

# FE261

Diagram No. 8502-2

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

Type of Survey .. Field Examination ..  
Field No. .... DA-10-1-84 ..  
Registry No. ... FE-261 ..

### LOCALITY

State ..... Alaska ..  
General Locality Gulf of Alaska ..  
Sublocality ... 24 Miles NW of Cape St. Elias ..

1984

CHIEF OF PARTY  
CDR T.W. Richards

### LIBRARY & ARCHIVES

DATE ..... August 19, 1985 ..

FE261

REF L-633 (85)

AREA 6

Chart

911 16 013  
530  
531  
500

TO SIGN OFF see  
"Record of Application"

50 - NC

## HYDROGRAPHIC TITLE SHEET

FE-261

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

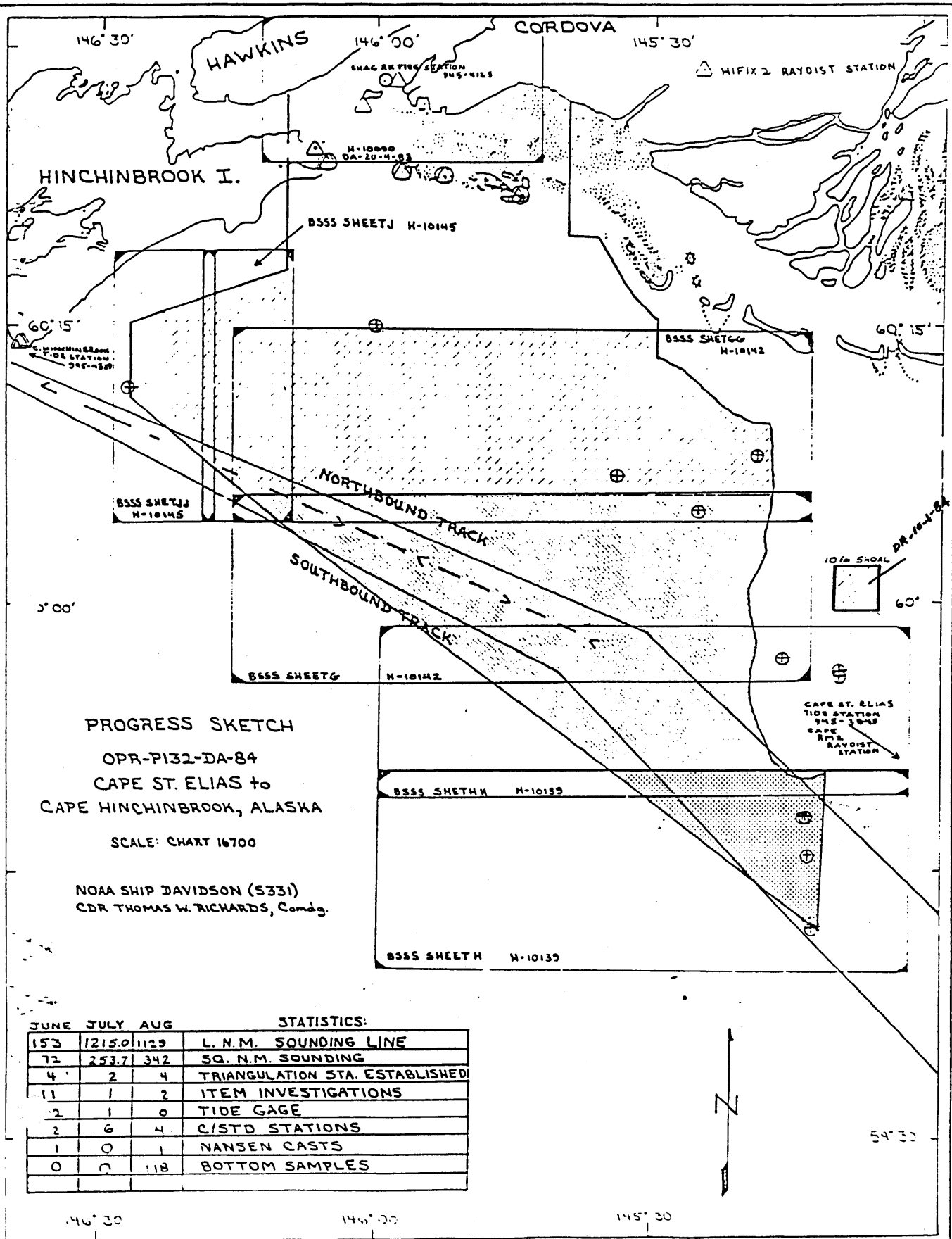
FIELD NO.

DA 10-1-84

State AlaskaGeneral locality Gulf of AlaskaLocality 24 miles NW of Cape St. EliasScale 1:10,000Date of survey 24 July 1984 (JD 205) and  
1 August 1984 (JD 213)Instructions dated 12 April 1984Project No. OPR-P132-DA-84Vessel NOAA Ship DAVIDSON S331 (3130)Chief of party CDR T. W. RichardsCDR T. W. Richards, LCDR W. Wert, LT G. Wheaton, LT M. Koehn,Surveyed by ENS J. Waddell, ENP<sup>S</sup> A. Allen, ENS D. Moeller & Ship's PersonnelSoundings taken by echo sounder, hand lead, pole Bathymetric Swath Survey System  
Raytheon DSF-6000N echo sounderGraphic record scaled by N/AGraphic record checked by Ship's personnel

Evaluated

~~Prepared~~ by A. LucenoAutomated plot by PMC Xynetics PlotterVerification by L. DeodatoSoundings in fathoms ~~xxx~~ at ~~MLW~~ MLLW \_\_\_\_\_REMARKS: Marginal notes in black by Evaluator. Separates are filed with the  
hydrographic data.*Notes in red ink in Descriptive Report made during  
office examination.**AWOS checked 55V 4/10/86  
SURF " " " "*



FIELD EXAMINATION  
OPR-P132-DA-84  
DA-10-1-84

A. PROJECT

The Field Examination was conducted in accordance with the Project Instructions dated 12 April 1984, with Change No. 1 dated 27 APR 1984, and Change No. 2 dated 6 JUL 1984. The field sheet number for the examination is DA-10-1-84.

The purpose of the Field Examination was to further develop a 10.9-fathom shoal discovered on Survey H-9205 (1971) at latitude 60° 00' 40"N, longitude 145° 13' 20"W in surrounding depths of 70 fathoms.

B. AREA SURVEYED

The area covered by this survey is within the following boundaries: Lat. 60° 01.1'N to 60° 00.2'N, Lon. 145° 12.5'W to 145° 14.3'W. Survey Operations were conducted on 24 July 1984 (JD 205) and were completed on 1 August 1984 (JD 213).

C. SOUNDING VESSEL

The only vessel gathering sounding data for this survey was DAVIDSON (3130) using the Bathymetric Swath Survey System (BSSS). No unusual sounding configurations were employed.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

The BSSS Bosun (General Instrument Serial #1) was the only device used to gather sounding data. Sound velocity correction data in the survey area were acquired by a PLESSEY/GRUNDY sensor, model 9040 CTD, serial # 5652. The most recent calibration for this instrument was preformed on April 1984. Calibration data are included with the Corrections to Echo Soundings Report. The velocity cast site, raw velocity data, computations, graphs, and corrections can also be found in that report. The velocity table applying the corrections to the soundings were created via BSSS program TABGEN.

*Refer to sections 4 & 6 of Eval. Report.*

Measurements by divers on JD 162 determined the ship's draft (TRA correction) to be 1.9 fathoms.

The tidal control station was Cordova, Alaska (945-4050). A supplemental tide station was installed at Cape Hinchinbrook (945-4329) and operated throughout the period of hydrographic operations. The appended Field Tide Note has further information on tidal control.

The BSSS was subjected to a patch test prior to operations on 29 JUNE 1984. The system performed according to design specifications. A discussion of the test can be found in the Corrections to Echo Soundings Report.

#### E. HYDROGRAPHIC SHEETS

The survey field sheet was made aboard ship by DAVIDSON's survey department using PDP-8e computer, DP-3 plotter, and program RK 201. Parameters for the 1:10,000 scale survey sheet are found in the BSSS file SHOAL.PAR. All field records will be submitted to the Pacific Marine Center (N/MOP21) for verification and smooth plotting. Only minimum depths were plotted on the sounding plots. ✓

#### F. CONTROL STATIONS

Existing control was recovered and was adequate for hydrographic use with the exception of station HIFIX 1971 which was found to have moved. DAVIDSON personnel established HIFIX 2, nearby. Third-order, Class I standard survey methods were employed in establishment of this station. Additional details can be found in the Horizontal Control Report. A station listing has been attached to this report. All positions are based on North American Datum of 1927. ✓

#### G. HYDROGRAPHIC POSITION CONTROL

Position control for the project was provided by a Raydist electronic navigation system. One station was erected at Cape St. Elias (CAPE RM 2 1979) and the other, two miles east of the Cordova airport (HIFIX 2). Serial numbers of the equipment used are listed in the Electronic Control Report.

