

H-10615

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-10-9-95 .....  
Registry No. .... H-10615 .....

### LOCALITY

State ..... Alaska .....  
General Locality .. Cook Inlet .....  
Sublocality ..... 5 NM NW of Kenai .....  
..... River Entrance .....  
..... 19 95 .....  
CHIEF OF PARTY  
CAPT D.R. Seidel

### LIBRARY & ARCHIVES

DATE ..... May 14, 1996 .....

**HYDROGRAPHIC TITLE SHEET**

H-10615

**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.

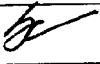
RA-10-9-95

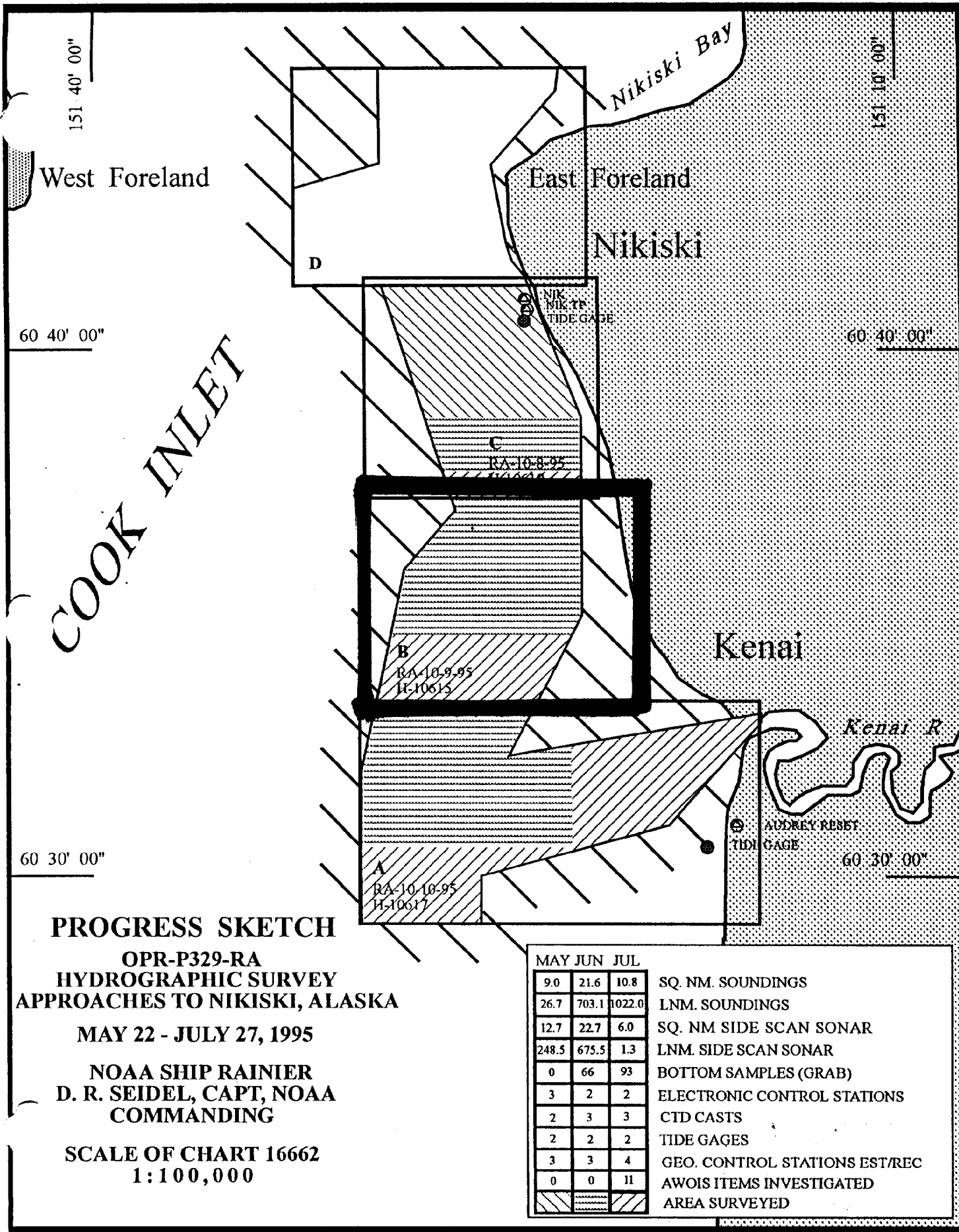
State Alaska  
 General locality Cook Inlet  
 Locality Five Nautical Miles Northwest of Kenai River Entrance  
 Scale 1:10,000 Date of survey June 1 - July 20, 1995  
 Instructions dated April 11, 1995 Project No. OPR-P329-RA  
 Vessel RA-3(2123), RA-4(2124), RA-5(2125), RA-6(2126), RA-8(2128), RA-7 (2127)  
 Chief of party CAPT Dean R. Seidel, NOAA  
 Surveyed by LT D.Haines, LT M.Larsen, LT J.Verlaque, ENS S.Smith, ENS S.Maenner,  
ENS E.Christensen, ENS J.Becker, ENS N.Bennett, CST F.Paranada, SST J.Fleischmann,  
ST J.Jacsonson, ST B.Roraback DSF-6000N, SSS Sonar (EG&G Model 260)  
 Soundings taken by echo sounder, hand lead, tide

