9711

Diag. Cht. No. 8551-3

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

(HYDROGRAPHIC)

Type of Survey HYDROGRAPHIC

Field No. RA-10-3-77

Office No. H-9711

LOCALITY

State ALASKA

General Locality PRINCE WILLIAM SOUND

Locality JACK BAY

1977

CHIEF OF PARTY
James P. Randall

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DATE March 31, 1978

☆ U.S. GOV. PRINTING OFFICE: 1976—669-441

AREA-6

9711

NOAA FORM 77-28 (11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.: H-9711

FIELD NO.: RA-10-3-77

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

State: Alaska

General locality: Prince William Sound

Locality: Jack Bay

Scale: 1:10,000 Date of survey: 17 August - 26 August 1977

Instructions dated: 5 August 1977 Project No.: OPR-452-RA-77

Vessel: Ship RAINIER, Launches RA-3 (2123), RA-5 (2125), RA-6 (2126)

Chief of party: CAPT James P. Randall

Surveyed by: Team Leader LCDR L. Lapine, OICS LTJG S. Ramsey, ENS J. Barnett

Soundings taken by echo sounder, hand lead, ~~pole~~: Ross Model 5000 Fineline Fathometer

Graphic record scaled by: RAINIER Personnel

Graphic record checked by: RAINIER Personnel

Position Verification ~~Plotted~~ by: Thelma O. Jones Automated plot by: PMC Xynetics Plotter

Soundings Verification by: Thelma O. Jones

Soundings in fathoms ~~feet~~ at ~~MLW~~ MLLW

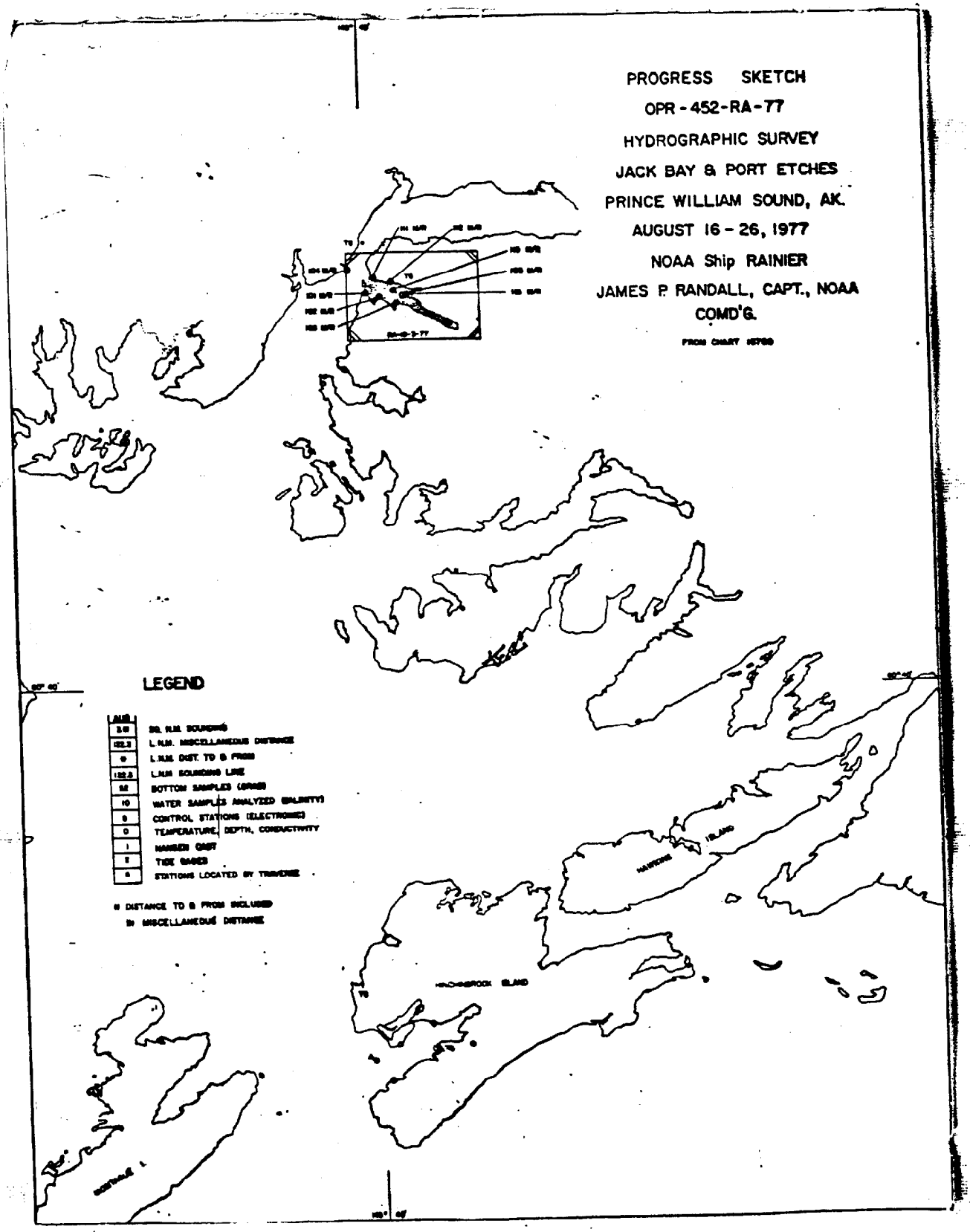
REMARKS: Time Meridian for the survey is 0° GMT.

The mean longitude of the boatsheets is 146°35.0'W.

applied T. & T. ds., 8-16-78 WJT

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1976—665-661/1222 REGION NO. 6


PROGRESS SKETCH
OPR-452-RA-77
HYDROGRAPHIC SURVEY
JACK BAY & PORT ETCHES
PRINCE WILLIAM SOUND, AK.
AUGUST 16 - 26, 1977
NOAA Ship RAINIER
JAMES P. RANDALL, CAPT., NOAA
COMD'G.
LEGEND
DISTANCE TO 8 FROM INCLUDED IN MISCELLANEOUS DISTANCE

A. PROJECT

This hydrographic navigable area survey was conducted in accordance with PROJECT INSTRUCTIONS, OPR-452-RA-77, Port Etches and Jack Bay, Prince William Sound, Alaska, dated 5 August 1977. The survey was in direct response to a request from the United States Coast Guard who intends to use Port Etches and Jack Bay as "bays of containment" in the event of tanker leakage. Change #1 6 Sep. 1977

B. AREA SURVEYED

The area covered by this survey included the entire area of Jack Bay, off of ~~Prince William Sound~~ Valdez Arm. The survey was bounded on the west by a line running from the southern shoreline of the bay across the mouth at a bearing of approximately 020°T to the Northern shoreline. The southern shore at this point is labeled Tongue Point. The northern and southern boundaries of the survey were to shorelines of the bay itself. The eastern boundary of the survey was also the bay shoreline and those areas with shallow mud flats were surveyed to the one fathom curve. The survey began on 19/17 August 1977 and was completed on 26 August 1977.

C. SOUNDING VESSELS

The RAINIER's aluminum launches RA-3 (2123) and RA-6 (2126) were used to conduct the survey hydrography. Each launch utilized sounding equipment whose respective serial numbers are found in Section D, "Corrections to Echo Soundings."

There was only one lead line sounding used during the survey due to the radical depth changes between the shoreline and bottom and also because of the regularity of the bottom itself. This means that few shoals were discovered during the course of the survey.

At times, a single main scheme line, while crossing the depth contours of Jack Bay, would require as many as four scale changes on the fathometer in order to retain an analog trace. This situation suggests that the bathymetry of Jack Bay is dominated by a U-shaped canyon which forms the axis of the elongated bay.

RAINIER and launch RA-5 (2120 and 2125, respectively) were used to obtain bottom samples during the final day of the survey.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

INTRODUCTION

The echo soundings corrections contained in this report are to be applied to OPR-452-RA-77 hydrographic survey in Jack Bay, Alaska. This survey was conducted between ~~19~~ 17 August (JD ~~231~~ 229) and 26 August (JD 238)

1977. The following echo sounding corrections are discussed: sound velocity corrections, launch draft corrections, settlement and squat corrections, and instrument corrections for blanking, initial phase, and sea swell errors. Corrections to manual soundings are also discussed.

SOUNDING EQUIPMENT

All echo soundings obtained during OPR-452-RA-77 were taken with Ross Fineline Fathometer systems which include the following components: Ross Model 4000 Transceiver, Ross Model 5000 Analog Recorder, Ross Model 6000 Digitizer and 100 kHz transducer. Table 1 summarizes the serial numbers of the various components used in each launch:

TABLE 1

Echo Sounder Component Serial Numbers

Component	Launch RA-3 (2123)	Launch RA-6 (2126)
Transceiver	1080	1042
Analog Recorder	1071	1070
Digitizer	1080	1041

SOUND VELOCITY CORRECTIONS

Sound velocity corrections for echo soundings were derived from analysis of sea water samples obtained during Nansen casts (see H.O. 607, Instruction Manual for Obtaining Oceanographic Data, Third Edition, U.S. Naval Oceanographic Office, 1968). One Nansen cast was performed during OPR-452-RA-77 and the details of it are presented in Table 2.

TABLE 2

Nansen Cast Data, OPR-478-RA-77

Cast No.	Location	Time and Date	Applicable Surveys	Table #
1	Lat. 61°02.6' N Lon. 146°40.2' W	1815 GMT 21 August 77	H-9711 (RA-10-3-77)	1

Samples from the casts were analyzed for salinity using standard laboratory procedures (see H.O. 607). The salinometer used for these analyses was a Bisset/Berman Model 6210, S/N 1040 which was last calibrated in April, 1977 by the Northwest Regional Calibration Center, Bellevue, Washington.

Data from each Nansen cast and its salinity measurements were put into computer program RK 530 - Velocity Correction Computations, and run on RAINIER's PDP 8/e digital computer, S/N 1015. Output from this program was used to plot a graph of "Actual Depth Minus Velocity Correction versus Velocity Correction." Preliminary and final velocity correctors were scaled from this curve using standard procedures (see Provisional Hydrographic Manual, fourth edition). Preliminary correctors were determined aboard RAINIER shortly after data from the Nansen cast had been processed, and these correctors were applied to soundings on smooth sheets. Final correctors were calculated at the completion of the survey and submitted to PMC with other data. Table 2 references the survey with its velocity correction table. (Since only one Nansen cast was used for the survey, the preliminary and final velocity correctors were nearly identical except for minor differences in scaling of depth values).