Calibration of the Raydist system was performed by comparing Raydist and Mini-Ranger fixes at a calibration site well within the range of good Mini-Ranger signal strength. The calibration site at 60° 15' N, 146° 00' W was normally used because of its good fix configuration and high Mini-Ranger signal strength levels. Correct Mini-Ranger operation was confirmed by visual calibration with sextants. Three simultaneous Raydist/Mini-Ranger fixes with check fixes having inverse distances of 5 meters or less were considered a successful calibration. Raydist partial lane correctors were computed for each station and the correctors were entered into the parameter table prior to running lines. These beginning partial correctors were also applied during data processing. ✓

For further information see the Electronic Control Report.

#### H. SHORELINE VERIFICATION

This survey did not involve any shoreline. ✓

#### I. CROSSLINES

A crossline was run across the central axis of the shoal. When compared to the main scheme hydrography, the soundings from the crossline compared favorably with the main scheme soundings especially on the steep slopes of the shoal. ✓

#### J. JUNCTIONS

There were no junctions within the limits of the field examination. ✓

#### K. COMPARISON WITH PRIOR SURVEYS

The Field Investigation consisted of developing a 10.9-fathom shoal (AWOIS item number 50577) discovered on Survey H-9205 (1971). The area encompassed by a 750 meter radius circle centered at latitude  $60^{\circ} 00' 40''N$ , longitude  $145^{\circ} 13' 20''W$  was surveyed by BSSS on JD's 205 and 213. Sounding line spacing in this area provided 100-percent coverage using sonar beams 0 through 7. The reduced least depth of 10.4 fathoms found by DAVIDSON was slightly shoaler than the least depth found by FAIRWEATHER (see section Q of this report). However, this will not alter the value of the charted least depth. More about the nature of the shoal was revealed through 100% coverage provided by the BSSS. The feature is a north northeast-south southwest tending ridge rising about 300 ft above the surrounding bottom with two peaks. ~~The southwesternmost peak is the shoalest.~~ Results of the development are plotted on a 1:10,000-scale enlargement (DA-10-1-84). Observed Loran-C rates obtained for the peak of this shoal are 14176.0 (7960-X) and 31592.0 (7960-Y).

*Refer to  
sect. 6 of  
Eval. Report*

*Shoalest peak (8<sup>2</sup>fms) lat.  $60^{\circ} 00' 43.88''N$ , long.  $145^{\circ} 13' 19.75''W$*

#### L. COMPARISON WITH THE CHART

The 10 fathom shoal indicated on chart 16013, 23rd edition 18 Sept. 1982, is a result of the 10.9-fathom depth found during prior survey H-9205 (1971). Selection of the 10-fathom depth on the chart rather than an 11-fathom depth was probably made by the chart compiler in order to enhance the sounding, since the 10-fathom depth curve on the chart is contoured in blue tint. Since the charted sounding originated with the prior survey (H-9205), and is discussed in detail in Section K of this report, no further discussion is offered here. ✓

M. ADEQUACY OF SURVEY

This Field Investigation is considered adequate to supplement the prior survey within the common area and to supersede the least depth determined in 1971.

*Refer to Sect.  
6 of Eval.  
Report*

N. AIDS TO NAVIGATION

There are no fixed or floating aids within the limits of the field examination. ✓

O. STATISTICS

Total number of positions: <sup>201</sup>~~152~~  
 Nautical miles of sounding lines: 15.0  
 Square miles of sounding lines: 0.51  
 Nautical miles of crosslines: 0.7  
 Bottom Samples: 2  
 Tide Stations: 1  
 Current Stations: 0  
 Velocity Casts: 1

P. MISCELLANEOUS

There were no wire drag or side scan sonar operations conducted during this project.

In addition to the LORAN-C rates taken on the shoal, comparisons to LORAN-C rates with Raydist GP's were made every half hour during survey operations. The results were sent to the Commandant (G-NRN), U.S.Coast Guard, Washington D. C. 20593. ✓

Two bottom samples were taken on the shoal. The samples were offered to the U. S. Geological Survey since the Smithsonian indicated they did not want them.

Q. RECOMMENDATIONS

On JD 213 an 8.2 fathom depth was plotted on the Gould contour chart while developing the 10-fathom shoal, AWOIS #50577 (see attachment B). After these data (SSF 213193) were processed through COP (Combined Offline Program), a least depth of 11 fathoms was plotted on the preliminary field sheet. An 11.235 value was present on the Selected Sounding Listing (shoalest soundings to be selected). To investigate why the 8.2 fathom depth had not appeared on the listing or preliminary field sheet, the raw data was reprocessed with program COPEDO, which corrects all the soundings and dumps them to magnetic tape. A listing of the corrected data was then available for review (Attachment C). Additional lines of hydrography were run over this location and the 8.2 fathom depth was not observed again. There were no further indications of the 8.2-fathom depth and its

*Refer to sect.  
6 of Eval.  
Report*

original appearance is attributed to noise in the water column.

Another interesting discovery made during this investigation was that the COP selected sounding of 11.235 fathoms from starboard beam #6 was flanked by a 10.5 fathom sounding on beam #7 (Attachments C & D). The reason that COP selected the 11.235 fathom sounding in lieu of the 10.5 fathom depth is not known.

It is recommended that the 10.<sup>4</sup> fathom sounding located at 60° 00' 44.15"N, 145° 13' 22.73"W be accepted as the least depth, and that the 10-fathom curve be retained on the chart at the above position. It is also recommended that an investigation of the BSSS software be undertaken to ensure that in similar situations program COP will select the correct least depth. *Refer to sect. 6 of Eval. Report.*

#### R. AUTOMATED DATA PROCESSING

The following BSSS programs were used to collect and process data for the survey:

PROGRAM	VERSION	DATE
RK561		12/4/82
SURVEY	10T	1/84
TABGEN	5	8/83
TIDGEN	4	5/83
GUPPY	2	2/83
GULP	5	3/83
TIDLST	3	2/83
CALIB	4	8/83
MTUTIL	2	2/83
ABSTRT	7	5/83
SURF	8	2/83
SMITTEN	6	2/83
NAVPLT	2	8/83
LARD	4	2/83
COP	8	3/84
POP	6	8/83
SPLIT	6	8/83
COPOUT	3	5/83
MT0EOF	1	7/81
MT1EOF	1	7/81



S. REFERRAL TO REPORTS

For additional information, consult the following reports for OPR-P132-DA-84:

Electronic Control Report  
Field Tide Note  
Corrections to Echo Soundings Report  
Horizontal Control Report  
Coast Pilot  
Field Geographic Names  
Descriptive Reports: H-10139  
                          H-10142  
                          H-10145

Respectfully submitted,



Gerald E. Wheaton, Lt. NOAA

MIDL

NATIONAL OCEAN SERVICE  
AUTOMATED WRECK AND OBSTRUCTION INFORMATION SYSTEM  
APRIL 09, 1984

NAME	QUADRANT	REG #	LATITUDE	LONGITUDE	AREA	GP AC	SVY ST	CARTO CODE	CHART
50577									
SNDG		1 0000000	60/00/40.00	145/13/20.00	P	33	11	0130	16013

HISTORY  
H9205/71--OPR-487-71; 10.9 FMS. IN LAT.60-00-40.0N, LONG.145-13-20.0W.  
RAYTHEON DE-723 RECORDER, DECCA HI-FIX IN R/R MODE. SHALE FOUND ON TOP OF  
SHOAL. FEATURE EXTENDS .4NM NORTH/SOUTH, .8NM EAST/WEST. VERIFIED NOT  
REVIEWED.  
LNM31/71--PUBLISHES ABOVE WITH POS. LAT.60-00-42N, LONG.145-13-22W.  
NM33/71--PUBLISHES ABOVE WITH POS. LAT.60-00-42N, LONG.145-13-22W.  
SPECIAL INVESTIGATION--NEGOA-SURVEYOR; LD OF 12 FMS ON ROSS FATHOMETER; LD  
OF 11 FMS FOUND ON RAYTHEON DE-723 FATHOMETER, SAT NAV, RADAR RANGE-BEARINGS.  
LINES OF RECON. QUALITY ONLY. HYDRO. REC. WIRE DRAG INVESTIGATION.

SURVEY REQUIREMENTS  
FULL--VERIFY OR DISPROVE THROUGH ECHO SOUNDER INVESTIGATION. 750 M. RADIUS,  
100% COVERAGE USING BSSS. (SEE PROJECT INST. SECT. 6.9.3; DA-84)  
ASSIGNED: OPR-P132-DA-84

50384									
UNKNOWN		1 0000000	60/14/18.00	146/24/00.00	P	53	12	0102	16709

HISTORY  
LNM5/82--DERRICK BARGE SUNK IN 36 FATHOMS IN (APPROX) 60-14-18N, 146-24-00W.

SURVEY REQUIREMENTS  
LIMITED--VERIFY BY ECHO SOUNDER INVESTIGATION, 1.5 MILE RADIUS AT ONE  
HALF THE NORMAL LINE SPACING. DISPROVAL MAY BE OBTAINED BY SALVAGE  
DOCUMENTATION.  
ASSIGNED:OPR-P132-DA-84..

THESE DATA WERE GENERATED FROM AUTOMATED FILES  
WITHIN THE NATIONAL OCEAN SERVICE. INFORMATION IN  
THE FILE IS INTENDED TO SATISFY THE NEEDS OF HYDRO-  
GRAPHIC SURVEY PLANNERS AND IS NOT CONSIDERED TO  
BE A COMPLETE RECORD OF WRECK AND OBSTRUCTION INFOR-  
MATION WITHIN ANY GEOGRAPHIC AREA. FOR ADDITIONAL  
INFORMATION OR ASSISTANCE IN INTERPRETING THE DATA  
PLEASE CONTACT THE HYDROGRAPHIC SURVEYS BRANCH  
(N/CG241), PHONE 301-443-8752.