Graphic record scaled by RAINIER Personnel  
 Graphic record checked by RAINIER Personnel  
 Evaluated by: B. Mihailov Automated plot by HP Design Jet 650C  
~~Plotted by~~  
 Verification by E. Domingo  
 Soundings in ~~fathoms~~ ~~feet~~ fathoms and tenths at MLW 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.

SURF / AWOIS 6/5/96 mcr

MAY 14 1996 

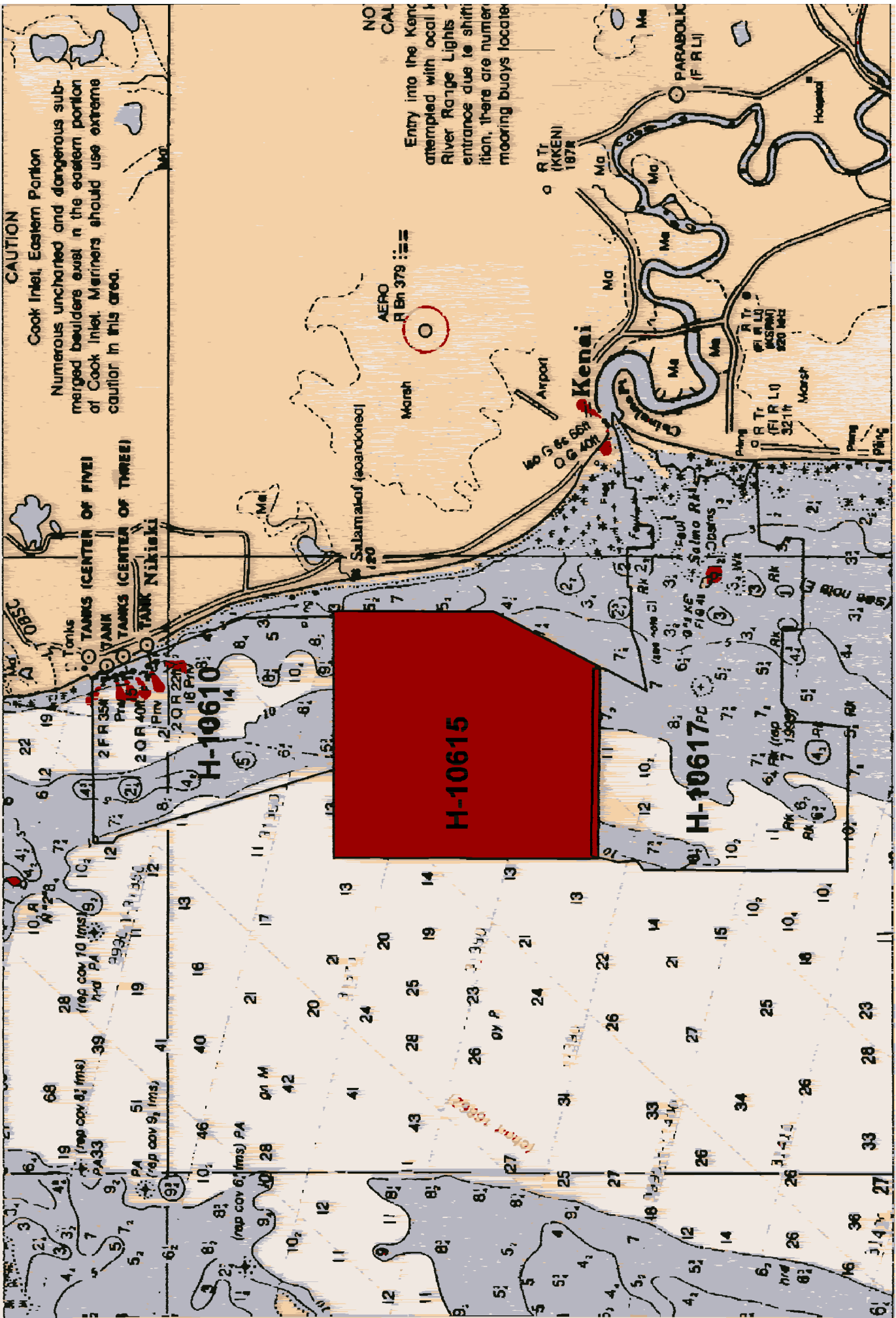


**CAUTION**

Cook Inlet, Eastern Portion

Numerous uncharted and dangerous submerged beuders 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, there are numerous mooring buoys located



# Descriptive Report to Accompany Hydrographic Survey H-10615

Field Number RA-10-9-95

Scale 1:10,000

~~May~~-July 1995  
June -

NOAA Ship RAINIER

Chief of Party: Captain Dean R. Seidel, NOAA

## A. PROJECT ✓

This basic hydrographic survey was completed in the vicinity of Port Nikiski, Alaska, as specified by Project Instructions OPR-P329-RA dated April 11, 1995.