LAUNCH DRAFT CORRECTIONS

Corrections for launch draft were determined from standard bar checks (see Provisional Hydrographic Manual, Fourth Edition). Bar checks were performed each day by each launch prior to beginning and at completion of sounding operations. The first bar check was taken at one fathom increments to a depth of seven fathoms, and the second bar check was performed similarily but only to a depth of three fathoms. (Graduations on bar hand lines were compared with steel measuring tapes prior to the beginning of and at the completion of OPR-452-RA-77, and were found to be accurate).

Each launches' fathometer values of bar depth were abstracted daily. These statistics were scanned at completion of the survey and since no discernable changes were observed, bar check values were averaged for that survey. The mean values were subtracted from the corresponding true bar depths to obtain a series of "bar check correctors." Bar check correctors were coplotted on the sound velocity correction curve. From these combined plots, the mean horizontal distances between bar and velocity correction curves were determined. These values represent the computed corrections for launch draft. However, since these correction values were not available until completion of the survey, an estimated launch draft correction of 0.3 fathoms was used for plotting of boat, semi-smooth and smooth field sheets. Computed launch draft corrections were supplied to PMC in TC/TI tapes that accompanied other survey data.

LAUNCH SETTLEMENT AND SQUAT CORRECTIONS

Settlement and squat refers to the tendency of a survey launch to settle in the water while making way, thus effectively increasing the vessel draft and transducer depth. Settlement and squat of the survey launches was not determined during OPR-452-RA-77. However,

the settlement and squat of launch RA-3 (2123) was measured during a previous survey (OPR-411-RA-76) by the following procedure: A self-leveling Zeiss Ni 2 level was set up on stable ground and a tide staff was positioned vertically on the launch deck over the transducer position. The launch was run past the level instrument at various speeds and the staff reading at each pass was recorded. No appreciable change in staff reading was noted during this test and consequently the settlement and squat of launch RA-3 (2123) was assumed to be negligible. Launch RA-6 (2126) has not been tested for settlement and squat, but since it is of nearly identical design to launch RA-3 (2123) its settlement and squat is also assumed negligible. Thus, no settlement and squat corrections were applied to any of the soundings obtained in this survey. (The maximum "on line" speed used in the surveys was 2000 rpm).

SOUNDING INSTRUMENT CORRECTIONS

Both hydrographic launches, RA-3 and RA-6, record soundings in two modes. The first is a digital mode in which depth is intermittantly sampled and recorded on teletype printout and on punch tape. The second is an analog mode in which depth is continuously sampled and recorded on fathograms. Digital data is used for basic compilation of field sheets with corrections and supplemental information taken from the analog record. The major error sources associated with each sounding system and field methods used to compensate for these errors are discussed below.

A blanking function is utilized in the digitizer system to prevent the logging of soundings from above a preset depth, i.e., spurious returns from fish, seaweed, etc. During survey operations the blanking depth was set to a value slightly shoaler than the shoalest bottom depth expected in the immediate area and was adjusted as the depth changed. When bottom depths shoaler than the blanking depth were encountered, the digitizer system would record the blanking value rather than the actual depth. In these cases, corresponding analog depths were substituted for missed digital soundings during field scanning operations.

During hydrographic operations, the analog recorder initial trace may occasionally wander from the zero axis of the strip chart paper, causing an initial error. This trace was frequently monitored during survey operations and adjusted when necessary to prevent initial errors. When these errors did occur, analog depths were corrected during the nightly check scanning which occurred prior to incorporation of these values with digital data. Thus, all required initial corrections have been applied to echo soundings.

Phase errors are caused by improper internal adjustment of the analog recorder and are manifested by differences between recorded analog and digital depths. The presence of phase error is determined by intro-

ducing an electronically simulated "exact depth" into the analog system and comparing the resultant analog trace with the "exact" values. During hydrographic operations, phase error of the analog system was frequently monitored and analog recorders were adjusted so as to have no phase error at the mean sounding depth. Consequently, no phase error corrections were applied to any echo soundings obtained in this survey.

At times when the analog trace was blurred by heavy seas and/or swells, depths were scaled by assuming the bottom to be located one-third of a trace width from the top of the trace. This method of averaging is similar in theory to the conservative method used for rounding off depths, and like the round-off method, yields depth values that are shoaler or more conservative than the apparent depths.

MANUAL SOUNDING CORRECTIONS

Manual soundings were taken with lead lines on those shoals with least depths shoaler than seven fathoms. Depth markings on these lead lines were compared with steel measuring tape before and after OPR-452-RA-77 and were found to be accurate. Since the records of lead line soundings were interspersed with fathometer soundings, special care was taken during shipboard processing to prevent the application of sound velocity corrections to lead line depths. All lead line soundings that were determined to in fact be a shoal's least depth were logged collectively for each survey on separate punch tapes. Each manual sounding punch tape was referred to a special velocity correction table containing zero corrections for all depths. Table 3 references the survey with the appropriate manual sounding velocity correction table. Care should be taken during verification as well to insure that velocity corrections are not applied to lead line soundings.

TABLE 3

CROSS REFERENCE OF SURVEY NUMBERS AND CORRESPONDING MANUAL SOUNDING VELOCITY CORRECTION TABLE NUMBERS

Survey	Velocity Correction Table
H-9711 (RA-10-3-77)	1
H-9711 (RA-10-3-77) Detached position	2

FORMAT OF ECHO SOUNDING CORRECTION COMPUTATIONS

The remainder of this report illustrates the calculation of sound velocity and other corrections for the survey of OPR-452-RA-77. The calculations for each survey are grouped separately, with the various

items arranged in the following order:

1. TC/TI Tape Listings
2. Velocity Correctors Listing
3. Oceanographic Log Sheet - A, Station and Temperature Data (Form C and GS - 733A)
4. Hytech Salinometer Log Sheet
5. Printout from Computer Program RK 530 - Velocity Correction Computations
6. Preliminary Velocity Correction Curve
7. Abstracts of Bar Check Curves
8. Final Velocity Correction and Bar Check Curves
9. Determination of Launch Draft Corrections
10. TRA (TC/TI) Tape Computation Forms

Where data from a single Nansen cast was used to compute corrections for two surveys, items 3 through 6 are included only with the data package of the "first" survey. A copy of the April, 1977 salinometer calibrations report is included after the computations.

E. BOAT SHEET

The modified Transverse Mercator Projection and soundings were plotted by RAINIER personnel using the ship's three PDP 8/e Hydroplot systems. Launch RA-3 (2123) was equipped with PDP 8/e computer S/N 1006 and complot plotter (model DP-3) S/N 6166-23, while Launch RA-6 (2126) utilized the same PDP 8/e computer (model DP-3) S/N 995 and complot system S/N 3750-1. Both launch systems were used for gathering on line data. RA-3's complot was used to plot the final sheet.

RAINIER's plotting room, utilizing a PDP 8/e computer, (S/N 5848-18) was responsible for nightly processing of the day's data onto a semi-smooth field sheet. After completion of hydrography a smooth sheet was made and along with the original boat sheet layouts, was forwarded to Pacific Marine Center for verification. Boat sheets for both RA-3 and RA-6 were plotted on line, when using electronic control. However, when RA-6 was used to run visual hydrography, with electronic digital sextants; it became necessary to hand plot each fix onto the boat sheet with the aid of an Oddessey Protractor. The central meridian

for the project was 146° 35.0' W and the control latitude was 6,759,000 meters north of latitude zero. Rough plots were made daily along with a smooth sheet of the corrected data. The final plot began on 31 August, 1977 and was completed on 2 September, 1977. Like the boat sheets used during the survey, the final smooth sheet was plotted at a scale of 1:10,000 with a skew of 331°. The skew allowed the entire bay to be plotted on one sheet. It was known prior to the survey that the version produced at the Pacific Marine Center would be non-skewed. Therefore, the necessary parameters for the non-skewed sheet (36x54) are included with the project data. The sheets utilized by RAINIER were 22x48 and had an origin of latitude 61° 01.7' N and longitude 146° 41.6' W.

F. CONTROL STATIONS

A Third Order Class I horizontal control survey was conducted in Jack Bay in August 1977 by NOAA Ship MCARTHUR and RAINIER personnel to establish a network of stations for electronic and visual position control of hydrographic survey operations. The first part of the horizontal control survey, performed by MCARTHUR personnel, consisted of a triangulation scheme that established six new stations in the bay (see Figure 1). RAINIER personnel established an additional four stations and one temporary point in the bay by intersection methods. To avoid confusion, those stations established by MCARTHUR personnel will be referred to as triangulation stations and those stations established by RAINIER personnel will be referred to as intersection stations.

SURVEY METHODS

Third Order Class I survey methods were used to obtain all geodetic distance and horizontal angle measurements. Third Order Class I specifications are presented in the following publications: Classifications, Standards of Accuracy, and General Specifications of Geodetic Control Surveys, NOAA-NOS, February 1974, and Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys, NOAA-NOS, July, 1975.

SURVEY EQUIPMENT

All horizontal angle observations were made with the following Wild T-2 theodolites: MCARTHUR - S/N 26390, RAINIER - S/N 68648 and S/N 73226. MCARTHUR's instrument was inspected and adjusted for correction of collimation errors prior to and during survey operations by Mr. Bob Melby, PMC Photogrametric Party and by ship's personnel. RAINIER's instruments were inspected and adjusted by Bob Melby and ship's personnel in April, 1977.

All distance measurements between triangulation stations were obtained with the following pair of Model CA-1000 Tellurometers: master - S/N 1052 and remote S/N 1051. No instrument calibration data other than the fixed instrument correction value was available at the time of the survey. This pair of tellurometers is normally assigned to the PMC Photo Party but was on loan to the MCARTHUR.

All Miscellaneous distance measurements were made with standard steel surveyor's tapes.

PROCESSING OF DATA

All electronically determined distances were converted to slope distances by applying fixed calibration constants and meteorological corrections to measured values. Meteorological corrections were determined from wet and dry bulb temperature measurements taken at master and remote tellurometer locations and from barometric pressure measurements taken at the approximate mid points of the measured line during distance measurements. Meteorological data was meaned and input to computer program 700/EDAT/010 - Meteorological Correction Electrochain, which was run on MCARTHUR's Wang 700 Series Programmable Calculator, S/N 812289. Geodetic distances were calculated from electronic slope distances by determining station elevations (above MSL) and inputting elevations and slope distances into computer program 700/EDAT/011 - Reduction - Slope Distance to Geodetic Distance, which was run on MCARTHUR's Wang Calculator. Elevations of new triangulation stations were determined as follows: the approximate vertical distance from the water surface to the station was measured with a steel tape, a tide corrector was computed from predicted tides and added to (or subtracted from) the taped vertical distance to obtain an elevation above MLLW. A vertical distance of 1.9 meters (computed by MCARTHUR personnel) was added to the MLLW elevation to obtain a MSL elevation. The published elevation of station HUT 3 1965 was used for computation purposes.