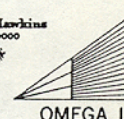
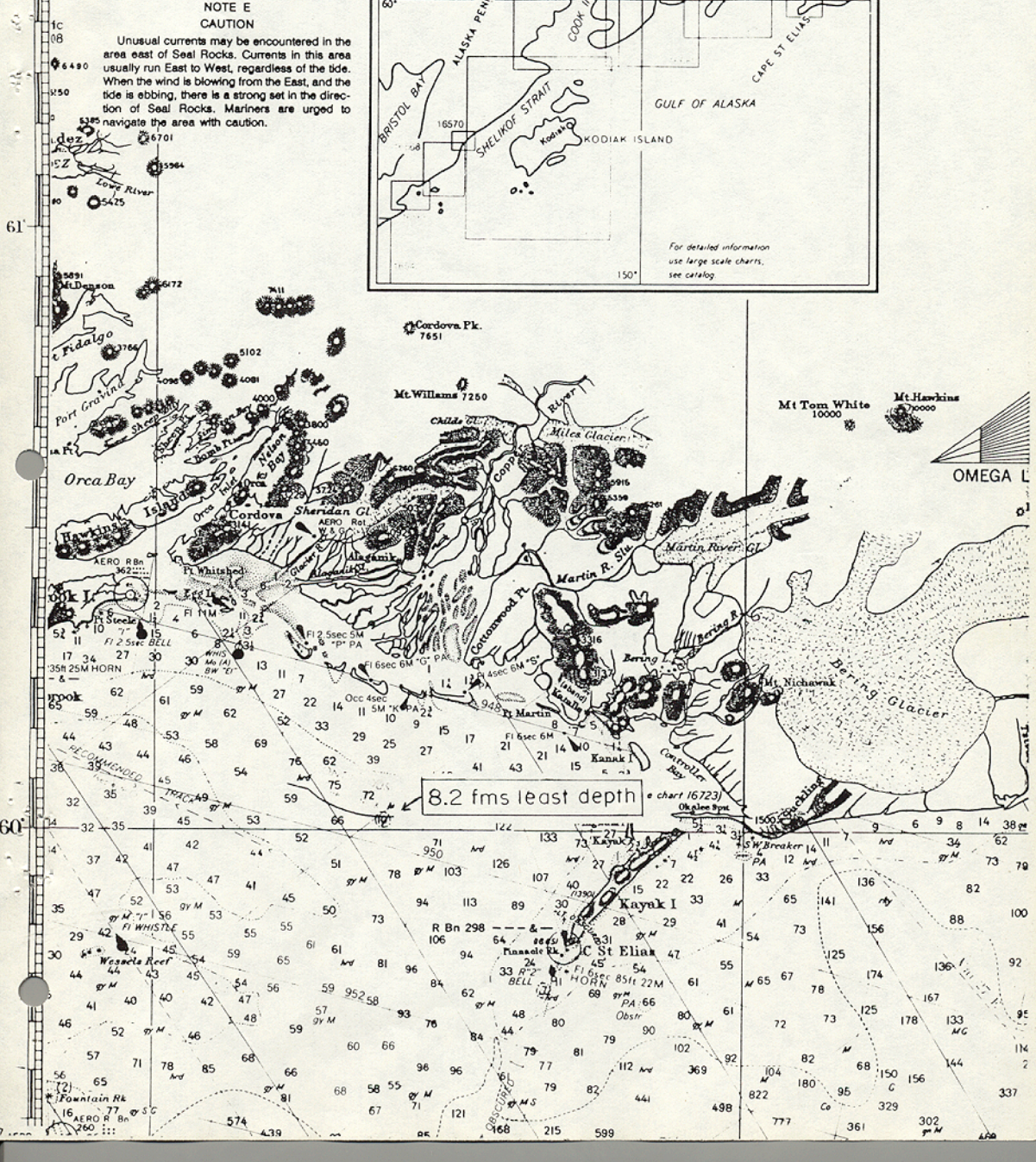
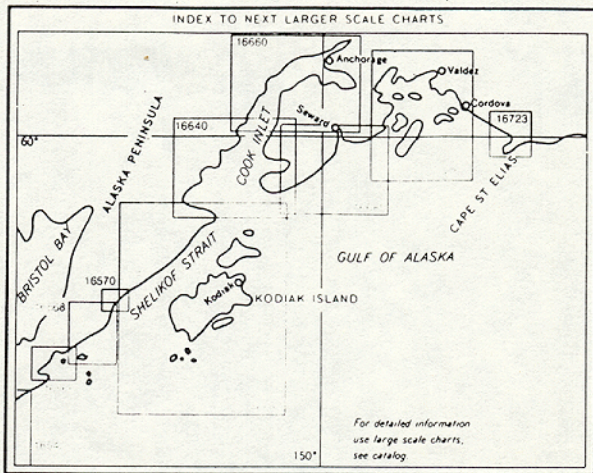
includes bulk and ok and

23rd Ed., Sept. 18/82

# 16013

NOTE E  
CAUTION

Unusual currents may be encountered in the area east of Seal Rocks. Currents in this area usually run East to West, regardless of the tide. When the wind is blowing from the East, and the tide is ebbing, there is a strong set in the direction of Seal Rocks. Mariners are urged to navigate the area with caution.



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84	213	20/26.63	60.556	1.24	95343.10	62117.54
84	213	20/28/28.55	62.410	1.24	95352.48	62206.93
84	213	20/29/29.79	60.798	1.24	95403.93	62220.68
84	213	20/29/36.79	61.340	1.24	95432.70	62189.91
84	213	20/29/46.31	61.702	1.24	95427.24	62002.01
84	213	20/30/05.99	60.382	1.28	95515.93	62168.57
84	213	20/30/07.91	58.978	1.28	95529.17	62227.62
84	213	20/30/07.43	61.671	1.28	95517.47	62117.73
84	213	20/30/14.15	59.195	1.28	95550.57	62157.95
84	213	20/30/21.34	58.324	1.28	95581.09	62227.00
84	213	20/30/27.59	58.250	1.28	95606.71	62085.12
84	213	20/30/38.63	58.278	1.28	95656.59	62187.02
84	213	20/30/44.87	56.362	1.28	95679.24	62088.41
84	213	20/30/48.23	57.944	1.28	95698.47	62231.50
84	213	20/31/08.39	50.879	1.33	95779.56	62157.43
84	213	20/31/07.91	51.717	1.33	95769.75	62092.10
84	213	20/31/27.48	30.516	1.33	95861.70	62177.79
84	213	20/31/34.41	11.235	1.33	95899.56	62168.61
84	213	20/31/46.20	12.527	1.33	95936.95	62162.30
84	213	20/31/59.73	22.229	1.33	95993.70	62133.64
84	213	20/32/16.23	40.288	1.37	96067.91	62206.67
84	213	20/32/15.88	39.332	1.37	96060.66	62110.76
84	213	20/32/48.12	53.368	1.37	96204.53	62225.17
84	213	20/32/47.77	52.786	1.37	96199.81	62161.57