Survey H-10615 corresponds to "sheet B" 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. 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 B.

The survey area is on the east side of Cook Inlet, south of Nikiski and north of the Kenai River Entrance. The survey's eastern limit is bounded by 151°22.0'W. The western limit is bounded by 151°29.9'W. The survey's northern limit is bounded by 60°37.4'N. The southern limit is bounded by 60°33.1'N.

## 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 Casts
RA-4	2124	Hydrography Sound Velocity Casts
RA-5	2125	Hydrography Side Scan Sonar Sound Velocity Casts

RA-6	2126	Hydrography Side Scan Sonar
RA-7	2127	Bottom Samples
RA-8	2128	Bottom Samples

#### D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Data were acquired and processed using HDAPS programs. Data collected from vessels 2127 and 2128 were manually entered. A complete listing is included in Appendix VI. \*

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. The 100 m range scale was used solely for this survey. The towfish was deployed exclusively from the stern of the launch.

Standard line spacing used was 160 m for 100 m 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).

\* Filed with the hydrographic records.

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 <sup>Branch</sup> ~~Section~~ and Hydrographic Surveys <sup>Division</sup> ~~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 on 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). Based on this information the area locally known as "The Flats" was developed using 10 meter line spacing to ensure 100% ensonification. RAINIER used 20m as the threshold depth and a 100m grid radius.

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 sonargram.
- 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. *See Evaluation Report Section P.*

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.

#### 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 be consistent with the surrounding data.*

The side scan sonar equipment ran without problems on Sheet B.

\* Filed with the hydrographic data.



## F. SOUNDING EQUIPMENT ✓

The Raytheon DSF-6000N is a dual frequency (100 kHz, 24 kHz), paper trace echo sounder. 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.

### Problems ✓

None.

## G. CORRECTIONS TO ECHO SOUNDINGS ✓

Correctors for the velocity of sound through water were determined from the casts listed below. Casts 1-6 plot outside the survey area.

<u>Velocity Table #</u>	<u>Cast#</u>	<u>DN</u>	<u>Cast Position</u>	<u>Deepest Depth (m)</u>	<u>Applicable DN</u>
1	1	146	60° 39.5' N 151° 24.5' W	49.8	145-152
2	2	161	60° 40.8' N 151° 25.1' W	50.0	157-166
4	4	178	60° 40.4' N 151° 25.2' W	40.5	170-180
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. Due the large tidal range, the data from the cast had manually extrapolated beyond the program VELOCITY's normal limits to meet all depths in the survey area. The cast 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". \*

Sound velocity tables were re-checked during office processing, and found to contain no significant problems.

Filed with the hydrographic data.

### Static Draft ✓

A transducer depth was determined using FPM Fig 2.2 for vessels 2123-2126 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 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 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 tables 7 and 8 (for 2127, 2128) contain all zeros and were used for manually entered bottom sample data.

### Heave ✓

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

### 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>Time Correction</u>	<u>Height Correction</u>
High Water	-0 25	none
Low Water	-0 25	none

Portions of this survey fall in tide zones III, IV, V, and VI, but the Zone VI encompasses most of the sheet. For ease of acquisition and processing, all depths were reduced using the corrections for Zone VI.

\* Filed with the hydrographic data.

HDAPS listings of the data used in generating tide corrector tables are included in Appendix V of this report. and are filed with the hydrographic data.

Seldovia, AK (945-550) 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 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<sup>\*</sup>) 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 January 30, 1994 is attached.

H. CONTROL STATIONS ✓ See Evaluation Report, section H.

A listing of the geodetic stations used to control this survey is included in Appendix III<sup>\*</sup> 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 Evaluation Report, section I.

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

\* Filed with the hydrographic data.

## 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. RAINIER personnel were unfamiliar with MONITOR 3.0, and only recovered part of the data, both of the SUMMARY.SUM files and the scatterplot for 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 the baseline closed. The problem was corrected on DN 152. *CONCUR*

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

\* Filed with the hydrographic data.