Horizontal angles were observed at station HUT 3 1965 and the new triangulation stations so as to form nine separate triangles (see Fig. 1). In addition to angle observations, all sides of all triangles were measured. Computer program 700/EDAT/006 - Triangle Computation was run on MCARTHUR's Wang calculator and used for all triangles to verify the quality of angle and distance measurements, where all three observed interior angles and one measured side distance of a triangle were input and the lengths of the other two triangle sides were computed. For the triangle HUT 3 1965 - STATION - BOVINE, computer program 700/EDAT/008- Triangle Computation was used to obtain an additional check; two measured side lengths and the included observed angle were input with the other two angles and the third side distance being computed.

Geographic positions of triangulation stations were computed on MCARTHUR's Wang calculator using computer program 700/001 - Long Line Geodetic Position.

RAINIER's intersection stations were established from horizontal angles made at several of MCARTHUR's triangulation stations. Geographic positions of these intersection stations were computed on RAINIER's Wang 700 Series Programmable Calculator, S/N 827335, using computer program 700/PF/022 - Intersection Problem. At least two separate geographic positions were computed for each station, and the results of these computations were meaned to obtain final geographic positions. The results of each position computation were compared with the other computed position for that station by using computer program RK-407 - Geodetic Direct and Inverse and RAINIER's PDP8/e Digital Computer, S/N 1015, to obtain the lineal distances between the various positions.

SURVEY STATION STATISTICS

Four previously established triangulation stations, including HUT 3 1965, JACK 1901, SLIM 1965, and OVAL 1965 were used for visual position control.

Six new triangulation stations, including TANKER, WHALE, FALLS, and SADO, were established, monumented, and described by RAINIER personnel. One temporary intersection point, called TP-2, was not monumented. RAINIER personnel felt that the point, due to its close proximity to the water, would almost certainly be disturbed or destroyed by wave and/or ice action.

ACCURACY OF THE SURVEY

Three sets of statistics are presented below to reflect the accuracy of the survey, including: triangle closure values, triangle side check data, and intersection geographic position comparisons. Triangle closure was computed as the sum of the three observed interior angles of a triangle minus 180^{o}. No triangles were large enough to consider spherical excess. Triangle closure for all triangles was 1.8 seconds of overclosure with a range of closures from 0.8 seconds of underclosure to 6.5 seconds of overclosure.

Triangle side checks were computed by dividing the difference of the measured and computed distance values of a given side by the measured value for that side. A mean value of 1/60900 was obtained for all side checks, with minimum and maximum checks of 1/5444000 and 1:12000 respectively. (The mean value presented above is not a completely accurate reflection of the average side check, but was inflated by several exceptionally good checks).

As stated above, the geographic position of each intersection station was determined by at least two separate computations and the lineal

distance between each position was calculated. The mean,minimum,and maximum position differences were 0.182, 0.090, and 0.325 meters repectively.

RAINIER personnel believe that distance and horizontal angle values used to compute station geographic positions meet or exceed Third Order Class I specifications. Furthermore, all stations,with the exception of BOVINE, were established using strong geometric configurations. Thus,the computed geographic positions of all stations are believed to meet Third Order Class I requirements. Although the geometric configuration used to establish station BOVINE was rather weak,checks on distance and angle measurements used in position computations indicate that the computed geographic position is adequate.

MISCELLANEOUS COMMENTS

The following paragraphs discuss various topics not considered elsewhere in this section including: determination of a starting azimuth for the survey, computation of geographic positions for stations GAS,DEX, observations of intersection stations from station FITZ, and shifting the initials of horizontal angle observations at station SOHIO.

The station JACK 1901 was observed from station HUT 3 1965, and consequently the line formed by the two stations was used for survey azimuth control. However, since no other previously established triangulation stations were observed from HUT 3 1965, no checks were obtained on the starting azimuth.

In the computation of geographic positions of stations GAS and DEX, computed distance values (of lines STATION-GAS and GAS-DEX) were used by MCARTHUR personnel in lieu of corresponding measured values. However, since side checks for the distances in question were both relatively good (1/19000 for the line STATION-GAS and 1/12000 for the line GAS-DEX), the effect of using computed versus measured distances is negligible.

During establishment of the intersection stations mentioned above, station FITZ was occupied and angles were observed from station DEX to several other stations including WHALE and STATION,however, before reobservations were begun, the target at station DEX was inadvertantly removed. Consequently, all initial observations of station WHALE and STATION were discarded,and a new run,including only stations DEX, WHALE, and STATION was made.

After completion of the above described horizontal angle observations at station SOHIO, the target at the initial station, FITZ, was found to be set eccentric with respect to the station. Consequently, upon completion of the reduction-to-center computations, the initial was shifted from station FITZ to station STATION.

Separates - All geodetic data and computations obtained for this survey are attached to this report as separates.

LIST OF GEODETIC DATA AND COMPUTATIONS
Jack Bay, Prince William Sound
August 1977

Unadjusted Field Geographic Positions

List of Stations Occupied by Theodolite

Abstract of Directions

List of Geodetic Distances

Tellurometer Observations

Meteorological Correction Program Printouts

List of Station Elevations

Corrections to be Applied to Tellurometer Slope Distances

Slope to Geodetic Distance Program Printouts

Computations of Triangles and Elevations

Position Computations, Third Order Triangulation

Intersection Geographic Position Printouts

Comparison of Intersection Station Geographic Positions

Recovery Notes and Descriptions

G. HYDROGRAPHIC POSITION CONTROL

Navigable area survey operations were conducted in Jack Bay, Alaska during the month of August, 1977. Operations were carried out as directed by Project Instructions OPR-452-RA-77, dated 11 August 1977. Position control for the survey was provided by the super high frequency (SHF) Motorola Mini-Ranger III system in a range-range mode. The system performed well during the survey and suffered no degradation due to atmospheric conditions or equipment malfunctions.

Description of Shore Stations - During this project, eight shore stations were used in various combinations to provide seven station pairs. This number of station pairs was necessary in order to provide an arc intersection between 30^{0} and 150^{0} throughout the work area. All Mini-Ranger sites were established over Third Order Class I geodetic control stations as described in Section F of this report. Frequently changes of antenna orientation were also necessary in order to maintain signal strengths at a satisfactory level in various areas. Transponder codes and locations are listed below.

Signal	Code	Dates Used	Name
101	1	228-230	FITZ
102	2	229-232	SOHIO
104	4	228-230	HUT 3
105	3	229-231	GAS
111	4	230-234	TANKER
112	1	230-232	(not named)
112	2	232-234	(not named)
113	3	231-234	WHALE
115	1	232-234	SADO

Serial numbers for the shore units were as follows:

Code 1	S/N PMC-1
Code 2	S/N 775
Code 3	S/N 776
Code 4	S/N 777

Power was obtained from two or four 12 volt batteries at each shore station.

Shore Stations Performance - There were only two problems encountered which could be attributed to the shore stations. The first occurred on Julian Days 230 to 232 when Mini-Ranger Code 1 was located at station 112. The frequency of Code 1 was close enough to that of the U.S. Coast Guard's C-band radar located on Potato Point that when this code was used in combinations with other codes large jumps were experienced. The second problem was that of occasional blocked codes in some of the survey areas.

Mini-Ranger Mobile Station Performance - Two vessels used Mini-Ranger control during the project: RAINIER (2120) and RAINIER aluminum launch RA-3 (2123). Serial numbers of the units were as follows:

Vessel	R/T Unit	Console
2120	727	715
2123	720	720

No equipment problems in the mobile units were experienced during this project.

Calibration and Overall Performance - Daily calibration of all Mini-Ranger codes to be used was checked before and after their use by positioning the vessel on a visual range, and taking a sextant angle between the range and a separate signal. The range was formed by stations FITZ (signal 101) and SOHIO (signal 102) while sextant angles were taken between station SOHIO and signal 114. All visual signals were located on Third Order Class I stations. The calibration range was set up within the survey limits to assure that local conditions had no effect on Mini-Ranger operation. Mini-Ranger rates for all codes, for various angles, while on the visual range were predetermined aboard RAINIER using the PDP 8/e computer and program RK 561. Mini-Ranger rates for three angles were recorded and had to agree within plus or minus three meters of their mean and that mean had to agree within plus or minus five meters of the baseline corrector values in order to have an acceptable calibration check.

Two baseline calibrations were performed during the project. The initial baseline calibration was conducted at Coal Point, Homer, Alaska on 13 August 1977 over a distance of 1539.09 meters. A second baseline calibration was conducted on 07 September 1977 over a distance of 1860.99 meters, from the end of PMC Pier 1 across Lake Union to the northern foot of the Aurora Bridge. Distances for these calibration ranges were determined by Tellurometer observations. The baseline calibrations were conducted in accordance with PMC OPORDER APPENDIX M. Baseline Calibration data is provided in the separates section

of this report and daily calibration checks can be found on the raw data printouts.

The values obtained from the initial calibration were used throughout the survey and are considered acceptable. The results of the second calibration indicated only minimal change in the baseline corrector values and as such, the correctors from the first baseline calibration can be used in smooth plotting of the survey data.

The baseline calibrations also determined low signal strength cut off points for each Mini-Ranger RT, console, and transponder combination. When low signal strengths occurred, data collection in the affected area was discountinued until transponder antenna orientation could be changed or by selecting another unaffected station pair. The following is a table of calibration data for the vessel RA-3 (2123):

Code No.	Mean Baseline Corrector (Coal Point)	Mean Corrector (daily)	Mean Baseline Corrector (Seattle)
1	+0.7525	+0.98	-0.33
2	+1.45	+1.51	+0.21
3	+0.4275	+1.33	+0.98
4	-0.4975	+1.45	+1.23

Baseline correctors were within the required accuracy of 0.5mm at the scale of 1:10,000.

Mini-Ranger was used aboard RAINIER (2120) strictly for positioning while taking bottom samples only and no calibrations were performed. All electronic control and calibration information are considered correct and acceptable for controlling hydrography on H-9711.