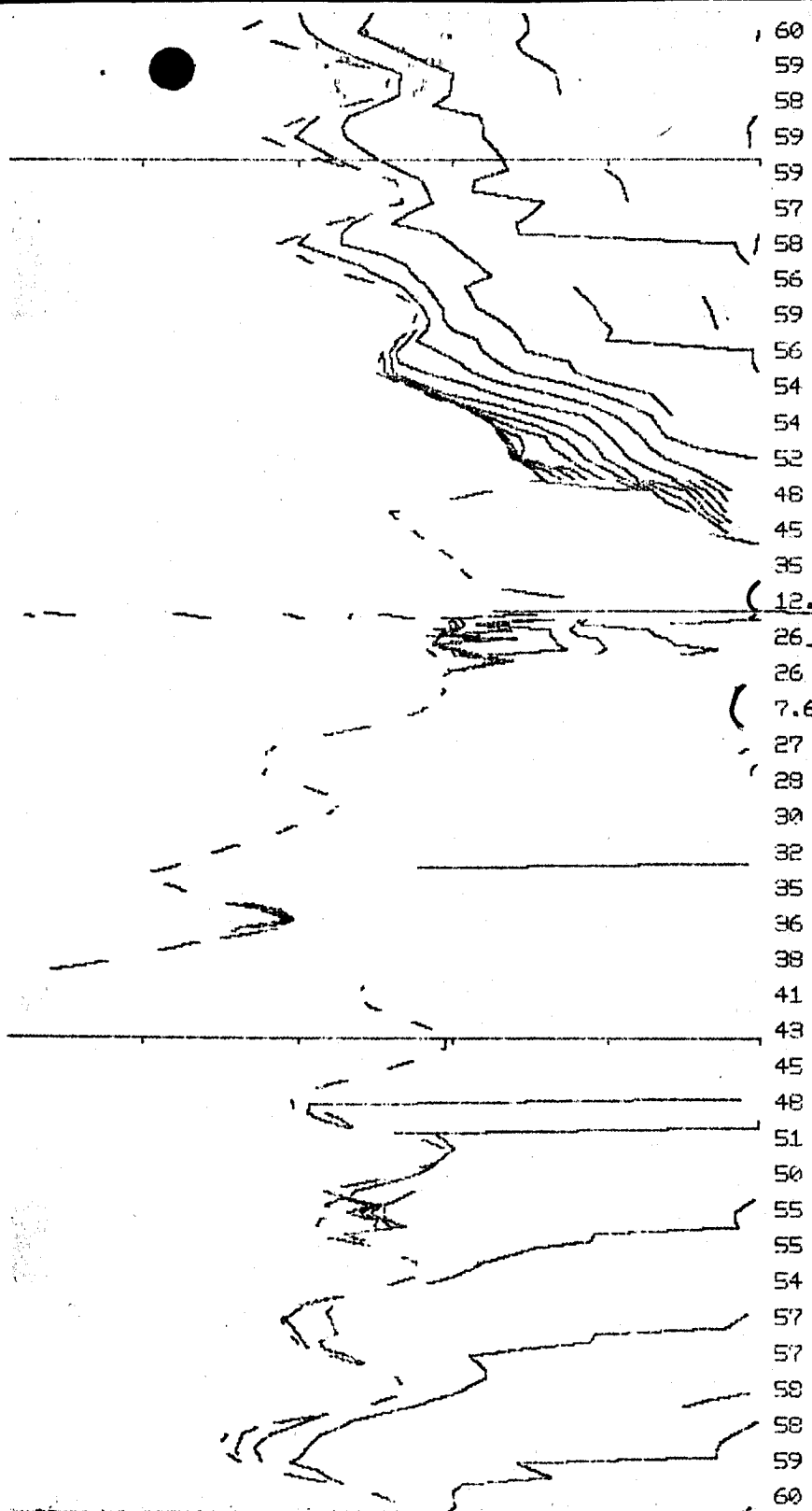
ATTACHMENT # D

10 fm SHOAL  
OPR-PIB-DA-84

COPCUT (Selected Sounding  
SSF #213193 Listing)

POSN #s 1908-1929

• Shoalst sounding selected by SPLOT.  
same as underlined sounding from beam 6  
on ATTACHMENT C.



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1685 205  
23:8:0  
2 FM 400M  
90.2°  
095860 062444  
333.0 8  
6 10  
11.2 63.6  
3.7 0.7  
4.4 0.6  
1686 205  
23:9:0  
2 FM 400M  
89.3°  
096114 062441  
251.50 11  
9 13  
11.2 37.1  
3.7 -1.8  
4.8 -0.9

Peak

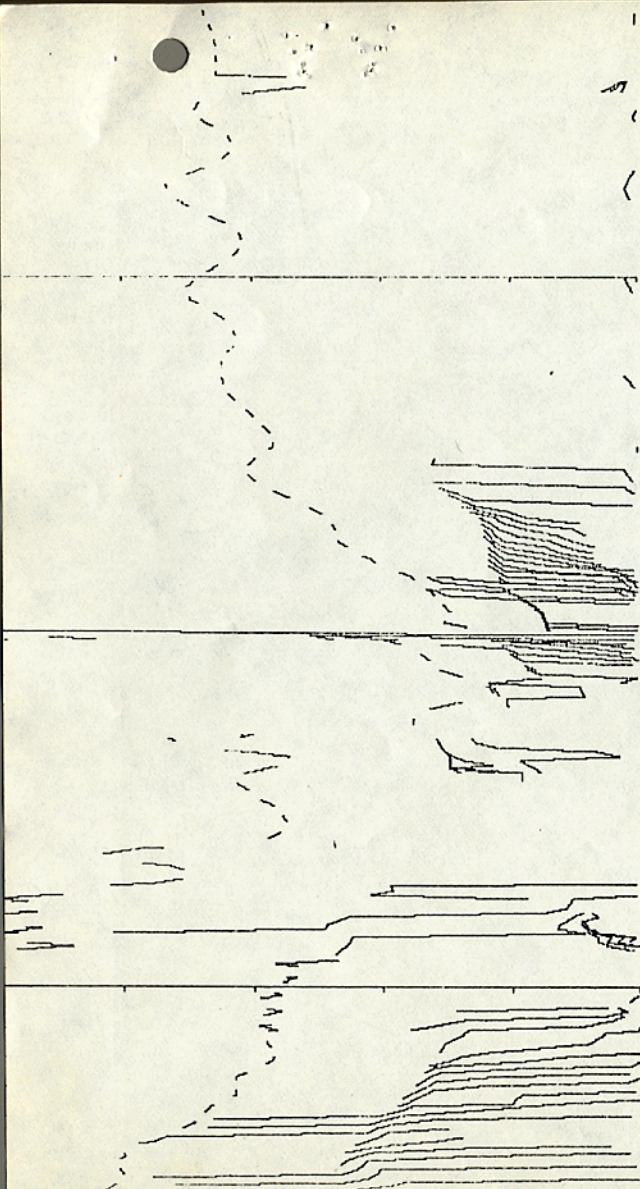
ATTACHMENT A B  
SSF 213.17

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-	1926	213
-	20:31:0	
-	2 FM	400M
-	93.0°	
-	095730	062163
-	319.25	7
-	7	9
-	11.2	63.4
-	1.3	-1.0
-	-3.2	-0.5

Peak

-	1927	213
-	20:32:0	
-	1 FM	200M
-	93.5°	
-	095989	062162
-	121.75	9
-	8	11





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE

NOAA Ship DAVIDSON 5331

September 18, 1984

To: N/MOP - Robert L. Sandquist

From: N/5331 - *James W. R. Cant*  
Commanding Officer  
NOAA Ship DAVIDSON

Subject: Submission of OPR-P132 Survey Data

Failure of DAVIDSON'S BSSS autotracking gate has necessitated use of all available survey personnel during data acquisition operations on OPR-M987. As a result, DAVIDSON'S ability to complete final processing of OPR-P132 data concurrently with OPR-M987 has been severely impaired. In accordance with section 6.14 of the project instructions for OPR-P132-DA-84, I request an extension for transmittal of this final OPR-P132 survey data to PMC until October 15 when DAVIDSON will be inport in San Francisco.



*TWR*  
UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Pacific Marine Center  
1801 Fairview Avenue East  
Seattle, Washington 98102-3767

September 21, 1984

N/MOP2/LWH

TO: Commanding Officer  
NOAA Ship DAVIDSON

FROM: N/MOP - Robert L. Sandquist *Robert L. Sandquist*

SUBJECT: Submission of OPR-P132 Survey Data

Your October 15 extension request for transmittal of OPR-P132 survey data to PMC is hereby granted.

cc: N/MOP2



BATHYMETRIC SWATH SURVEY SYSTEM

OPERATING MANUAL

Nautical Charting Division  
Charting and Geodetic Services  
National Ocean Service

August 1983

U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration

TABLE 2. RECOMMENDED SWATH PATTERNS FOR TYPICAL SITUATIONS

<u>Bottom Configuration</u>	<u>BS<sup>3</sup> Swath Pattern</u>
Flat Bottom	Run parallel swaths in any direction.
Steep Slopes	Run cross-lines across contours to define slope. Run principal swath pattern parallel to general trend of depth curves. Run splits for developments and to define specific depth curves as needed.
Pinnacles	Run principal swaths in a spaced swath pattern to parallel general trend of depth contours. Run splits to provide 100-percent bottom coverage. Run developments to locate least depths. <u>Determine least depth in critical areas by conventional methods.</u> Separate principal swaths, splits, and developments in data processing to avoid congested sounding plots and simplify data analysis.
Canyons, Faults, Channels	Run cross-lines across depth contours to locate feature. Run principal swath pattern parallel to long axis of feature. Run splits to provide 100-percent bottom coverage.
Wrecks, Obstructions	See pinnacles above. Run all lines at reduced speed to increase sonar scanning density.

### A.7. Allowable Error in Depth for Crossline Comparisons

The following standards meet or exceed IHB and NOS standards and were developed for use in BS<sup>3</sup> hydrography:

The ability to meet a required accuracy shall be assumed to be a function of two independent terms, repeatability and predictability; based on the above analysis of error sources for an automated system, the following accuracy standards are proposed as a function of bottom relief.

1. In areas of flat bottom or top-of-shoal features, 90 percent of the differences in depth, which result from a comparison of crosslines with principal sounding lines, shall not exceed:

$$\pm(1.5 + .014 d) \text{ feet or } \pm(.7 + .014 d) \text{ meters.}$$

This is based on the previous analysis of error sources and the propagated error of the difference between two independent determinations of the same quantity. Any single error greater than twice those listed should be investigated for blunder; in areas of flat bottom this error is presumably due to measurement of depths.

2. In areas of sloping bottom independent checks of depths expressed as equal elevation (contour lines) should not differ by more than one half of the contour interval 10 percent of the time. Horizontal error in the plotted position of the contour will be accounted for when making this comparison. (Mobley, 1977, *ibid*)

Enlarged plots of swath crossings may be necessary to adequately evaluate the data.

### A.8. Allowable Error in Depth Measurements Over Wrecks, Obstructions, and Shoals

Determine least depths using conventional techniques described in the Hydrographic Manual to meet published standards.

### A.9. Allowable Error in Referencing Soundings to Vertical Datums

Use published standards.