**J. SHORELINE** ✓

None

**K. CROSSLINES** ✓

Crosslines are within 0.3 meter agreement with mainscheme hydrography. Crosslines totaled 28.7 nautical miles, representing 8.8% of the total mainscheme hydrography.

**L. JUNCTIONS** See Evaluation Report, section L.

This survey junctions with survey H-10610 (1:10,000, 1995) at the northern limit and survey H-10617 (1:10,000, 1995) at the southern 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 Evaluation Report, section M

Charted soundings originated from the following USC&GS prior surveys: H-8617WD (1:20,000, 1961), ~~H-8618 (1:20,000, 1961)~~, ~~H-9074 (1:5,000, 1969)~~, H-9619A (1:20,000, 1976) and ~~H-9621 (1:20,000, 1976)~~. H-9545 (1:20,000, 1975)

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.

**N. ITEM INVESTIGATIONS** ✓

There was one AWOIS investigation for survey H-10615.

**AWOIS ITEM 52190** ✓

**1. Area of Investigation**

State: Alaska  
Locality: 5 NM Northwest of Kenai River Entrance  
Reported Latitude: 60° 36' 51.95" N  
Reported Longitude: 151° 25' 34.05" W  
Datum: NAD 83  
Depth: 6fm 2ft (11.5m)  
Feature: Obstruction

## 2. Description of Source Item

During wire drag survey H-8617WD (1961), a depth of 38ft (11.5m, 6fm 2ft ) was cleared but hung at an obstruction at a second drag also at 38ft. Survey H-9619 (1976) showed a depth of 7.6fm. The shoaler sounding from H-8617WD was carried forward with a subsidence of 0.2fm applied for the 1964 earthquake.

## 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.

## 5. Results of Investigation ✓

<i>Date:</i>	DN 194
<i>Time (UT):</i>	21 27 14
<i>Measured Depth:</i>	11.7m
<i>Predicted tide corrector:</i>	+0.1m
<i>Corrected Least Depth:</i>	12.1m (6fm <sup>3</sup> ft)
<i>Position Number</i>	16527 +3
<i>Latitude</i>	60° 36' 49.03" N
<i>Longitude</i>	151° 25' 35.59" W
<i>Datum:</i>	NAD 83

The least depth of 12.1m (6fm 3ft) was determined with an echo sounder.

## 6. Comparison with Prior Surveys ✓

Prior survey H-8617WD (1:20,000, 1961) show a clear depth of 6fm 2ft.  
Prior survey H-9619 (1:20,000, 1976) shows a sounding of 7fm 3ft.

## 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 the 6fm 2 ft (11.5m) sounding at latitude 60° 36' 51.95"N, longitude 151° 25' 34.05"W. Chart a 6fm 3 ft (12.1m) sounding at latitude 60° 36' 49.0"N longitude 151° 25' 35.6" W. *concur, 6fm 3ft plotted on smooth sheet.*

## O. COMPARISON WITH THE CHART *See Evaluation Report, Section 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 small features were located. On the long north-south shoal, several new least depths were located which reduce the controlling depth by approximately one fathom. Non-sounding charted features are discussed in Section J, Shoreline. Final comparisons to be made at PHS.

## Dangers to Navigation *See Eval Rpt, Section O.*

Three dangers to navigation within the limits of H-10615 were reported to the Seventeenth Coast Guard District, July 14, 1995.

Twenty-six additional dangers to navigation within the limits of H-10615 were reported to the Seventeenth Coast Guard District, August 9, 1995. Copies of the correspondence ~~are~~ *attached to be found in Appendix I* of this report.

## P. ADEQUACY OF SURVEY ✓

Survey H-10615 is complete and adequate to supersede charted depths and features in their common areas. *Concur*

## Q. AIDS TO NAVIGATION ✓

There were no aids to navigation on H-10615. *Concur*

## R. STATISTICS ✓

# Selected Soundings	48335
NM Hydrography	1078.5
Velocity Casts	5
Detached Positions	0
Bottom Samples	46
Tide Stations	2
NM <sup>2</sup> Hydrography	16.5

**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:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
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,

*Shepard M. Smith*  
for Shepard M. Smith  
Ensign, NOAA

Approved and Forwarded,

*Dean R. Seidel*  
Dean R. Seidel  
Captain, NOAA  
Commanding Officer



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	151:23:57.331	17	250	0.0	0.0	05/23/95	NIK 1944(GPS STATION)
102	F	060:40:57.891	151:23:56.403	19	250	0.0	0.0	05/27/95	NIK TP(GPS STATION), 1995



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

OFFICE OF NOAA CORPS OPERATIONS

NOAA Ship RAINIER

July 14, 1995

**ADVANCE  
INFORMATION**

Director  
DMAHTC  
ATTN: MCNM  
6500 Brookes lane  
Washington, DC 20315-0030

Dear Sir:

While conducting hydrographic survey operations in Cook Inlet, Alaska, NOAA Ship RAINIER discovered three 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,

Dean R. Seidel  
Captain, NOAA  
Commanding Officer

Enclosures



NOJ DE WTEF

T

PTTUZYUW RUHPTEF1981 1981715-UUUU--RUHPSUU.  
ZNR UUUUU  
P 171515Z JUL 95  
FM NOAA S RAINIER  
TO CCGDSEVENTEEN JUNEAU AK  
DMAHTCCNAVWARN WASHINGTON DC//MCNM//  
INFO NOAAMOP SEATTLE WA  
ACCT CM-VCAA  
BT

ADVANCE  
INFORMATION

UNCLAS  
NOAA SHIP RAINIER HAS LOCATED 3 DANGERS TO NAVIGATION IN  
COOK INLET, ALASKA (PROJECT OPR-P329-RA) WITHIN THE LIMITS  
OF HYDROGRAPHIC SURVEY H-10615. THE FOLLOWING INFORMATION IS  
PROVIDED FOR PUBLICATION IN LOCAL NOTICE TO MARINERS:

CHARTS 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
A.	SOUNDING	7 FM	60/34/51.4N	151/25/17.5W
B.	SOUNDING	6 3/4FM	60/36/06.8N	151/25/06.0W
C.	SOUNDING	7 FM	60/33/54.0N	151/24/15.5W