H. SHORELINE

Shoreline was transferred from the field edited T-sheets manuscripts T-12992 and T-12993. All shoreline and topographic detail on the boatsheet(s) was verified by field edit. Edit is complete on this sheet. There were, however, 25 additional items found that were not noted on the field manuscripts. These items appear in red ink on the final smooth sheet while verified, shoreline features are shown in black ink. For further information refer to the Field Edit Report OPR-452-RA-77.

I. CROSSLINES

Crosslines totalled 15.05 nautical miles or 12.3% of the main scheme sounding. This is within the requirements of the Provisional Hydrographic Manual. (See section 1.4.2). All crosslines soundings, when compared to main scheme soundings, agreed within 3 fathoms.

At the deepest points of the survey, soundings agreed within 3-4 fathoms. Any discrepancies are probably due to the steeply sloping bottom and are not an indication of weak control. All crosslines are plotted in red ink on the smooth sheets. The minimum angle formed between crossline and mainscheme line was 45°. This occurred mostly in the long narrow finger extending to the Southeast because it was felt that the 45° angle would provide the optimum check on mainscheme soundings without having to run twice as many shorter lines that would have been perpendicular. The deepest depth was found at the middle of the bay entrance and was recorded as 161 fathoms.

J. JUNCTIONS

This survey, (H-9711), junctions with the prior survey, H-9422, scale 1:20,000, dated May 1974. The prior survey covers Valdez Arm from Rocky Point north to Middle Rock. Jack Bay is an extension of the Arm on the east side of Valdez Narrows.

There are 21 soundings from H-9422 that overlap this survey and these all occur at the deepest point of Jack Bay.

A comparison of these soundings with RA-10-3-77 revealed a difference of 3-4 fathoms. Considering the difference in scales between the two surveys and the depth of the junction area, agreement between the soundings is considered to be good. This consistency in the junction soundings suggests that an adjustment to soundings and depth contours is not needed for this survey.

K. COMPARISON WITH PRIOR SURVEYS

The prior survey of Jack Bay to be used for comparison is H-2627, scale 1:20,000, dated May 22 to September 17, 1902. Soundings for the survey were transferred onto the RA-10-3-77 boat sheet after some manipulation. The transfer of soundings required a changeover in scale (to 1:10,000) as well as a repositioning of the latitude and longitude lines due to a shift in the datum.

Of the previous survey, (which dealt mostly with Prince William Sound) there are 54 soundings in Jack Bay that were used for comparison. Soundings in the deepest entrance to the bay differed from 0-10 fathoms, but an average value would be 4 fathoms. In the shoaler areas, such as the long baylet extending to the southeast, agreement between

soundings never varied more than 2 fathoms with one notable exception. A sounding of 61 fathoms was found on the prior survey approximately 50 meters from the shoreline, ~~near contemporary visual signal No. 331~~ at 61° 01' 20" 146° 34' 30". RA-10-3-77 shows soundings of 7.8 fathoms, 11 fathoms, and 13 fathoms. The next deepest depth is 47 fathoms, about 50 meters away on the next mainscheme line. Two lines over, however, a mainscheme line running 300°T contains soundings of 61-63 fathoms. This would suggest that the discrepancy between the surveys is due to poor position control during the prior survey. The sounding occurred in an area where visual hydrography was conducted and visual signals worked well, hence, positioning of the sounding during H-9711 is accurate. The proximity of the sounding to the shoreline shows that such a depth (61 fm) is highly improbable in that location. Agreement between the soundings is generally excellent considering the following factors: 1) difference in survey scales, 2) shift in the datum since 1902, and 3) difference in hydrographic methods and requirements between the two surveys. concur PHS

Exposed rocks and shoreline features were plotted on the boat sheets from T-sheets and agreed on all accounts. Those more noticeable landforms are: various small islands found along the shoreline of the elongated baylet, the larger islands located in the very center of Jack Bay, and the charted foul area found at 61° 01.8' N and 146° 39.0' W. There was a shoal not defined by the previous survey at Latitude 61° 02.2' N and Longitude 146° 35.7' W. This was not exposed at low water and was not found by the prior survey. least depth 2 fm

L. COMPARISONS WITH THE CHART

Chart #16708 (14th Edition, dated 18 December, 1976, scale 1:80,000, was used for comparison with the survey area. There are 46 soundings on the chart along with various charted rocks, 10 fathom depth curve, mud flat areas, and one designated anchorage site.

The soundings, when compared with those taken during RA-10-3-77 agree within 2 fathoms. This agreement is to be expected since most of the charted soundings were taken from the 1902 survey.

Mainscheme sounding lines were produced at a spacing of 80 meters, which is less than the required 100, as per project instructions. Hydrography was conducted with electronic control and visual signals, the latter using digital sextants. The visual end proved to be extremely productive and can attribute most of its success to the excellent placement of visual signals by the field editor. Upon scanning the boat sheets nightly certain "holidays" or gaps in the survey were found and subsequently covered using development and crosslines. During the period of hydrography only one uncharted shoal was found. This was located at latitude 61° 01.2' N and longitude 146° 35.7' W and was investigated as follows: After running two sets of obliquely

overlapping mainscheme lines, a buoy was dropped over the shoalest peak noted on the fathometer. A spiral search was performed around the buoy and several detached positions were taken. These DP's were accompanied by lead line soundings and check angles. The shoalest depth obtained on fix number 6675 after tide reductions, was 3 fathoms, as read off the lead line. More information on the DP can be found in the Abstract of Positions and the printout.

least depth 2.2 fms

In keeping with the navigable area concept, the perimeter of the bay was sounded up to the 1 fathom curve. In spots, however, negative values (as seen on the smooth sheets) testify that the zero fathom curve had at times also been reached. There were two mud flats located at the eastern-most end of the 2 elongated baylets. These were amply defined by RA-6 using visual signals.

The 10 fathom curve is shown on the chart as a blue area bounded by a dashed line. The curve, as shown, is in close agreement with the survey. Little difference should be noted when the larger scale chart of Jack Bay is ultimately produced. The increase in scale, however, will yield a much better definition of the curve, as would be expected.

There is one anchorage site charted that is located on the south side of the bay, within the 10 fathom curve. Although it was not used by RAINIER, it lies within a general area where anchorage sites for large vessels are readily available.

However, as one purpose of the survey was to determine the suitability of Jack Bay for anchoring large seagoing ships in the event of heavy traffic in Valdez Narrows, it would be feasible to discuss the areas found in the survey that lend themselves to this purpose. The criteria for the choosing of anchorage sites was mainly depth as the substrate was found to be mud throughout the bay. The table below lists several "centers" of possible anchorage sites, around which a radius of 3-4000 meters can be drawn to define a general locality.

TABLE OF POSSIBLE ANCHORAGES

	Latitude	Longitude
A	61° 01.9' N	146° 36.9' W
B	61° 01.8' N	146° 36.3' W
C	61° 02.5' N	146° 37.0' W
D	61° 02.2' N	146° 35.2' W

When running visual hydrography along the rocky shoreline, a fix was taken each time the launch changed course. The course change was recorded on both the analog and printout. In certain shoal coves, this was helpful as visual signals were often lost due to obstructed views. The procedure allowed the "outs" following the last fix taken to be plotted using time, course, and speed. This is a valid procedure which cannot be done with electronic control.

As it stands, the present day smaller scale chart (#16708) supports the survey results.

M. ADEQUACY OF THE SURVEY

This survey (H-9711) is complete and adequate to supersede all prior surveys for charting purposes. All fathogram field survey records were scanned and checked for peaks and deeps and appropriate changes made to the original records where necessary. The bay was developed with 80 meter spacing lines which ran nearly perpendicular to the depth curves. In the narrow extensions where visual hydrography was conducted the same 80 meter spacing was used; however, the lines were run nearly parallel to the depth curves. This was done for reasons of both feasibility (maneuvering the launch) and practicality. It was felt that perpendicular lines would be too time consuming and would not delineate the depth curves any better.

N. AIDS TO NAVIGATION

No fixed or floating aids to navigation were present within the limits of the survey.

O. STATISTICS

This survey contains 131.35 nautical miles of soundings, covering 3.61 square nautical miles. This data was obtained by the following vessels:

VESSEL NO.	NAUTICAL MILES OF SOUNDINGS	POSITIONS
RAINIER (2120)	-----	24*
RA-3 (2123)	65.4	505
RA-5 (2125)	-----	30*
RA-6 (2126)	65.95	639

*There were 54 bottom samples taken for the survey. Refer to the Abstract of Positions in the separates following the text for further information concerning statistics.

P. MISCELLANEOUS

Jack Bay is close to the port of Valdez and would serve the purpose of harboring those tankers who choose to anchor prior to entering Valdez. However, it is hoped that any commercial ventures that result from the survey are not damaging to the natural environment of Jack Bay, for it ideally represents that type of clean wilderness that Alaska is known for.

Q. RECOMMENDATIONS

It is recommended that hardware or software modification be effected such that on-line plotting of visual hydrography is made possible. At present, X and Y coordinates of fixes taken seem to lie useless on the teletype while one additional person is needed to hand plot the data. The added use of the plotter during visual hydrography would also enable the OIC to choose the correct visual signals, as the position of the launch with respect to signals would be constantly available.

R. REFERENCES TO REPORTS

Coast Pilot Report, OPR-452-RA-77

Field Edit Report, OPR-452-RA-77

S. DATA PROCESSING PROCEDURES

Data aquisition and processing were accomplished per instructions in the Provisional Hydrographic Manual and the PMC OPORDER.