## 2.0 APPROACH

### 2.1 General

The sounding selection criteria in original COP program were designed, in effect, for noise-free data. The very shoalest sounding in each PUA was selected and considered to be "verified" if it fell within 25 percent of the mean depth of the surrounding eight soundings. This is hardly a sufficient criterion when one considers that the accuracy standards require errors of less than roughly one percent of the depth. Selection of the shoalest sounding from a PUA guarantees a shoal depth measurement bias equal to or greater than the system noise level, because the most anomalous shoal soundings in the tail of the depth measurement noise distribution will be selected and verified. It is obvious that some kind of noise rejection procedure is required if the magnitude of the shoal bias is to be reduced.

The measurement noise arises from several independent sources. In the first place, it has been observed that some kind of interference can take place when the BS<sup>3</sup> is operated concurrently with other sonars. The most obvious embodiment of this problem occurs as anomalously high noise in beams  $\pm 5$  and consequential large depth measurement errors which occur more or less regularly in time (at a beat frequency). This noise occurs most strongly in beams  $\pm 5$  due to their unique lack of phasing circuitry (which incidentally acts to filter out much of the stray interference in other beams). Some unknown hardware problem has also had a more subtle and hence more potentially damaging effect on soundings from other beams such as  $\pm 3$ , in particular, which seem to act strangely at times.

Secondly, soundings with anomalously high or low return signal strengths have exhibited a propensity for severe depth biases -- both shoal and deep. Thirdly, the hardness of the bottom affects the acoustic penetration and can cause significant apparent depth variations (as was noted in the Bellingham data from the April Field Experiment).

Fourthly, the basic measurement uncertainty of the system varies significantly from beam to beam. It is increasingly large for the outer beams for which propagation and bottom reflection geometry cause severe temporal pulse stretching and associated pulse location uncertainty. It is the tail of this noise distribution which is most important and difficult to exclude from the set of COP-selected soundings. The computer code must also, however, be configured to be insensitive to all the other stray noise sources, or conversely, to be able to recognize and reject them.

### 2.2 Diagnostics


In order to solve problems, it is first necessary to recognize them. The COP program itself provided few clues as to data character or to how soundings became selected. A number of diagnostic programs and routines have been developed to permit detailed analyses of the relationships among data functionalities, intermediate results, and subsequent COP outputs, and to intercompare results against external and internal standards.

The most useful of these programs for continued useage are COPEDO, COPSTA, and COPMAT. COPEDO generates an output tape which, when read by

APPROVAL SHEET

Data acquisition during this field examination was under my direct daily supervision. The survey data are adequate to supplement survey H-9205 (1971) in the common area and to supersede the prior survey's depth on the shoal.

Approved and forwarded,

  
Thomas W. Richards, CDR NOAA  
Commanding Officer  
NOAA Ship DAVIDSON

FIELD TIDE NOTE  
 OPR-P132-DA-84  
 Gulf of Alaska  
 June-August 1984

Field tide corrections for this project were based on Cordova, Alaska predicted tides (945-4050) with zoning adjustments according to project instructions, dated 12 APR 1984. A magnetic tape containing the predicted data was provided by N/OMS132 and all interpolation and zonal corrections for BSSS operations were accomplished by BSSS program SMITEN, version #6. Times of both predicted and observed tides are Universal Time Coordinated (UTC) with one exception occurring on 04 AUG (JD 217) involving SSF # 217110 when an operator initiated the file with an incorrect time (one hour difference). Plotted soundings were corrected for this one hour error.

Three tide stations were installed in the project area. Locations and operating periods are as follows:

<u>SITE</u>	<u>STATION NUMBER</u>	<u>LOCATION</u>	<u>PERIOD</u>
Cape St. Elias	945-3849	59 47.7'N 144 35.5'W	22 JUN- 27 JUN and 06 JUL- 09 AUG
Shag Rock	945-4125	60 27.9'N 145 57.3'W	12 JUN- 20 JUN
Cape Hinchinbrook	945-4329	60 14.6'N 146 40.0'W	12 JUL- 16 AUG

CAPE ST. ELIAS

Two gages (S/N's 67A10945 and 73A229) were installed as well as a 15-ft tide staff on 8 JUNE (JD 160). Also on this date, the staff was leveled to five existing benchmarks. Station operation did not commence, however, until 22 JUNE (JD 174) when gages were activated and a 3-hour acceptance test was performed on gage 67A10945. (Gage 73A229 had yet to produce a trace steady enough to undergo acceptance test.) Difficulty was experienced in purging sea water from the orifice tubing, due to the tubing's great length (approximately 1050 ft). On 22 JUNE (JD 174), the tide staff was again leveled to the same benchmarks to resolve a discrepancy (see LEVELING below). On 29 JUNE (JD 181), after a period of heavy weather, the tide staff was discovered to have been destroyed. Also, the bubbler tubing had been detached from the orifices. Judging from the marigram the time of destruction was 0300 UTC on 27 JUNE (JD

179). Efforts at reinstallation were denied by continually dangerous sea conditions at the site. An unfortunate result of this was that more than three days loss of data occurred, disrupting the continuous thirty day span which was required by project instructions. In response to this, the DAVIDSON requested of N/OMS121 a reduction of the requirement to a minimum of three days. An affirmative reply was received via amendment to instructions, Change No. 2 dated 06 JULY 1984. On 06 JULY (JD 188), the station was restored with reinforced staff and orifice emplacements. A successful acceptance test was performed on both gages that same day. In order to monitor the station more effectively, two of ship's personnel were left ashore at the Cape St. Elias Lighthouse as observers for the remainder of the leg (while the ship completed survey H-10139). This measure proved to be most beneficial as on two occasions misfortune befell the gages. On 9 JUL (JD 191), the orifice tubing of gage 63A10294 was found to have been crimped by driftwood. Less than an hour's data was lost. A resident bear tipped over gage 73A229 at 0807 UTC on 10 JUL (JD 193) causing a 10-hr data loss.

Marigram for gage 67A10294 read 2.2 ft above the original staff and 0.4 ft above the new staff until it shifted for some unknown reason to 0.8 ft between 07 JUL and 8 JUL (JD's 189 & 190). Gage 73A229's marigram read above the new staff 0.3 ft until it altered to 0.2 ft on the same occasion. Station was removed on 09 AUG (JD 222). It is recommended that tidal information from this station be used as control for hydrography on sheet DA-40-1-84 (H-10139).

#### SHAG ROCK

Shag Rock tide station was installed and leveled on 11 JUNE (JD 163), gage S/N 67A16209 & a 15-ft tide staff. A 3-hour acceptance test issued the station into official operation on 12 JUNE (JD 164). Tidal control from this station was necessary in the reduction of several unresolved features from last year's project (OPR-P132-DA-83). During the DAVIDSON's offshore operating periods, this station was not needed and thusly shut down. Marigram reads 5.0 ft greater than the staff. Station was removed on 13 AUG (JD 226).

#### Cape Hinchinbrook

The tide station at Cape Hinchinbrook was installed on 12 JULY (JD 194), including a 10-ft tide staff and two gages (63A2920 & 67A16201). On 19 JULY (JD 201) acceptance tests and leveling were performed. The data obtained between 12 JULY (JD 194) and 19 JULY (JD 201) appears valid. No shift in the staff or orifice is suspected. During a routine inspection on the evening of 30 JULY (JD 212), the nitrogen bottle attached to gage 63A2920 was found to have a defective valve. The bottle was removed. The gage was still recording accurate data when the problem was found. Chart paper on gage 67A16209 was found to have jumped the

sprockets, affecting data after 1930 UTC on 31 JULY (JD 213) and losing data between approximately 2345UTC on 01 AUG (JD 214) and 2300 UTC on 02 AUG (JD 215). The same gage was inspected the next day (JD 215) and the same problem had recurred. No data was lost. However, gage time was affected from 0700 UTC on 03 AUG (JD 216) until the paper was changed. Henceforth, gage 63A2920 was employed and rendered a faithful record. Gage 67A16201's marigram read 6.0 ft above the staff, whereas the marigram of gage 63A2920 read 4.5 ft higher until it shifted to 5.0 ft after attaching a new cylinder on 14 AUG (JD 227). Station was discontinued on 16 AUG (JD 229). This station is recommended as tidal control for DA-40-2-84 (H-10142) and DA-20-2-84 (H-10145).