*not  
on CRIT LIST  
or smooth  
sheet*

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

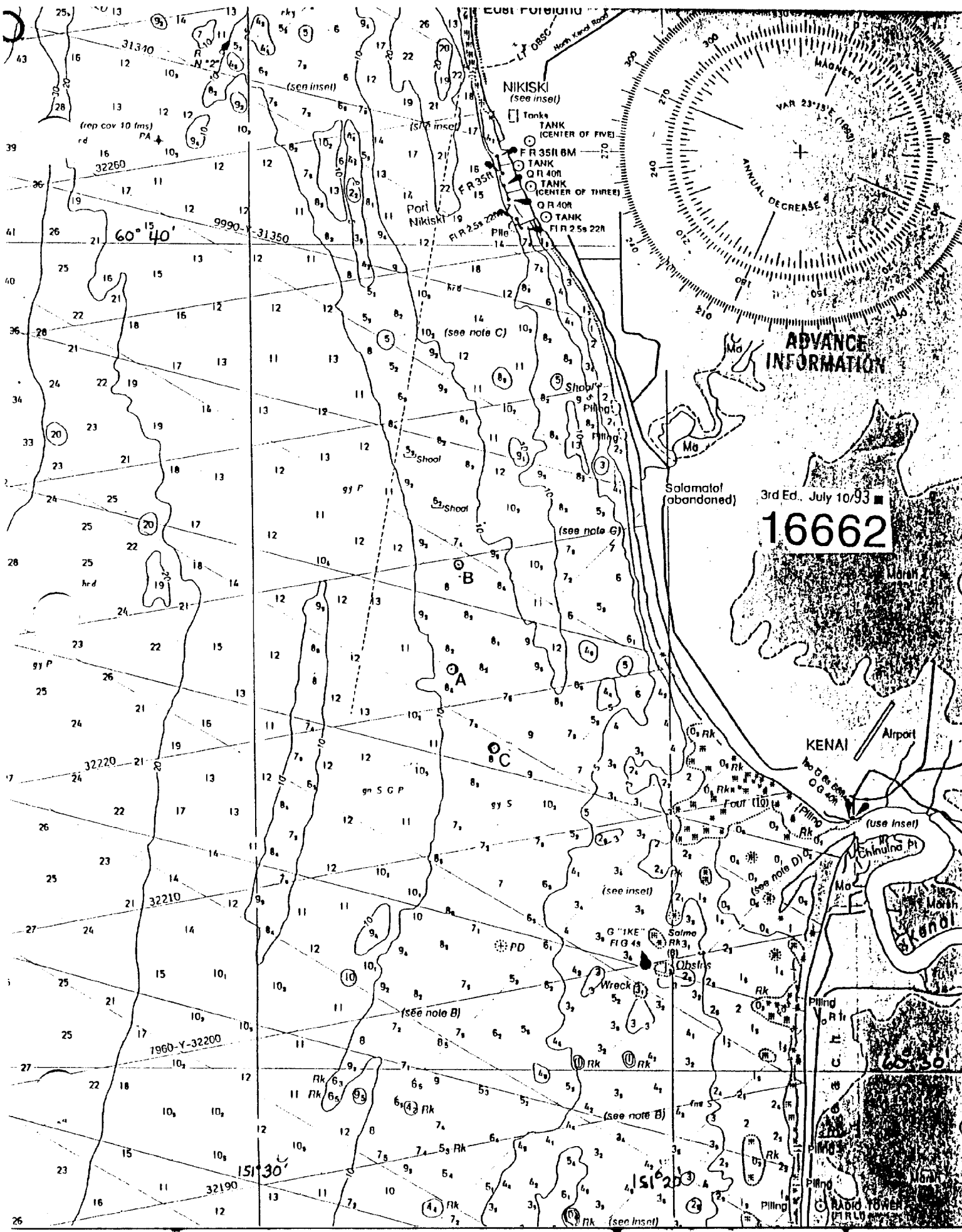
NNNN

KKKK

1106 NOJ

12114 WTEF X +?

QSL TFC+ 1163 BYTES 7/17/95 17:30 GMT  
GA+?



NIKISKI  
(see inset)

- Tanks
- TANK (CENTER OF FIVE)
- F R 3511 BM
- TANK
- Q R 401
- TANK (CENTER OF THREE)
- Q R 401
- TANK
- F I R 2 55 221

ADVANCE  
INFORMATION

3rd Ed., July 10/93

16662

KENAI Airport

Chinulna Pt

Salmo

Wreck

65° 30'

151° 30'

RADIO TOWER



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

**ADVANCE  
INFORMATION**

August 8, 1995

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

Dear Sir:

During the processing of hydrographic surveys H-10610 and H-10615 in Cook Inlet, <sup>26</sup> ~~45~~  
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-10615

**ADVANCE  
INFORMATION**

Survey Title: State: Alaska  
Locality: Cook Inlet  
Sublocality: Five Nautical Miles Northwest of Kenai River Entrance.

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</u>	<u>Longitude</u>	<u>FIX #5</u>	<u>DEPTHs (m)</u>
T.	SOUNDING	7FM 5FT	60/36/48.2N	151/22/36.5W	10416+1	14 <sup>8</sup>
U.	SOUNDING	6FM 5FT	60/36/31.6N	151/22/08.4W	16106+1	12 <sup>9</sup>
V.	SOUNDING	7FM 2FT	60/36/28.9N	151/22/36.1W	8081+4	13 <sup>7</sup>
W.	SOUNDING	8FM 1FT	60/36/13.6N	151/24/12.9W	9399+2	15 <sup>2</sup>
X.	SOUNDING	10FM 1FT	60/36/07.3N	151/23/07.6W	6141+1	18 <sup>9</sup>
Y.	SOUNDING	7FM 0FT	60/35/54.4N	151/25/24.1W	4575+5	13 <sup>1</sup>
Z.	SOUNDING	6FM 5FT	60/35/54.9N	151/24/54.9W	10992+3	12 <sup>7</sup>
AA.	SOUNDING	7FM 3FT	60/35/50.9N	151/24/18.9W	9341+2	13 <sup>9</sup>
AB.	SOUNDING	7FM 2FT	60/35/23.0N	151/25/11.3W	4953+3	13 <sup>6</sup>
AC.	SOUNDING	7FM 3FT	60/34/48.6N	151/24/32.8W	6509+7	13 <sup>9</sup>
AD.	SOUNDING	7FM 1FT	60/34/47.9N	151/24/00.1W	5274+0	13 <sup>3</sup>
AE.	SOUNDING	7FM 0FT	60/34/13.0N	151/24/36.2W	16837+1	13 <sup>2</sup>
AF.	SOUNDING	7FM 4FT	60/34/14.2N	151/23/26.2W	1843+3	14 <sup>2</sup>
AG.	SOUNDING	7FM 0FT	60/34/04.6N	151/24/08.4W	1819+2	13 <sup>1</sup>
AH.	SOUNDING	7FM 0FT	60/33/53.8N	151/24/53.4W	8602+7	13 <sup>2</sup>
AI.	SOUNDING	6FM 3FT	60/37/10.7N	151/25/54.2W	9617+2	12 <sup>3</sup>
AJ.	SOUNDING	8FM 3FT	60/36/21.8N	151/26/08.2W	3932+2	16 <sup>0</sup>
AK.	SOUNDING	10FM 0FT	60/35/55.9N	151/26/54.5W	3812+2	18 <sup>7</sup>
AL.	SOUNDING	9FM 1FT	60/35/57.2N	151/28/35.0W	9695+1	17 <sup>2</sup>
AM.	SOUNDING	9FM 1FT	60/35/49.3N	151/28/21.5W	9712+0	17 <sup>0</sup>
AN.	SOUNDING	7FM 1FT	60/34/41.1N	151/28/28.2W	15132+1	13 <sup>4</sup>
AO.	SOUNDING	7FM 0FT	60/34/12.5N	151/28/38.8W	3282+1	13 <sup>1</sup>
AP.	SOUNDING	10FM 0FT	60/33/57.5N	151/27/09.4W	8770+3	18 <sup>6</sup>
AQ.	SOUNDING	10FM 2FT	60/33/40.8N	151/27/42.6W	8373+2	19 <sup>2</sup>
AR.	SOUNDING	5FM 5FT	60/33/24.8N	151/28/58.6W	3226+1	11 <sup>0</sup>
AS.	SOUNDING	6FM 0FT	60/33/11.1N	151/29/00.3W	0565+4	11 <sup>2</sup>

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 15, 1995

**ADVANCE  
INFORMATION**

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

Dear Sir:

Eleven 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-10615. These dangers 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) 526-6835.