Soundings and positions were taken by the Hydroplot system using RK 111 and the visual programs RK 171, RK 175, and RK 176. There are daily master tapes and corresponding corrector tapes which include the TRA of both launches, electronic control calibration corrections, and all depth corrections. Velocity tapes were generated from Nansen Cast Data. The following is a list of all computer programs (and version dates) used during the survey:

PDP 8/e		VERSION DATE
RK 111	Range-Range Real Time Hydroplot	04/29/77
RK 171	Visual Hydrolog Loader	05/18/76
RK 175	Visual Hydrolog	05/03/76
RK 176	Visual Hydrolog Restarter	05/01/74

Computer Programs and Version Dates Continued

PDP 8/e		VERSION DATE
RK 201	Grid, Signal, and Lattice Plot	07/12/75
RK 212	Visual Station Table Load and Plot	04/01/74
RK 215	Visual Station and Sounding Plot	08/16/74
RK 300	Utility Computations	02/10/76
RK 330	Reformat and Data Check	05/04/76
RK 360	Electronic Corrector Abstract	02/02/76
RK 407	Geodetic Inverse/Direct Comp.	04/14/77
RK 409	Geodetic Utility Package	09/05/73
AM 500	Predicted Tide Generator	11/10/72
RK 530	Velocity Layer Corrections	05/10/76
RK 561	H/R Geodetic Calibration	02/19/75
AM 602	ELINORE-Line Oriented Editor	05/22/74
AM 603	Tape Consolidator	10/10/72
RK 606	Tape Duplicator	08/22/74

Respectfully submitted,

Bruce F. Hillard

BRUCE F. HILLARD, ENS, NOAA

FIELD TIDE NOTE
H-9711
OPR 452
JACK BAY, VALDEZ, ALASKA

Field tide reduction of the soundings for H-9711 was based on the predicted tides for Cordova, Alaska. The GMT tide correctors were generated from these tides with a PDP 8/e minicomputer using PROGRAM AM 500, PREDICTED TIDE GENERATOR (version 10 November 1977). The tide stations were initially set on Alaskan standard time. Prior to the start of hydrography on 17 August 1977 the tide stations were reset to GMT and all remaining observations were done on GMT. Observations were done by RAINIER personnel as operational limitations would allow. Two tide stations were established by the NOAA Ship MCARTHUR to monitor the tides within the project limits:

T1, Jack Bay 945-4309	LAT 61° 02.22' N LON 146° 36.52' W	8/4/77 to 8/26/77 22 Days
T2, Valdez Narrows 945-4328	LAT 61° 04.9' N LON 146° 40.1' W	8/1/77 to 8/26/77 25 Days

T1, Jack Bay, 945-4309

T1 was a 0 to 30 foot Bristol Bubbler gage S/N 67A 16203. 0.0 feet on the marigram equaled 3.81 feet on the fixed staff. Metric installation levels were run to 3 bench marks on 4 August 1977. On 26 August 1977 the removal levels were run in feet to 5 bench marks, with the final bench mark elevations converted to meters. The removal levels were run in feet because RAINIER has only two metric rods; one was being used at Valdez Narrows and the other one was assigned to a shore party. Twelve minute staff/gage comparison observations were done on 17 August 1977 from well before to well after high and low tide stages. Level records indicate that the staff did not move.

T2, Valdez Narrows, 945-4328

T2 was a Fisher & Porter ADR gage S/N 7403A3402M2. 0.0 feet on the ADR tape equaled 2.64 feet on the fixed staff. The installation levels were not forwarded to the RAINIER from the NOAA Ship MCARTHUR. Metric removal levels were run to 5 bench marks on 26 August 1977. Twelve minute staff/gage comparison observations were done on 17 August 1977 from well before to well after high and low tide stages.

Gage Comparisons

T1 recorded a tidal range of 12.5 feet on the 18th of August, 1977 while T2 recorded a tidal range of 12.56 feet on the 18th of August, 1977. The times of high and low tide stages recorded by T1 and the

times of high and low stages recorded by T2 differed by 3 minutes; with T2 occuring later than T1. On the 21st of August, 1977 T1 recorded a tidal range of 10.8 feet and T2 recorded a tidal range of 10.97 feet. The times of high and low tide stages recorded by T1 and those times of high and low tide stages recorded by T2 differed by 3 minutes; with T2 occuring later than T1. These differences in the recordings of T1 and T2 are not significant considering T2 is a discrete gage while T1 is a continuous gage.

Comparison with Predicted Tides

The T1 bubbler gage data was compared to the Jack Bay predicted tides for the days of 18 August 1977 and 21 August 1977. For 18 August 1977 there was no difference in the tidal range of the predicted tides and the tidal range recorded by T1. In each case the tidal range was 12.5 feet. The times of high and low tides from the predicted tides tables were 0.25 hours (15 minutes) later than the recorded times of high and low tides by T1. For 21 August 1977 the predicted tides tables range was 0.3 feet higher than the actual recorded tide range at T1. The high tide occured at the same time for the predicted tides tables and T1. The predicted tides tables low occured 0.23 hours (14 minutes) later than the T1 recorded low tide.

Recommended Zoning

Unless Rockville smooth tides displays significantly different comparison information to the above, it is recommended that H-9711 be reduced using smooth tides from the Jack Bay station (T1) and that no zoning is required.

ACTUAL DEPTH (SURFACE) MINUS VELOCITY CORRECTION (FM)	VELOCITY CORRECTION (FM)
0001.08	0000.01
0002.15	0000.04
0003.22	0000.06
0004.30	0000.08
0005.37	0000.10
0008.05	0000.15
0010.73	0000.20
0013.42	0000.25
0016.13	0000.28
0021.55	0000.32
0027.00	0000.34
0032.43	0000.38
0037.87	0000.41
0043.30	0000.44
0048.73	0000.48
0054.17	0000.51
0065.04	0000.58
0075.90	0000.65
0086.76	0000.73
0097.62	0000.80
0108.48	0000.88
0119.33	0000.96
0130.19	0001.05
0141.04	0001.13
0151.88	0001.22
0162.73	0001.31
0168.15	0001.36

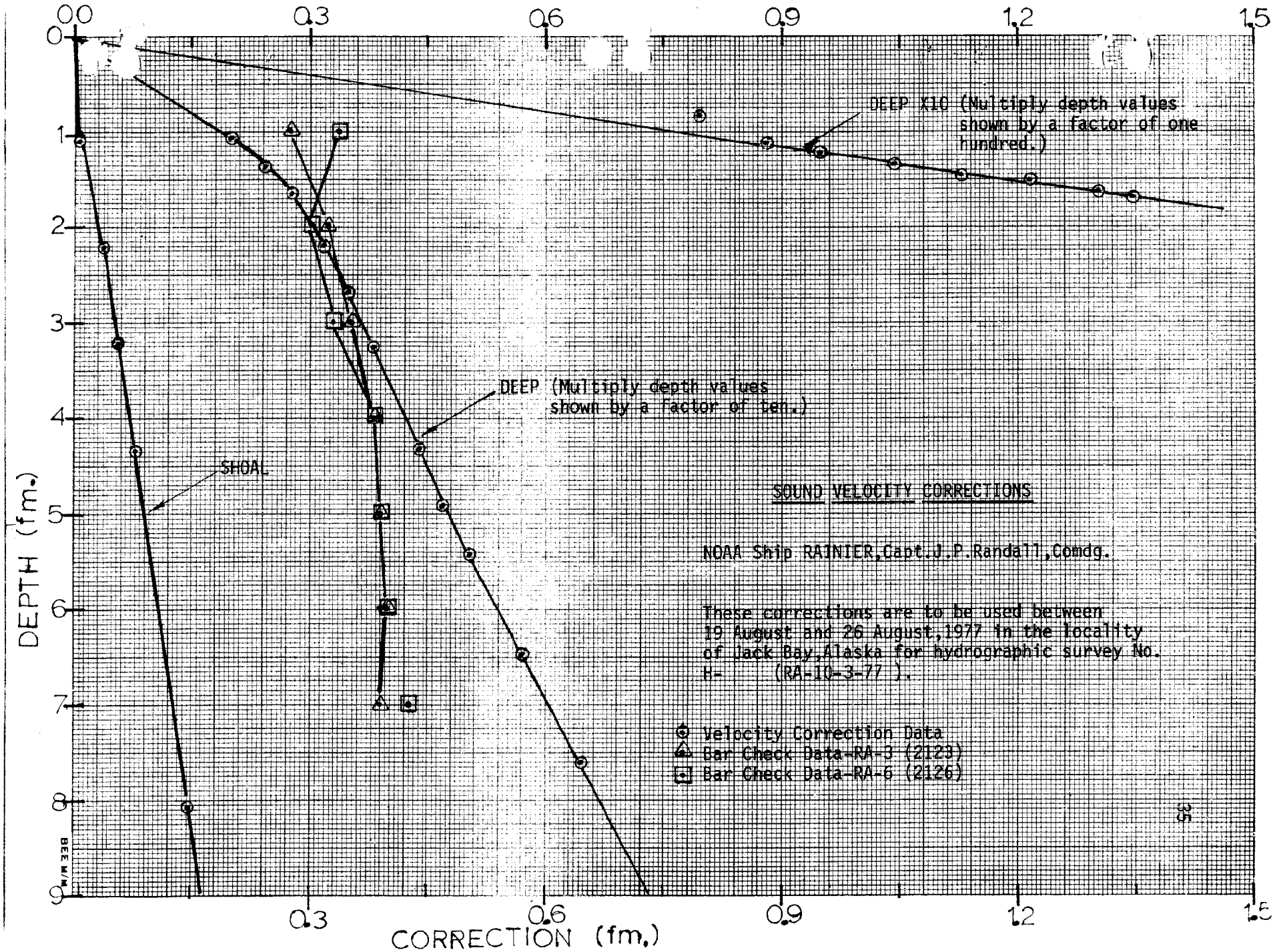

0.0
0.3
0.6
0.9
1.2
1.5
0
1
2
3
4
5
6
7
8
9
DEPTH (fm.)
CORRECTION (fm.)
DEEP X10 (Multiply depth values shown by a factor of one hundred.)
DEEP (Multiply depth values shown by a factor of ten.)
SHOAL
SOUND VELOCITY CORRECTIONS
NOAA Ship RAINIER, Capt. J.P. Randall, Comdg.
These corrections are to be used between 19 August and 26 August, 1977 in the locality of Jack Bay, Alaska for hydrographic survey No. H- (RA-10-3-77).
Velocity Correction Data
Bar Check Data-RA-3 (2123)
Bar Check Data-RA-6 (2126)
85
BEE W/M

Table No. 1

Depth(fm.)	Correction
2.8	0.0
8.1	0.1
13.5	0.2
27.5	0.3
36.5	0.4
54.5	0.5
69.5	0.6
85.0	0.7
105.0	0.8
115.0	0.9
125.0	1.0
140.0	1.1
150.0	1.2
165.0	1.3
175.0	1.4
190.0	1.5