#### LEVELING

Cape St. Elias tide station was leveled to five existing benchmarks on three occasions during OPR-P132-DA-84. Initial levels were run on 8 JUNE (JD 160) with historical information in agreement with the exception of BM NO. 4, which appeared to have had an upward shift of 1.1 ft. Releveling on 22 JUNE (JD 174) confirmed the 8 JUNE values. An abbreviated level run was carried out on 6 JULY (JD 188) to tie the new staff into the benchmark scheme. Only the staff stop, BM NO.1, and BM NO.2 were leveled at this time. Final leveling took place on 09 AUG (JD 222) with all values comparing well with previous runs. The final run also confirmed a revised elevation for BM NO. 4. An abstract of comparative levels is presented below:

Leg	Difference in elevation (ft)				
	<u>Historical</u>	<u>8 JUNE</u>	<u>22 JUNE</u>	<u>6 JULY</u>	<u>16 AUG</u>
NO.1-2	{4.130 {4.129 {4.131 {4.137	4.127	4.134	4.127	4.134
NO.2-3	{-1.131 {-1.130 {-1.135 {-1.142	-1.135	-1.138		-1.135
NO.3-4	{1.922 {1.924	3.058	3.051		3.058
NO.4-5	{0.624 {0.624	0.610	0.608		0.610

Shag rock tide station was leveled to 3 existing benchmarks, as required by the project instructions, sec. 5.8.2. All recent leveling data agreed well with historical information. Beginning and ending level runs were on 11 JUNE (JD 163) and 13 AUG (JD 226) and they revealed no significant shift in staff nor benchmarks. A leveling abstract follows:



Leg	Differences in elevation (ft)		
	Historical	11 JUNE	13 AUG
NO.1-2	{-0.259		
	{-0.258		
	{-0.258		
	{-0.256	-0.256	-0.256
	{-0.259		
	{-0.261		
	{-0.256		
NO.1-3	{2.875		
	{2.870		
	{2.868		
	{2.874	2.867	2.871
	{2.871		
	{2.873		
	{2.868		

Cape Hinchinbrook tide station had three existing benchmarks and two new marks were established. Beginning levels took place on 19 JULY (JD 201). Levels were also run at station removal, 16 AUG (JD 229). Present information agreed well with historical as shown in following table:

Leg	Differences in elevation (ft)		
	Historical	19 JULY	16 AUG
NO.3-4329G	{-1.991	-1.978	-1.975
	{-1.978		
4329G-NO.5	{1.683	1.683	1.689
	{1.683		
NO.3-NO.5	3.660	3.661	3.665

Cordova control station was subjected to pre- and post-project level runs on 10 JUNE (JD 163) and 17-18 AUG (JD 230-231) respectively. Six existing benchmarks were involved. Results compared with historical data are shown below:

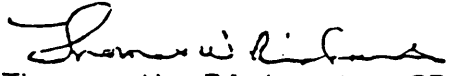
Leg	Differences in Elevation (m)		
	Historical	DAVIDSON	DAVIDSON
	PTP 13-14 JUL '82	5 JUN/24 JUL '83	10 JUN/17-18 AUG '84
a-NO13	---	0.670/0.670	0.672/0.674
NO13-E	-0.9690	-0.972/-0.971	-0.975/-0.977
E-M	1.9030	1.907/1.910	1.914/1.920
M-F	6.2247	6.225/6.220	6.219/6.214
F-G	-4.4332	-4.436/-4.436	-4.437/-4.436
G-NO9	-3.1048	-3.106/-3.103	-3.100/-3.101

The only BM suspected of movement is E, which appears to be sinking slowly. All other differences in elevation compare well.

Respectfully submitted,

  
Andrew J. Allen, ENS NOAA

Approved and forwarded,

  
Thomas W. Richards, CDR NOAA

DATE: 03/21/85

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Pacific

OPR: P 132

Hydrographic Sheet: FE-261 (DA-10-1-84)

Locality: Gulf of Alaska

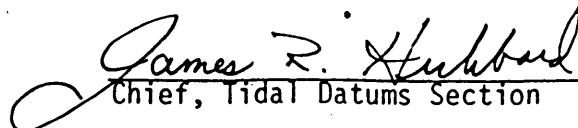
Time Period: July 23-31, 1984

Tide Station Used: 945-4329 Cape Hinchinbrook, AK

Plane of Reference (Mean Lower Low Water): -0.41 ft.

Height of Mean High Water Above Plane of Reference: 10.2 ft.

Remarks: Recommended Zoning:  
apply x0.86 range ratio to all heights.

  
Chief, Tidal Datums Section

GEOGRAPHIC NAMES

FE-261

Name on Survey	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">A ON CHART NO.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">B ON PREVIOUS SURVEY NO.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">C ON U.S. QUADRANGLE MAPS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">D FROM LOCAL INFORMATION</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">E ON LOCAL MAPS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">F P.O. GUIDE OR MAP</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">G RAND MCNALLY ATLAS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">H U.S. LIGHT LIST</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">K</div> </div>											
	ALASKA (title)											
GULF OF ALASKA												2
ST. ELIAS, CAPE (title)												3
												4
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												25

Approved:

*Charles E. Harrington*  
Chief Geographer - N/CG 2x5

JUL 1 1987

**HYDROGRAPHIC SURVEY STATISTICS**

FE-261

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		6
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		5
DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDIAN FILES	1				
ENVELOPES					
VOLUMES					
CAMERS					
BOXES					

**SHORELINE DATA**

SHORELINE MAPS(List):

PHOTOBATYMETRIC 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			201
POSITIONS REVISED	2815		
SOUNDINGS REVISED	1		
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION	12		12
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	7		7
VERIFICATION OF SOUNDINGS	5	16	21
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	4		4
COMPARISON WITH PRIOR SURVEYS AND CHARTS		2	2
EVALUATION OF SIDESCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
PRODUCTION REPORTS	2	19	21
OTHER		7	7
Digitization	2		2
<b>TOTALS</b>	32	44	76

Pre-processing Examination by <b>M. Kenny</b>	Beginning Date	Ending Date 12/10/84
Verification of Field Data by <b>L. Deodato</b>	<del>xxxxxxx</del> Begin 1/22/85	Ending Date 5/14/85
Verification Check by <b>S. Otsubo, B. Olmstead, J. Green</b>	Time(Hours) 13.5	Ending Date 6/19/85
Evaluation and Analysis by <b>A. Luceno</b>	<del>xxxxxxx</del> Begin 5/13/85	Ending Date 6/18/85
Inspection of <b>D. Hill</b>	Time(Hours) 2	Ending Date 6/20/85

PACIFIC MARINE CENTER  
EVALUATION REPORT

FE-261

1. INTRODUCTION

FE-261 was accomplished by NOAA Ship DAVIDSON in accordance with the following project instructions:

OPR-P132-DA-84, dated April 12, 1984  
Change No. 1, dated April 27, 1984  
Change No. 2, dated July 6, 1984

This is a field examination by Bathymetric Survey Swath System (BS<sup>3</sup>) of a 10.9 fathom shoal originating from H-9205 (1971), located about 24 miles northwest of Cape St. Elias.

Predicted tides based on Cordova, Alaska gage was used during field processing. Tide correctors used for the reduction of final soundings reflect approved hourly heights zoned from Cape Hinchinbrook tide station.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to Polyconic.

The electronic correctors have been revised during office processing to use the mean correctors derived from the initial and final calibrations.

The DSF-6000N bridge fathometer sounding correctors have been applied during processing.

2. CONTROL AND SHORELINE

Hydrographic control and positioning are adequately discussed in the Descriptive Report (sections F and G) and in the Horizontal and Electronic Control Report for OPR-P132-DA-84. Geodetic positions for control stations used during the hydrography are published and field positions based on the North American Datum of 1927.

There is no shoreline applicable to this survey.

3. HYDROGRAPHY

Sounding line spacing provides 100 percent swath coverage and is adequate to delineate the standard depth curves and bottom configuration. Soundings within the swath limits of the single crossline are in good agreement with the common mainscheme swath coverage. Positional accuracy is commensurate with a 1:40,000 scale survey as required by the Project Instructions. Critical least depths were not determined adequately by the present survey (see section 4 of this report).

4. CONDITION OF SURVEY

The hydrographic records and reports are adequate and conform to the requirements of the Hydrographic Manual 4th Edition, revised through Change Three, except as noted in the Preprocessing Examination Report, dated December 10, 1980, and as follows:

- a. The BS<sup>3</sup> was used to determine critical least depths in this survey. According to Table 2, Recommended Swath Patterns for Typical Situations, and Section A-8 of the BS<sup>3</sup> Operating Manual, dated August 1983, critical depths over pinnacles, wrecks, and obstructions should be developed and determined by conventional methods.
- b. A Raytheon DSF-6000N dual beam echo sounder was operated concurrently with the BS<sup>3</sup>. Some spurious deeper soundings were selected for the final records by the BS<sup>3</sup>. This anomaly could have been caused by some kind of interference that can take place when the BS<sup>3</sup> is operated concurrently with other sonars (refer to Section 2.1 of NOAA OTES 10, Report, dated December 1982). It is not advisable to operate the BS<sup>3</sup> simultaneously with other sonars. The anomalous soundings were rejected from the hydrographic records.

5. JUNCTIONS

none

6. COMPARISON WITH PRIOR SURVEYS

H-9205 (1971), 1:40,000 (*unreviewed survey*)

AWOIS #50577

The minimum depth over the shoal as determined by the BS<sup>3</sup> selected data is 10.4 fathoms at latitude 60°00'44.15"N, longitude 145°13'22.73"W. However, shoaler depths were indicated on the center beam of the BS<sup>3</sup> contour plot and by the bridge DSF-6000N fathometer operated concurrently with the BS<sup>3</sup>. These shoaler indications plus the BS<sup>3</sup> operating manual's cautions against operating the BS<sup>3</sup> simultaneously with other sonars and in determining critical least depths over pinnacles, wrecks, and obstructions cast doubt as to whether the minimum depths over the shoal area had been determined by the BS<sup>3</sup>. Therefore, these shoaler depths have been added to the smooth sheet and the survey records, resulting in the addition of the following depths:

- a. 8.2 fathoms at latitude 60°00'43.88"N, longitude 145°13'19.75"W from the BS<sup>3</sup> centerbeam (12.4 fathoms from BS<sup>3</sup> data selection).
- b. 9.6 fathoms at latitude 60°00'41.09"N, longitude 145°13'24.28"W from the wide beam trace of the DSF-6000N echo sounder (12.4 fathoms from BS<sup>3</sup> data selection).