Sincerely,

*over* Kathryn Timmons  
Commander, NOAA  
Chief, Pacific Hydrographic Branch

Enclosures

cc: DMAHTC  
N/CS261  
PMC





**ADVANCE  
INFORMATION**

Hydrographic Survey Registry Number: H-10615

Survey Title: State: Alaska  
Locality: Cook Inlet  
Sublocality: 5 NM Northwest of Kenai River Entrance

Project Number: OPR-P329-RA

Survey Date: June 1 - 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

<u>ITEM</u>	<u>DANGER</u>	<u>DEPTH</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
A.	Sounding	8 fms 2 ft	60°34'02.0"	151°23'16.7"
B.	Sounding	5 fms 1 ft	60°35'27.8"	151°22'06.0"
C.	Sounding	8 fms 4 ft	60°36'11.3"	151°23'43.1"
D.	Sounding	8 fms 4 ft	60°36'01.4"	151°22'56.3"
E.	Sounding	6 fms 5 ft	60°36'24.2"	151°25'05.1"
F.	Sounding	8 fms 0 ft	60°36'44.9"	151°22'23.2"
G.	Sounding	6 fms 1 ft	60°36'21.2"	151°22'08.4"
H.	Sounding	7 fms 5 ft	60°37'09.9"	151°22'03.5"
I.	Sounding	6 fms 1 ft	60°33'28.5"	151°28'48.2"
J.	Sounding	8 fms 3 ft	60°35'24.7"	151°25'37.4"
K.	Sounding	6 fms 5 ft	60°36'28.9"	151°25'34.1"

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



APPROVAL SHEET


for

H-10615

RA-10-9-95

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.

 , LT, NOAA  
RDC Dean R. Seidel  
Captain, NOAA  
Commanding Officer



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: January 30, 1996

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR P329-RA

HYDROGRAPHIC SHEET: H-10615 (amended)

LOCALITY: Five Nautical Miles Northwest of Kenai River Entrance,  
Cook Inlet, Alaska

TIME PERIOD: June 1 - July 20, 1995

TIDE STATION USED: 945-5760 Nikiski, Alaska  
Lat.  $60^{\circ} 41.0'N$  Lon.  $151^{\circ} 23.8'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.91 ft.  
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 19.63 ft.

REMARKS: RECOMMENDED ZONING

1. In Cook Inlet, south of  $60^{\circ} 37.5'N$ , north of  $60^{\circ} 32.0'N$ , east of  $151^{\circ} 37.0'W$ , and west of  $151^{\circ} 27.0'W$ , apply a -15 minute time correction and a X0.98 range ratio to heights using Nikiski, Ak. (945-5760).
2. In Cook Inlet, south of  $60^{\circ} 37.5'N$ , north of  $60^{\circ} 32.0'N$ , east of  $151^{\circ} 27.0'W$ , apply a -15 minute time correction and heights are direct using Nikiski, Ak. (945-5760).

- Notes:
1. Hourly heights are tabulated in Greenwich Mean Time.
  2. This version of tide note H-10615 supersedes the original of December 8, 1995, and the amended note of December 14, 1995.

  
CHIEF, DATUMS SECTION



H-10615

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 16662 B ON PREVIOUS SURVEY NO. 16660 C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G GRAND 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
											3
											4
											5
											6
											7
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											23
											24
											25

Approved:

*Christie Colony*

Chief Geographer

FEB 27 1996

**HYDROGRAPHIC SURVEY STATISTICS**

H-10615

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		0
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		0
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	2				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

**SHORELINE DATA**

SHORELINE MAPS (List):	Not Applicable
PHOTOBATHYMETRIC MAPS (List):	
NOTES TO THE HYDROGRAPHER (List):	
SPECIAL REPORTS (List):	
NAUTICAL CHARTS (List):	16662 3rd ED

**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	124		124
COMPARISON WITH PRIOR SURVEYS AND CHARTS		2	2
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		38	38
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	124	40
			164