MASTER STATION LIST
OPR-452,JACK BAY,ALASKA

RA-10-3-77

VERSION FINAL

```
101 6  61 02 08372 146 39 40317  250 0001 000000
/FITZ          M/R                          611463

102 6  61 01 56260 146 38 07187  250 0002 000000
/SOHIO      M/R                             611463

103 0  61 02 00285 146 35 43055  139 0004 000000
/DEX                                        611463

104 3  61 03 24451 146 41 40621  250 0008 000000
/HUT 3 1965     M/R                         611463

105 7  61 01 32962 146 36 14463  250 0008 000000
/GAS          M/R                           611463

111 4  61 02 55668 146 38 59522  250 0000 000000
/TANKER     M/R                             611463

112 4  61 02 42763 146 37 08034  250 0000 000000
/TP 2     M/R                               611463

113 7  61 02 15367 146 36 41055  250 0000 000000
/WHALE     M/R                              611463

114 4  61 02 34442 146 35 49317  250 0000 000000
/FALLS       M/R                            611463

115 4  61 01 56426 146 35 15195  250 0000 000000
/SADO     M/R                               611463

200 4  61 00 06538 146 30 07092  139 0002 000000
/BOVINE                                     611463

201 1  61 02 05862 146 36 16152  139 0002 000000
/STATION                                    611463

202 4  61 00 56453 146 32 33193  139 0000 000000
/OVAL 1965                                  611463

203 4  61 00 04901 146 29 25940  139 0000 000000
/SLIM 1965                                  611462
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301 1  61 01 47272 146 34 39476  243 0000 000000
/PHOTO SIGNAL                                T-12993

302 4  61 01 33350 146 33 41334  243 0000 000000
/PHOTO SIGNAL                                T-12993

303 6  61 01 23311 146 33 34113  243 0000 000000
/PHOTO SIGNAL                                T-12993

305 1  61 00 47073 146 31 33884  243 0000 000000
/PHOTO SIGNAL                                T-12993

306 1  61 00 34290 146 30 33065  243 0000 000000
/PHOTO SIGNAL                                T-12993

307 2  61 00 29360 146 30 12013  243 0000 000000
/PHOTO SIGNAL                                T-12993

308 2  61 00 22738 146 29 40339  243 0000 000000
/PHOTO SIGNAL                                T-12993

315 6  61 00 17116 146 31 03466  243 0000 000000
/PHOTO SIGNAL                                T-12993

331 3  61 01 27290 146 35 36862  243 0000 000000
/PHOTO SIGNAL                                T-12992

336 6  61 01 00010 146 33 54402  243 0000 000000
/PHOTO SIGNAL                                T-12993

337 6  61 00 48424 146 33 10750  243 0000 000000
/PHOTO SIGNAL                                T-12993

338 5  61 00 43156 146 32 40034  243 0000 000000
/PHOTO SIGNAL                                T-12993

339 3  61 00 27656 146 31 43976  243 0000 000000
/PHOTO SIGNAL                                T-12993

341 4  61 01 15136 146 33 33361  243 0000 000000
/PHOTO SIGNAL                                T-12993

351 1  61 02 21688 146 36 41004  243 0000 000000
/PHOTO SIGNAL                                T-12992

354 4  61 02 05873 146 34 19695  243 0000 000000
/PHOTO SIGNAL                                T-12993
```

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355 1  61 01 51776 146 34 19093  243 0000 000000
/PHOTO SIGNAL                              T-12993