A 7.6 fathom depth and a 12.2 fathom depth in its vicinity were indicated by the BS<sup>3</sup> center beam at latitude 60°00'51.98"N, longitude 145°13'16.18"W.

The BS<sup>3</sup> selected depth of 23 fathoms at this position is supported by the DSF-6000N fathometer. Therefore, the 7.6 fathom and 12.2 fathom depths have not been added to this survey and the 23 fathom BS<sup>3</sup> selected depth retained on the smooth sheet.

Because of the 100 percent coverage of the shoal area afforded by the BS<sup>3</sup>, a very detailed delineation of the depth curves and bottom configuration was accomplished in the present survey which was not realized in the prior survey. Although the shoaler depths noted in sections 6a and 6b obtained in the current survey may not actually be the minimum depths over the shoal area, the present survey is adequate to supersede the prior survey.

#### 7. COMPARISON WITH CHART

Chart 16013, 23rd Edition, dated September 18, 1982; scale 1:969,761

a. Hydrography - The lone ten fathom charted depth, <sup>at lat. 60°00'43"N, long. 145°13'20"W</sup> within the limits of this survey originates from H-9205 (1971). Refer to section 6 of this report for a discussion of shoaler depths found in the present survey.

Geographic names appearing on the smooth sheet originate from chart 16013, 23rd Edition.

This survey is adequate to supersede the charted hydrography within the area of common coverage.

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

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

#### 8. COMPLIANCE WITH PROJECT INSTRUCTIONS

Although FE-261 complies with project instructions and changes to the instructions mentioned in section 1 of this report, system limitations by the BS<sup>3</sup> operating manual mentioned in section 4 of this report were not complied with.

#### 9. ADDITIONAL FIELD WORK

This is an adequate field examination, however, additional field work is required by conventional methods to verify that the least depth over the shoal area has been determined.

  
Arsenio A. Luceno  
Cartographer



This survey has been verified and evaluated. I have examined the survey and it meets Charting and Geodetic Services survey standards and requirements for use in nautical charting. The survey is recommended for approval.



Dennis Hill  
Chief, Hydrographic Section

ATTACHMENT TO DESCRIPTIVE REPORT FOR FE-261

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

Daniel W. Jaeger June 21, 1985  
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWMordock

SIGNATURE AND DATE:

Larry J. Mordock 6/21/85

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

Robert L. Seufel 6-21-85  
Director, Pacific Marine Center (Date)



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL OCEAN SERVICE  
OFFICE OF CHARTING AND GEODETIC SERVICES  
ROCKVILLE, MARYLAND 20852

N/CG242:LQ

July 27, 1987

TO: N/CG24 - Roy K. Matsushige

FROM: N/CG242 - *George K. Myers, Jr.*  
George K. Myers, Jr.

SUBJECT: Examination of Hydrographic Survey FE-261 (1984), Alaska, Gulf of Alaska, 24 Miles NW of Cape St. Elias

Chief of Party ..... T. W. Richards  
Field Unit ..... NOAA Ship DAVIDSON  
Processed by ..... Pacific Marine Center  
Examined by ..... L. Quinlan

An examination of hydrographic survey FE-261 (1984) was accomplished to monitor the survey for adequacy with respect to data acquisition, conformance with applicable project instructions, delineation of the bottom, determination of least depths, navigational hazards, sounding line crossings, smooth plotting, decisions made and actions taken by the evaluator, and the cartographic presentation of data.

A digital plot from magnetic tape was not available during the examination of this survey. Therefore, an inspection of a plot from the certified tape was not performed.

In general, the survey was found to conform to National Ocean Service standards and requirements except as stated in the Evaluation Report.



ALASKA, GULF OF ALASKA  
SOUTH APPROACH TO ORCA INLET

60° 01'

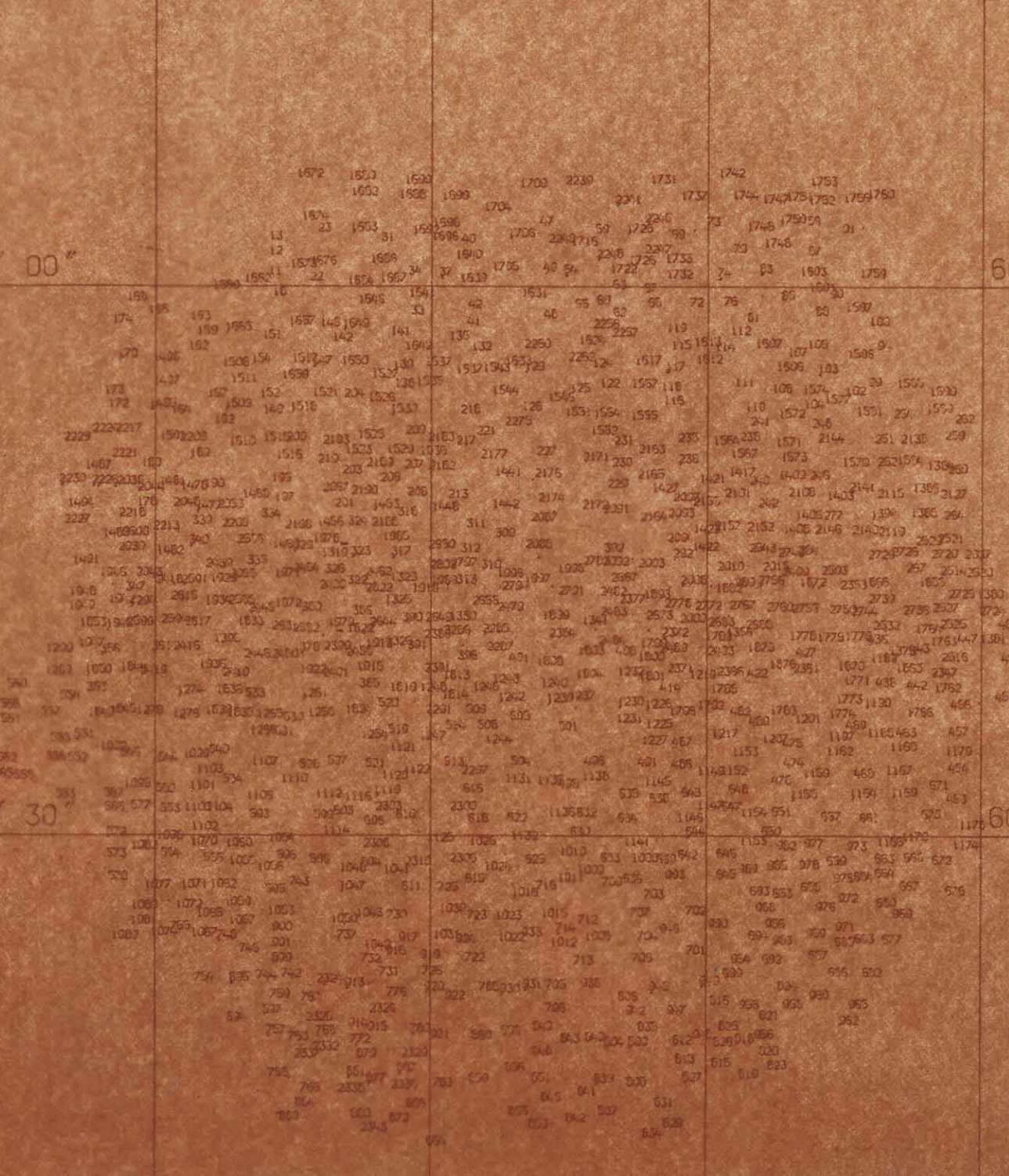
FIELD SHEET: DA 10-1-84		PROJECT: OPR-P132
DATUM: HOR. SNOG.	NORTH AMERICAN DATUM OF 1927 MEAN LOWER LOW WATER	
PROJECTION	POLYCONIC	CENTRAL LONGITUDE 145° 13' 25" W
SCALE	1:10000	SOUNDINGS IN FATHOMS AND TENTHS
SURVEYED BY	NOAA SHIP DAVIDSON CDR T. W. RICHARDS	CMDG. JUL 1964
PROCESSED BY	NAUTICAL CHART BRANCH, PACIFIC MARINE CENTER	
APPROVED BY	ADM R. L. SANDQUIST	DIRECTOR, SPECIFIC MARINE CENTER

60° 01' 00"

60° 01'

60° 00' 30"

60° 00'



145° 14' 00"      145° 13' 30"      145° 13' 00"      145° 12'