Pre-processing Examination by <b>LT G. Noll</b>	Beginning Date <b>8/11/95</b>	Ending Date <b>8/11/95</b>
Verification of Field Data by <b>E. Domingo, I. Almacen</b>	Time (Hours) <b>124</b>	Ending Date <b>3/2/96</b>
Verification Check by <b>B. Mihailov, B. Olmstead</b>	Time (Hours) <b>2</b>	Ending Date <b>3/29/96</b>
Evaluation and Analysis by <b>B. Mihailov</b>	Time (Hours) <b>40</b>	Ending Date <b>3/28/96</b>
Inspection by <b>B.A. Olmstead</b>	Time (Hours) <b>12</b>	Ending Date <b>4/1/96</b>

## **EVALUATION REPORT**

**H-10615**

### **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 60/37/28N and on the south by latitude 60/33/06N. It is bounded in the east by longitude 151/22/00W and extends westward up to longitude 151/29/54W. The bottom is made up of sand, mud, gravel and pebble. Depths range from 4.6 to 14.0 meters.

### **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-10615. 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 Nikiski, Alaska, gage (945-5760). 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 published and field 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: -2.057 seconds (-63.658 meters)  
Longitude: 8.050 seconds (122.564 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. Charted shoreline falls outside the survey limits and could not be shown for orientation only.

## **K. CROSSLINES**

Crosslines are discussed in the hydrographer's report.

## **L. JUNCTIONS**

Survey H-10615 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10610	1995	1:10,000	North
H-10617	1995	1:10,000	South

The junctions with surveys H-10610 and H-10617 are complete and the soundings are in satisfactory agreement. There are no contemporary surveys to the east and west of this survey.

## **M. COMPARISON WITH PRIOR SURVEYS**

H-8617WD (1961) 1:20,000  
H-9545 (1975) 1:20,000  
H-9619 (1976) 1:20,000

Survey H-8617WD was a wire drag survey of the area undertaken by the USC&GS in 1961. A charted 38 foot sounding at latitude 60/36/51.95N, longitude 151/25/34.05W is the only depth which originates from this prior survey. The 38 foot sounding was assigned for investigation as AWOIS item 52190 and has been adequately addressed during survey

operations. A 12.1 meter (39.7 foot) sounding was found at latitude 60/36/49.0N, longitude 151/25/35.6W and should supersede the prior survey depth.

H-9545 and H-9619 cover the entire survey area. Comparison with these prior surveys reveal a pattern of slight shoaling since 1975. The present survey data is consistently 0.5 to 1 fathom shoaler with several additional shoaler depths found then indicated on the prior work.

With the exception of the areas mentioned above H-10615 is adequate to supersede the prior surveys within the common area.

#### **N. ITEM INVESTIGATIONS**

AWOIS item 52190 originates with wire drag survey H-8617WD (1961) and was adequately investigated. This item has been adequately discussed and disposed of in the hydrographer's report.

#### **O. COMPARISON WITH CHART**

Survey H-10615 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.

Survey H-10615 is adequate to supersede charted hydrography within the common area of coverage.

##### **b. Dangers to Navigation**

The hydrographer reported twenty nine shoal depths as dangers to navigation. Eleven 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/CS34. Copies of these reports are attached.

## **P. ADEQUACY OF SURVEY**

Except as noted below, the hydrography on survey H-10615 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 investigation of side scan sonar contacts 8553.83 and 8059.68 at latitude 60/37/11N, longitude 151/24/21W and latitude 60/35/31.0N, longitude 151/22/15W were not adequately investigated by echosounder development. Estimated depths of 9.6 fathoms and 4.6 fathoms were scaled from side scan records and have been shown on the smooth sheet. These depths and associated positioning are considered approximate.

H-10615 falls within the designated survey limits as specified by the project instructions. However, there were four additional north-south lines of hydrography and associated crosslines collected during survey operations. This additional work comprises approximately six nautical miles outside the specified sheet limits and is centered between latitude 60/35/30N to 60/37/15W and along longitude 151/28/30W.

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-10615 adequately complies with the project instructions.

## **Q. AIDS TO NAVIGATION**

There are no fixed or floating aids to navigation located within the survey area. There are no features of landmark value within the survey limits.

## **R. STATISTICS**

Statistics are itemized in the hydrographer's report.

**S. MISCELLANEOUS**

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

**T. RECOMMENDATIONS**

This is a good hydrographic survey. Additional work on a low priority basis is recommended on the two side scan sonar contacts mentioned in section P.

**U. REFERRAL TO REPORTS**

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



Bob Mihailov  
Cartographer

APPROVAL SHEET  
H-10615

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 disapproval 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: 4/1/96  
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: 4/9/96  
Kathy Timmons  
Commander, NOAA  
Chief, Pacific Hydrographic Branch

\*\*\*\*\*

Final Approval

Approved:  
Andrew A. Armstrong III Date: 6-10-96  
Andrew A. Armstrong III  
Captain, NOAA  
Chief, Hydrographic Surveys Division