356 1  61 02 18045 146 33 28337  243 0000 000000
/PHOTO SIGNAL                              T-12993

357 1  61 01 55855 146 34 18456  243 0000 000000
/PHOTO SIGNAL                              T-12993

360 6  61 01 21174 146 34 53370  252 0000 000000
/HYDRO SIGNAL                              T-12993

452 1  61 02 22685 146 35 13123  252 0000 000000
/HYDRO SIGNAL                              T-12992

453 1  61 02 16452 146 34 22497  252 0000 000000
/HYDRO SIGNAL                              T-12993
```

APPROVAL SHEET

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SURVEY

H-9711
RA-10-3-77

In producing this sheet, standard procedures were observed in accordance with the Provisional Hydrographic Manual,PMC OPORDER, and the Instruction Manual for Automated Hydrographic Surveys. The data was examined daily during the execution of the survey.

The boatsheet and accompanying records have been examined and are complete and adequate for charting purposes and are approved.

James P. Randall

James P. Randall
CAPT.,NOAA

December 8, 1977

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific **Marine Center:**

Hourly heights are approved for Form 362

Tide Station Used (NOAA Form 77-12): 945-4309 Jack Bay, Alaska

Period: August 17-27, 1977

HYDROGRAPHIC SHEET: H-9711

OPR: 452

Locality: Prince William Sound, Alaska

Plane of reference (mean lower low water): 7.9 ft.

Height of Mean High Water above Plane of Reference is 10.8 ft.

Remarks: Zone Direct.

Dan M. Spillman

Chief, Tides Branch

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-9711

Name on Survey	A ON CHART NO. 16708	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
JACK BAY ✓	X									1
TONGUE POINT ✓	X									2
VALDEZ ARM ✓	X									3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
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										22
										23
										24
										25

APPROVED
GEOGRAPHER
8/3/78 MP

NOAA FORM 76-155 SUPERSEDES C&GS 197

☆ U.S. G.P.O. 1972-769-565/516 REG.#6

APPROVAL SHEET

FOR

SURVEY H- 9711

A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position print-out has been made. A new final sounding print-out has been made.

B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the verifier's report.

Date: 15 Feb 1978

Signed: [signature]

Title: Chief, Verification Branch

NOAA FORM 77-27 (5-77) | U. S. DEPARTMENT OF COMMERCE NOAA | HYDROGRAPHIC SURVEY NUMBER

HYDROGRAPHIC SURVEY STATISTICS

H-9711

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	BOAT SHEETS & PRELIMINARY OVERLAYS	8
DESCRIPTIVE REPORT	1	SMOOTH OVERLAYS: POS. ARC, EXCESS	43

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES			1-Smooth			
CAHIERS	1 -with printouts & tides					
VOLUMES	1					
BOXES						

T-SHEET PRINTS (List) T-12992, T-12993

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES
The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS: PRE-VERIFICATION	AMOUNTS: VERIFICATION	AMOUNTS: TOTALS
POSITIONS ON SHEET			1167
POSITIONS CHECKED		1167	
POSITIONS REVISED		19	
SOUNDINGS REVISED		145	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME – HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	5		
VERIFICATION OF CONTROL		8	
VERIFICATION OF POSITIONS		53	
VERIFICATION OF SOUNDINGS		79	
COMPILATION OF SMOOTH SHEET		10	
APPLICATION OF TOPOGRAPHY		36	
APPLICATION OF PHOTOBATHYMETRY			
JUNCTIONS		2	
COMPARISON WITH PRIOR SURVEYS & CHARTS		32	
VERIFIER'S REPORT		35	
OTHER		8	
TOTALS	5	263	

Pre-Verification by James S. Green	*Beginning Date* 10/27/77	*Ending Date* 10/27/77
Verification by Thelma O. Jones	*Beginning Date* 11/1/77	*Ending Date* 2/2/78
Verification Check by A.E. Eichelberger J.S. Green	*Time (Hours)* 30	*Date* 2/9/78
Marine Center Inspection by HIT	*Time (Hours)* 20	*Date* 3/1/78
Quality Control Inspection by F.P. SAULSBURY	*Time (Hours)* 64	*Date* 4/28/78
Requirements Evaluation by J Baumgardner	*Time (Hours)* 2	*Date* 11/8/78

Cartans 8/3/78 13 hrs

REGISTRY NO. H-9711(1977)

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE_____ TIME REQUIRED_____ INITIALS_____

REMARKS:

REGISTRY NO. _____

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE_____ TIME REQUIRED_____ INITIALS_____

REMARKS:

PACIFIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO: H-9711

FIELD NO: RA-10-3-77

Alaska, Prince William Sound, Jack Bay

SURVEYED: 17 August - 26 August 1977

SCALE: 1:10,000

PROJECT NO: OPR-452-RA-77

SOUNDINGS: Ross Model 5000
Fineline Fathometer

CONTROL: Mini-Ranger
Visual

Chief of Party.....CAPT James P. Randall
Surveyed by.....Team Leader, LCDR L. Lapine,
LTJG S. Ramsey, ENS J. Barnett
Automated Plot by.....PMC Xynetics Plotter
Verified by.....Thelma O. Jones
February 2, 1978

INTRODUCTION

This navigable area survey was conducted at the request of the United States Coast Guard, by NOAA Ship RAINIER, in accordance with Project Instructions, dated 5 August 1977. The area surveyed includes the entire area of Jack Bay, off Valdez Arm, Alaska. ✓

Field sheet soundings were reduced using predicted tides for Cordova, Alaska. Smooth sheet soundings were reduced using smooth tidal data from Jack Bay tide station. ✓

In some isolated areas, the digitizer was reading grass and kelp, resulting in numerous erroneous depths. No visible kelp in survey area.

II. CONTROL AND SHORELINE

Horizontal control is adequately described in paragraph F of the Descriptive Report. ✓

The Class I unreviewed photogrammetric manuscripts utilized on this survey with their respective dates of photography and field edit are: ✓

T-12992	1965-74, 77
T-12993	1965-77

III. HYDROGRAPHY

Crossline agreement was within 1 - 2 fathoms throughout the survey. ✓

Standard depth curves could be adequately drawn, except for inshore areas where there were insufficient soundings to accurately delineate the curves. ✓

The main scheme hydrography incorporated in this survey is adequate to delineate the bottom configuration and to determine least depths. There were no major difficulties in the verification of main scheme soundings. ✓

There are fifty four (54) bottom samples in this survey. ✓

IV. CONDITION OF SURVEY

The hydrographic records, overlays, smooth sheet and reports are adequate and conform to the requirements of the Provisional Hydrographic Manual. ✓

V. JUNCTIONS

This survey junctions on the west with contemporary survey, H-9422, 1:20,000 (1974). The junction occurs at the deepest part of H-9711, the mouth of the bay. The maximum difference between the soundings were 3-4 fathoms. Due to the depth of the junction area, this discrepancy does not constitute a problem in the junctioning of the curves. The junction curves and notes were inked accordingly. ✓ —clinton is point to point at entrance to Jack Bay

VI. COMPARISON WITH PRIOR SURVEY

Comparison was made with prior survey H-2627, 1:20,000 (1902). There were several notable discrepancies between the prior survey and the present survey. There is a three (3) minute difference in the labeling of the longitude lines. The 1927 datum shift and the shoreline could not be reconciled, causing a sounding difference of 0-9 fathoms depending on how the present survey was shifted. ✓

Considering the difficulties encountered, the soundings are in good agreement. ✓

The prior survey shows numerous submerged rocks along the shoreline. H-9711 does not have hydrographic data to support such rocks. Due to the navigable area concept of this survey, and the above mentioned difficulties with comparison, the transference of these rocks to the present survey was not feasible. ✓ do not concur - see QC. Critique

There are no pre-survey items for this survey. ✓

H-9711 is adequate to supersede the prior survey in areas of common hydrography.

VII. COMPARISON WITH CHART (16708, 14th Edition, 18 December 1976, 1:80,000)

All of the charted hydrography originated from prior survey, H-2627, 1:20,000 (1902).

Soundings in general showed the same discrepancies as discussed in the above section. There has been little change in the shoreline except for a foul area extending to a shoal in the vicinity of Lat. 61°01'18", Long. 146°33'48". There is an uncharted shoal at Lat. 61°02!12", Long. 146°35'42". The verifier recommends that these features be charted.

Chart 16708 shows the same submerged rocks as discussed in the previous section. It is the verifier's recommendation that, until these rocks are investigated further, they should continue to be charted as shown. *See Q.C. Critique for disposition of chtd. rocks*

There is one anchorage site charted on the south side of Jack Bay. Other possible sites suitable for anchorage can be found in the table on page 17 of the Descriptive Report.

H-9711 is adequate to supersede charted hydrography except the submerged rocks alon g the shoreline. *do not concur-See Q.C. Critique*

There were no fixed or floating aids to navigation present within the limits of this survey.

There is a questionable 4 foot rock and foul area on the present survey at approximate Lat. 61°01'27", Long. 146°34'00". This rock is located between two lines of hydrography with 50 meter spacing in 48-50 fathoms depths. The hydrographic records do not show any data pertaining to the rock. It's apparent source is a field identification on photo 65L4397 per Al Rauck, Coastal Mapping Division, 31 January 1978. The verifier recommends that this rock be charted as plotted. *do not concur; See Q.C. Critique JPS Rock disproved by 1978 HD investigation*

VIII. COMPLIANCE WITH PROJECT INSTRUCTIONS

This survey adequately complies with the Project Instructions, dated August 5, 1977; Change No. 1, dated 6 September 1977.

IX. ADDITIONAL FIELD WORK

This is a very good navigable area survey. No additional field work is recommended. *See Q.C. Critique*

Respectfully submitted

Thelma O. Jones

Thelma O. Jones
Cartographic Technician
2 February 1978

Examined and approved,

James S. Green
Chief, Verification Branch

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Pacific Marine Center, 1801 Fairview Ave. E.
Seattle, WA 98102

15 March 1978

TO: Eugene A. Taylor
Director, Pacific Marine Center

FROM: Glen R. Schaefer
Chief, Processing Division

SUBJECT: PMC Hydrographic Survey Inspection Team Report H-9711

This survey is a navigable area hydrographic survey of Jack Bay, Prince William Sound, Alaska. This survey was conducted by NOAA Ship RAINIER in 1977 in accordance with Project Instructions OPR-452-RA-77 dated 5 August 1977 and Change No. 1 dated 6 September 1977. ✓

The Hydrographic Inspection Team cannot reach a consensus as to the validity of the data indicating a shoal and culminating with a rock at Latitude 61°01'27" and Longitude 146°34'00". The rock, in question, was not shown on the ship's final field sheet. Additional work is recommended to develop or disprove the shoal and should be accomplished by Ship MCARTHUR during their work in Prince William Sound early in the summer of 1978. Until the status of this rock is finitely determined, it should be charted as shown on the smooth sounding sheet.

Ad. work done in 1978. Rock is not there. F.R.S. 1978 Report attached

