (1987) 1:5,000

Prior surveys H-8789, H-8790 and H-9545 cover the majority of the survey area. Comparison with the present survey reveals general differences of 0.3-0.5 fathoms. There appears to be no consistent pattern of shoaling or an increase in depths. H-10252 and FE-226 are common to the present survey along the southwestern survey limits and the area of Salmo rock respectively. Comparison of depths with the present survey generally reveal the same differences as discussed above. The following features from prior survey H-8789 have not been adequately addressed by the hydrographer and have been brought forward to the smooth sheet at the following locations.

<u>Feature</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
rock awash	60/30/42.1	151/17/47.8
rock awash	60/30/40	151/17/38

With the exception of the features listed above, H-10617 is adequate to supersede the prior surveys within the common area.

N. ITEM INVESTIGATIONS

AWOIS items 50175, 50176, 50385, 51216, 52188 and 52189 were assigned and investigated during this survey. AWOIS items 50175 and 50176 originate from prior survey FE-226 (1979). AWOIS items 50385, 51216, 52188 and 52189 originate from miscellaneous sources. These items have been adequately discussed and disposed of in the hydrographer's report.

O. COMPARISON WITH CHART

Survey H-10617 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
16662	3rd	July 10, 1993	1:100,000	NAD83

a. Hydrography

Charted hydrography originates with the previously mentioned prior surveys and requires no further discussion.

Except as noted above, survey H-10617 is adequate to supersede charted hydrography within the common area of coverage.

b. Dangers to Navigation

The hydrographer reported twenty-eight shoal depths and eight submerged rocks as dangers to navigation. Four additional shoal depths were discovered as dangers to navigation during office processing. These dangers were reported to the local United States Coast Guard District, DMAHTC and N/CS261. Copies of these reports are attached.

P. ADEQUACY OF SURVEY

Hydrography on survey H-10617 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.

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 Procedure Manual, April 1994 Edition.

Survey H-10617 adequately complies with the project instructions.

Q. AIDS TO NAVIGATION

There are two fixed aids to navigation located within the survey area. Kenai Entrance River Front and Rear Light (Light List numbers 26325 and 26330) were located by detached positions. These positions agree well with the charted position. These aids are in very poor condition and probably will be destroyed by tidal surges in the near future. These aids agree well with the chart and serve their intended purpose.

There is one floating aid to navigation located within the survey area. Kenai Entrance Channel Lighted Buoy 1KE (Light List number 26320) was located by detached position and marks a shoal area to the entrance of the Kenai River. This aid agrees well with the chart and serves the intended purpose.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS

No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is a good hydrographic survey, no additional work is required.

U. REFERRAL TO REPORTS

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

Bob Mihailov
Bob Mihailov
Cartographer

APPROVAL SHEET
H-10617

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 disproof 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. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report. Final control, position and sounding printouts have been included with the survey records.

Bruce A. Olmstead Date: 4/15/96
Bruce A. Olmstead
Senior Cartographer, Cartographic Section
Pacific Hydrographic Branch

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

Kathy Timmons Date: 4/15/96
Kathy Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Andrew A. Armstrong III Date: 6/12/96
Andrew A. Armstrong III
Captain, NOAA
Chief, Hydrographic Surveys Division