\*

FE-261

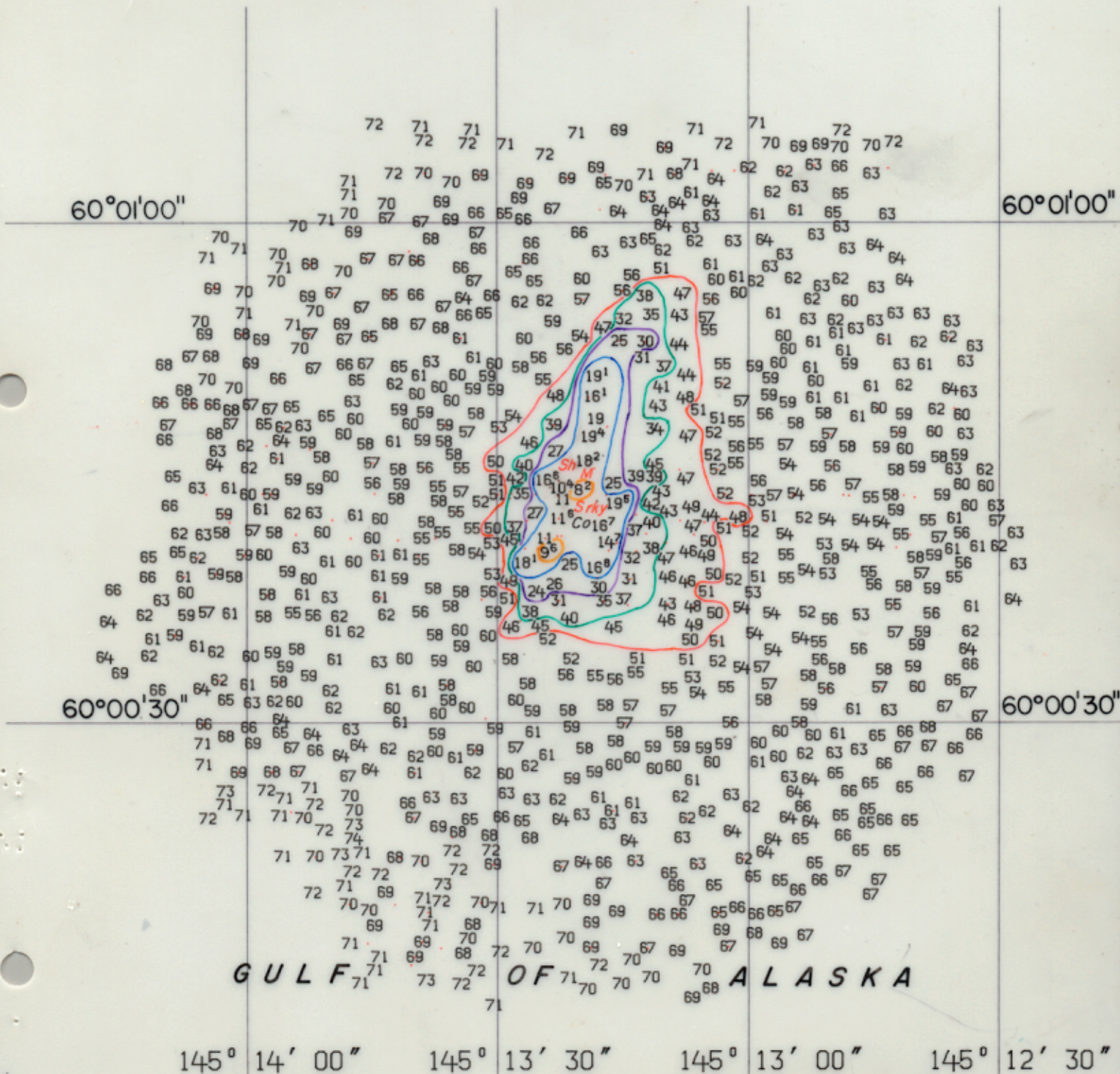
ALASKA, GULF OF ALASKA  
24 MILES NW OF CAPE ST ELIAS

DATE OF SURVEY: JUL 1984

SCALE 1:10,000

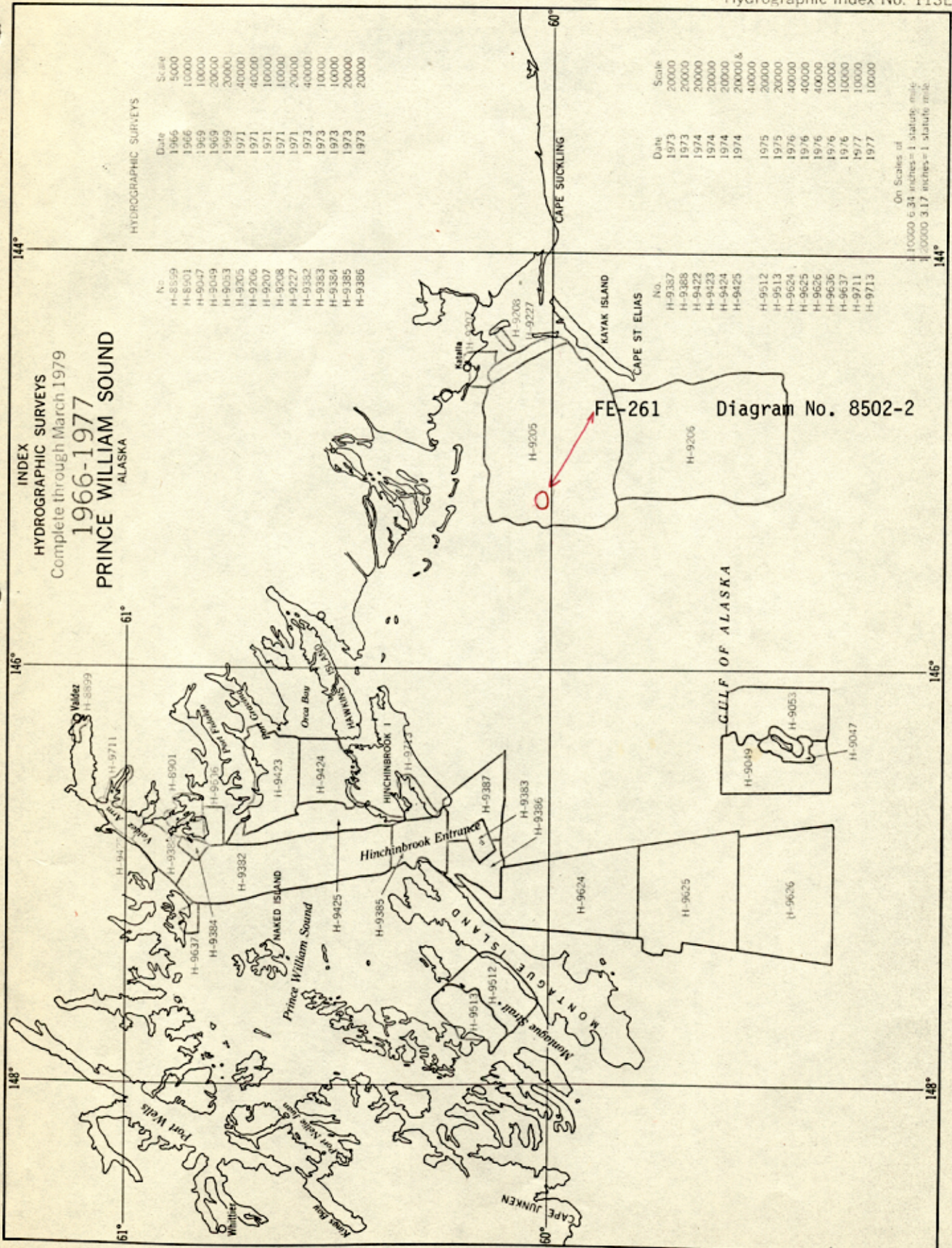
SOUNDINGS IN FATHOMS AND TENTHS AT MLLW

Bottom samples in red from H-9205 (1971)



DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Survey  
Washington, D.C.

Hydrographic Index No. 113E



HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-8559	1966	5000
H-8501	1966	10000
H-9047	1969	10000
H-9049	1969	20000
H-9053	1969	20000
H-9205	1971	40000
H-9206	1971	40000
H-9207	1971	10000
H-9208	1971	10000
H-9227	1971	20000
H-9382	1973	40000
H-9383	1973	10000
H-9384	1973	10000
H-9385	1973	20000
H-9386	1973	20000

No.	Date	Scale
H-9387	1973	20000
H-9388	1973	20000
H-9422	1974	20000
H-9423	1974	20000
H-9424	1974	20000
H-9425	1974	20000 &
		40000
H-9512	1975	20000
H-9513	1975	20000
H-9624	1976	40000
H-9625	1976	40000
H-9626	1976	40000
H-9636	1976	10000
H-9637	1976	10000
H-9711	1977	10000
H-9713	1977	10000

On Scales of  
 1:10000 6.34 inches = 1 statute mile  
 1:20000 3.17 inches = 1 statute mile

INDEX  
HYDROGRAPHIC SURVEYS  
Complete through March 1979  
1966-1977  
PRINCE WILLIAM SOUND  
ALASKA

FE-261  
Diagram No. 8502-2

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

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. FE-261

**INSTRUCTIONS**

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

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

CHART	DATE	CARTOGRAPHER	REMARKS
<i>16013</i>	<i>2-16-89</i>	<i>ED MARTIN</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>28</i> , <i>APPLY THRU NM/85 REF L-633/85</i>
<i>531</i>	<i>3-6-89</i>	<i>ED MARTIN</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>19</i> , <i>APPL'D THRU NM 28/85</i>
<i>500</i>	<i>7/24/89</i>	<i>John Pierce</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>6</i> , <i>Examined, NC; app'd thru NM 28/85</i>
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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