H-9711 is adequate to supersede charted hydrography. Note that charted submerged rocks along the shoreline were not in an area covered by this survey. They were neither proven nor disproven and hence it is recommended they continue to be charted as shown.

do not concern, See Q.C. Critique

The inspection team finds H-9711 to be a very good navigable area survey, exclusive of the questionable rock, and adequate to supersede common areas of prior surveys and charted hydrography. Administrative approval is recommended.

Glen R. Schaefer

John C. Albright

James W. Steensland

Matthew G. Sanders

ADMINISTRATIVE APPROVAL
H-9711

The smooth sheet and reports of this survey have been examined and the survey is adequate for charting and to supersede common areas of prior surveys.

Eugene A. Taylor, RADM
Director
Pacific Marine Center

March 15, 1978
Date

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C352/FPS

April 28, 1978

TO: for A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury
Quality Evaluator

SUBJECT: Quality Control Report for H-9711 (1977), Alaska, Prince William Sound, Jack Bay

A quality control inspection of H-9711 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, shoreline transfer, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as stated in the report by the verifier and Hydrographic Inspection Team and as follows:

1. Some depth curves were revised where soundings supported a more definitive delineation of bottom configuration, corrected where in conflict with soundings, and a few added where formerly omitted.

2. Signal 356, falling in water, is not described.

3. Corrections to shoreline were made from Bp-103328, an updated revision of Class I shoreline manuscript T-12992.

Portions of the dotted low water curve were added to the survey from contemporary photogrammetric manuscripts.

4. The reef located in latitude 61°01.34', longitude 146°33.70' and the foul area in latitude 61°02.68', longitude 146°37.00' were transferred to the smooth sheet from the boat sheet.

5. Based on items revised or noticed on the present survey, the following suggestions may be beneficial.

a. Signal descriptions are to be in vertical lettering enclosed within parentheses.

b. When a control signal is located on a bare or high water feature, such as a bare rock or islet, the feature is to be shown on the smooth sheet if possible or the signal adequately described.

c. When drawing depth curves on a steep gradient, with insufficient room to show all curves, the shoalest and deepest depth curves are to be shown on the survey.

d. Depth curves drawn perpendicular to the shoreline are generally unnatural and usually should approximately parallel shoreline at their inshore beginnings and/or endings.

e. The selection of soundings surrounding reefs should be done so that the reef is not obscured, is adequately delineated, and can be clearly read by the survey user.

f. High water or bare features, such as islets, are to be identified with vertical lettering.

g. When leaders are used, they should point toward the center of the object being identified and not just in its general direction.

6. An adequate junction was effected on the west with H-9422 (1974). Overlapping depth curves were made coincidental during quality control inspection.

7. A rock awash uncovering 4 feet at MLLW and accompanied with foul limits in latitude 61°01.46', longitude 146°33.98' on T-12993 (1965-77) was originally transferred to the smooth sheet during verification. This rock reportedly was not seen on the photographs, but was added by the field editor. Further investigation was verbally reported as done in 1978 with negative results. Two lines of hydrography, spaced 50 meters apart, straddle this alleged rock. An examination of the fathograms reveals no evidence of the rock, recording 48- to 50-fathom depths in this area. Because of this, the alleged rock was removed from the survey and is considered nonexistent.

8. The verifier addressed the lack of hydrographic data supporting the existence of numerous inshore submerged rocks charted from prior surveys T-2565 (1901) and H-2627 (1902). With the exception of four submerged rocks charted from T-2565 (1901) in the vicinity of latitude 61°01.50', longitude 146°36.50', all rocks were located on the present survey, generally as rocks awash and occasionally as bare rocks, at their charted locations or in close proximity to same. The four excepted submerged rocks, if existing at all, are considered to fall on or at shore with no charting significance.

With the addition of a sounding brought forward from H-2627 (1902), the present survey is adequate to supersede prior surveys and charted information within the common area.

cc:
C35
C351

NOAA SHIP MC ARTHUR

SPECIAL REPORT

Questionable Rock Awash

HYDROGRAPHIC INVESTIGATION

JACK BAY, PRINCE WILLIAM SOUND, ALASKA

H-9711
(RA-10-3-77)

MAY - JUNE 1978

Submitted by:

Burl L. Wescott
LCDR, NOAA
Field Operations Officer

Approved by:

Darrell W. Crawford
Commander, NOAA
Commanding Officer
NOAA Ship MC ARTHUR (S330)

CONTENTS

filed with fathograms

I. PROJECT AUTHORITY, PURPOSE AND SCOPE

This special investigation was conducted in accordance with Project Instructions S-P918-AR-78, Jack Bay, Prince William Sound, Alaska, dated April 28, 1978. The purpose of this investigation was to conclusively prove or disprove the existence of a rock awash, baring four feet at MLLW, and the surrounding foul area. The alleged rock was photogrammetrically placed at latitude 61°01'27", longitude 146°34'00" on survey H-9711 (1977).

II. CHARACTER AND LIMITS OF THE WORK

Positioning control for the project consisted of visual signals re-established over photo-identified shore points previously chosen by the RAINIER during the hydrographic survey of Jack Bay in 1977 (OPR-452-RA-77) and plotted on a copy of H-9711. The reconstructed signal positions were verified on H-9711 by sextant angles, all of which are recorded in the field book accompanying this special investigation.

A thorough visual search in the area of the subject rock was conducted by launch. This was accomplished on May 13, 1978, at a tide stage of about 3.5 feet above MLLW. There was no visual evidence of the rock's existence.

On June 5, 1978 two Mc ARTHUR launches conducted wire sweep operations. A ground wire 300 feet long, coupled to towlines of 105 feet in length (all 5/16-inch wire), was deployed in a two-vessel sweep configuration. Polyform end marker buoys were attached at each end of the sweep wire by a 25-foot manila hemp upright line which carried a 30-pound weight at the juncture of the upright, sweep and tow lines. This arrangement provided an effective sweep depth of 25 feet below the water surface. In all probability, much greater sweep depth was obtained due to bottom wire sag between supporting end floats. This conclusion was obvious when the sweep wire "hung" on a fourteen-fathom charted shoal near the end of sweep strip one.

With a towing speed of about three knots, six sweep strips were accomplished in the immediate area of the reported rock position. Four of the wire sweeps passed directly over the plotted position of the rock. Each of these four sweeps approached the rock from a different direction. No indication of any hang was evident, either from the plot of the tow vessels or from observation of the end buoys. The two additional sweeps provided overlap and clearance out to a 300-foot radius of the rock awash position.

The sweep vessels controlled their positions using sextant angles with appropriate data recorded in a single volume aboard the guide launch. Maintenance of the sweep underway was directed by the guide launch. No cuts were taken to the end buoys during the sweeps.

III. ORGANIZATION OF PARTY PERSONNEL

A. Shore Control Location and Verification:

CDR Darrell W. Crawford	Commanding Officer
LCDR Frederick J. Jones	Executive Officer

B. Guide Launch (AR-3):

LCDR Burl L. Wescott	Field Operations Officer
CST Ramon B. Buendia	Timekeeper Plotter/Recorder
LT Peter E. Gadd	Left Angle
ST Michael S. Colton	Right Angle
AB Richard Davies	Cockswain

C. End Launch (AR-2):

LTjg John W. Blackwell	Left Angle
CBM Herbert Padilla	Right Angle
LTjg Derek C. Sutton	Cockswain

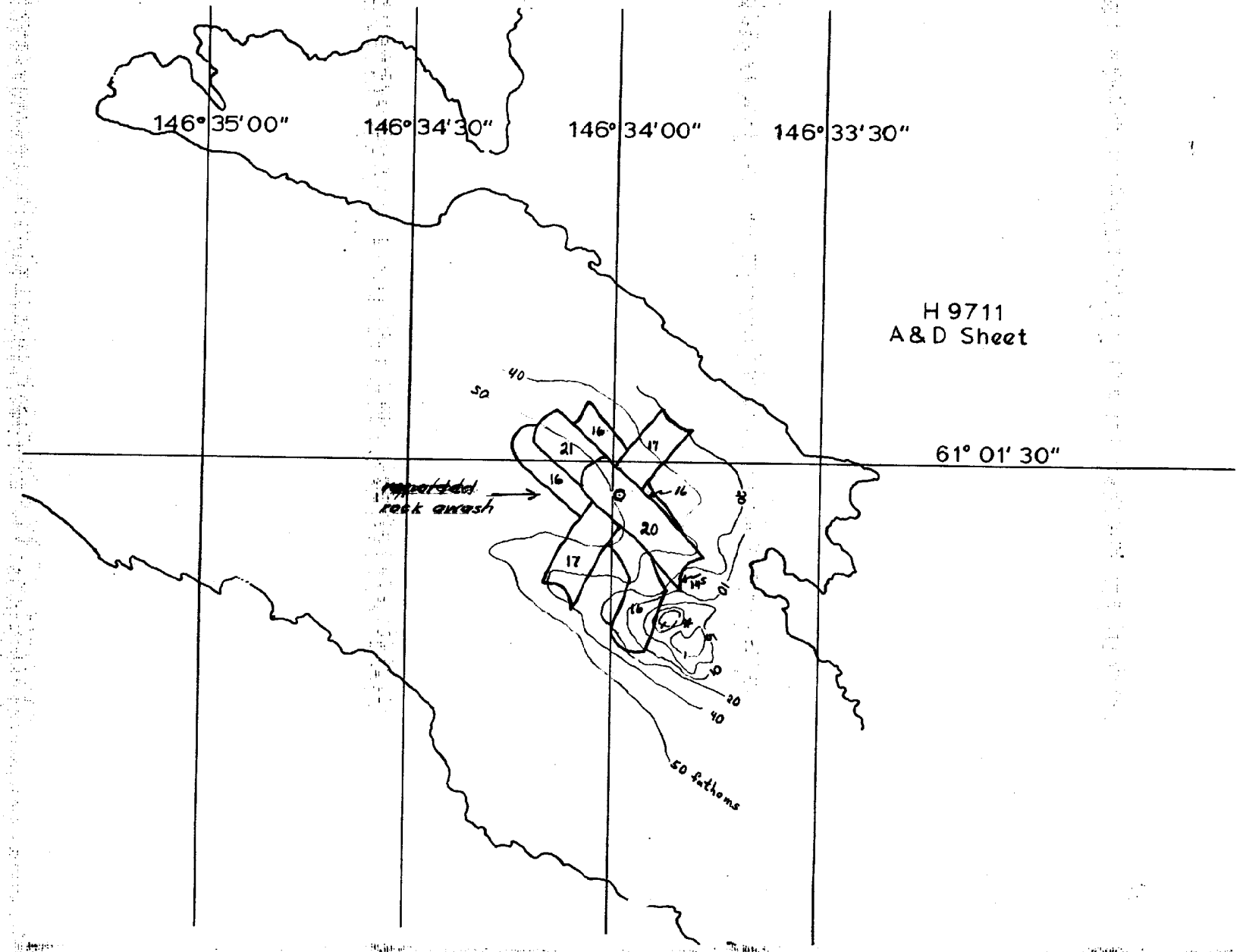
IV. RESULTS

Using the upright lengths minus predicted tides (Cordova), conservatively, the six sweep strips produced effective depths that ranged from sixteen to twenty feet below chart datum. Smooth plot overlaps at the scale of H-9711 were prepared for each sweep strip. The red outlined area on each sweep strip is the estimated effective area of coverage, as determined by a scaled mylar strip representing the length of wire payed out and curved to a normal bite so that end buoy positions could be estimated relative to the launch position plots. Using the area outlined in red and the depth determined by predicted tides, an Area and Depth Diagram was constructed showing the total effective coverage of the combined sweeps. Sufficient sweep strip overlap was provided for all sweep paths across the reported rock to allow for reduced effective width.

V. CONCLUSIONS

The wire sweep survey indicates the absence of a rock, baring four feet at MLLW, at the reported position, and further establishes the non-existence of a rock at any point within the "rock awash symbol zone" at the plotted site. Furthermore, it indicates a clearance of at least sixteen feet below chart datum of an area with a radius of 300 feet surrounding the reported rock.

It is recommended that the rock awash symbol appearing on H-9711 at latitude 61°01'27" and longitude 146°34'00" be removed.


146° 35' 00"
146° 34' 30"
146° 34' 00"
146° 33' 30"
H 9711
A&D Sheet
61° 01' 30"
40
50
16
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17
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16
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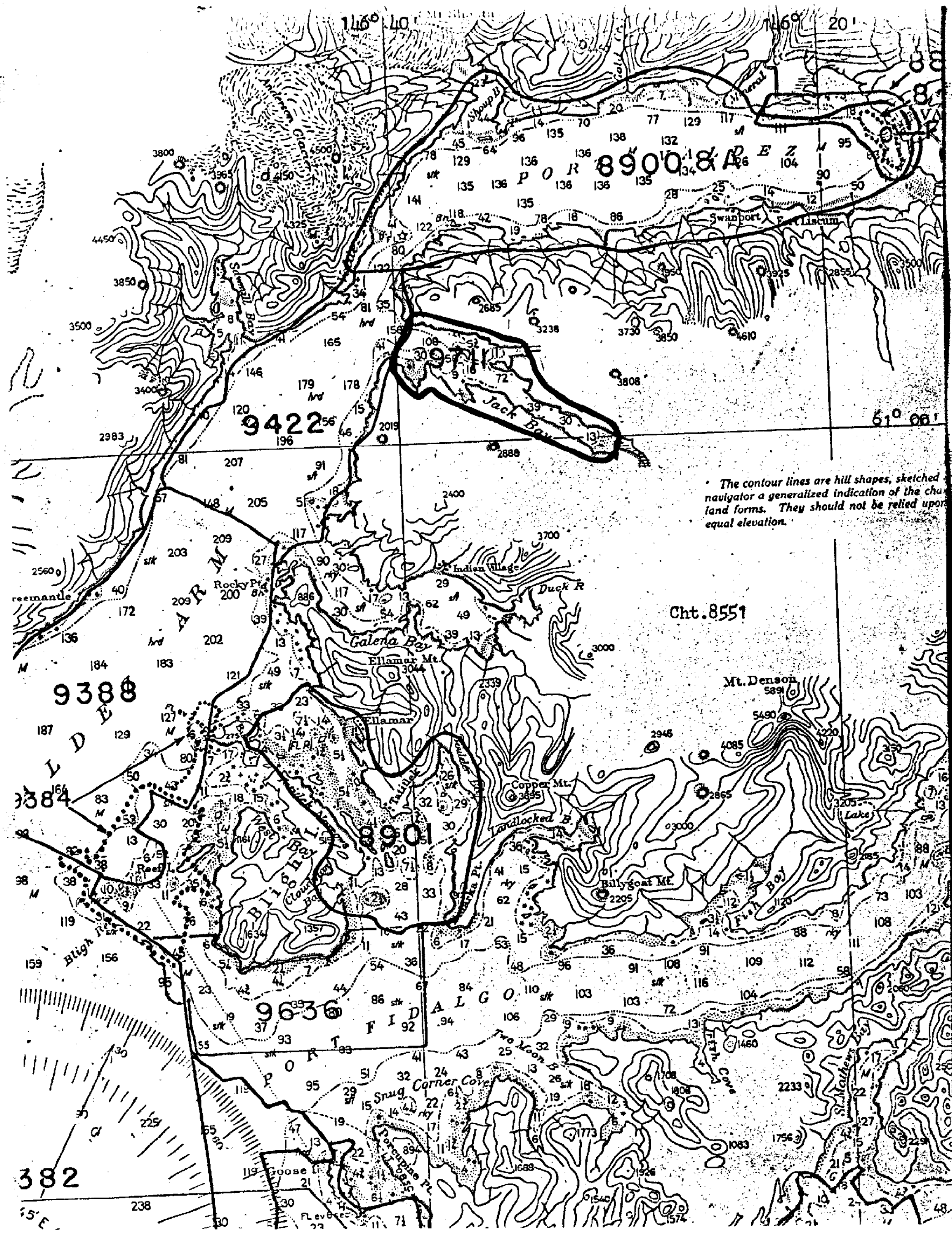
17
16
20
40
50 fathoms



8900 8A
PORT VALDEZ
Swanport
Fort Liscum
Shoup B.
9711
Jack Bay
9422
• The contour lines are hill shapes, sketched
navigator a generalized indication of the cha
land forms. They should not be relied upon
equal elevation.
Indian Village
Duck R
Cht.8551
Rocky Pt.
9388
9384
Galena Bay
Ellamar Mt.
Ellamar
Mt. Denson
Copper Mt.
Landlocked B.
Billygoat Mt.
Bligh I.
Reef I.
West Bay
Cloudman Bay
Tatitlek
8901
Fish Bay
Bligh Reef
9636
PORT FIDALGO
Two Moon B.
Snug Corner Cove
Porcupine Pt.
Goose I.
Irish Cove
382

FORM C&GS-8352
(3-25-63)

NAUTICAL CHART DIVISION

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. 9711

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
16708	6/9/78	Kenyon, D.J.	~~Full~~ Part Before After Verification Review Inspection Signed Via
			Drawing No. #16 Added critical information before only to proof.
16707	9/14/78	Naitor	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 1 Fully applied
16700	12/12/78	Naitor	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. #22 Fully applied thru 16707 Drwg# 1
16708	7/28/80	Naitor	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 17
			Fully applied thru 16707 Dwg 1
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.
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FORM C&GS-8352 SUPERSEDES ALL EDITIONS OF FORM C&GS-975.

USCOMM-DC 8558-P63