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11/15/89

9027 a

Diag. Ght. Nos. 9302 & 9380.

FORM C&GS-504

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

DESCRIPTIVE REPORT

Type of Survey CONSHELF

H-9027 &

Field No. OPR-483 Office No. H-9027a

LOCALITY

State ALASKA

General locality BERING SEA

Locality ST. LAWRENCE ISLAND

1970

CHIEF OF PARTY

R.F. LANIER, CAPT., NOAA

LIBRARY & ARCHIVES

DATE 7-14-71

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HYDROGRAPHIC TITLE SHEET

See Remarks

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.

See Remarks

State Alaska

General locality Bering Sea

Locality St. Lawrence Island

Scale See Remarks Date of survey 6/17/70-9/20/70

Instructions dated 3/10/70 Project No. OPR-483

Vessel NOAA SHIP RAINIER

Chief of party R.F. Lanier, Capt., NOAA

Surveyed by Ship's Officers

Soundings taken by echo sounder, ~~hand lead, etc.~~

Graphic record scaled by Personnel, Ship Rainier

Graphic record checked by " " "

Positions Verified by Personnel Proc. Div. Automated plot by PLC

Soundings ~~plotted~~ verified by Personnel Proc. Div. PLC

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

REMARKS:	Register No.	Field No.	Scale
	H-9023		1:100,000
	H-9027		1:100,000
	H-9162	RA-100-1-70	1:100,000
	-----	1814 NC	1:251,000

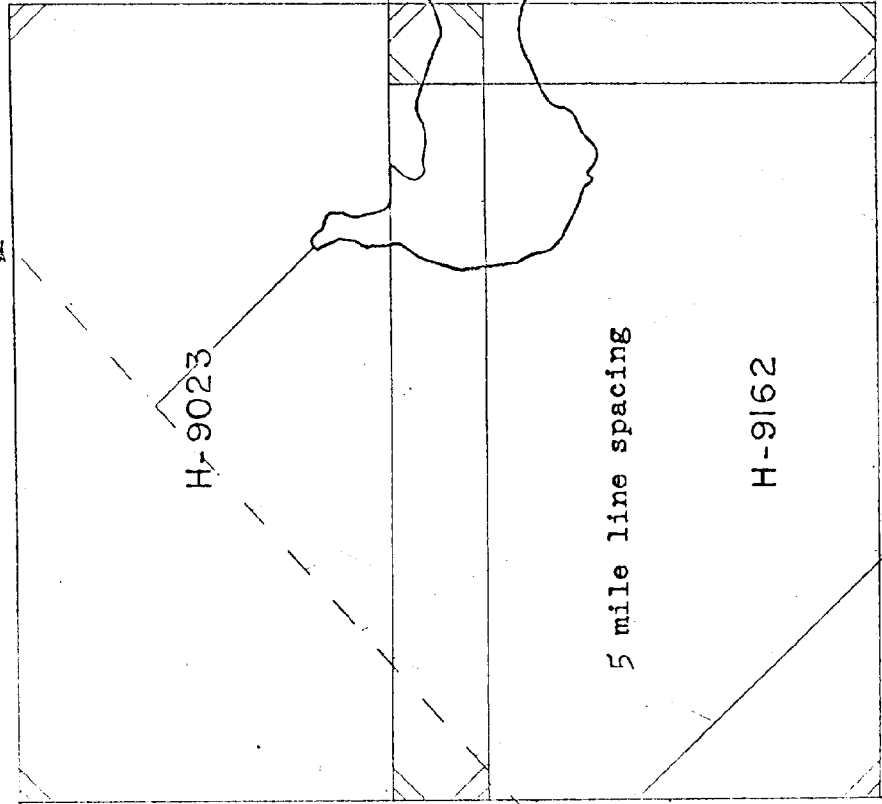
174°

172°

170°

168°

U.S.-RUSSIA CONVENTION LINE



OPR-483
 ST LAWRENCE ISLAND
 BOAT SHEET LAYOUT
 RAINIER 1970

64°

63°

62°

1814 NC

15 mile line spacing

5 mile line spacing

H-9162

H-9027

H-9023

OPR 483

DESCRIPTIVE REPORT TO ACCOMPANY HYDROGRAPHIC SURVEYS

H-9023

H-9027

H-9162 FIELD NUMBER RA-100-1-70

——— FIELD NUMBER 1814 NC

SCALE OF SURVEY: BASIC 1:100,000

 1814NC 1:251,000

1970

NOAA SHIP RAINIER

ROGER F. LANIER, CAPT., NOAA

COMMANDING OFFICER

A. PROJECT

Project Number OPR-483

Original Instructions dated 10 March 1970

Change Number 1 dated 16 March 1970

Change Number 2 dated 19 June 1970

B. AREA SURVEYED

Description of Area: This survey includes areas of the Bering Sea adjacent to St. Lawrence Island, bounded on the south by latitude 62°30' and on the west by the U.S.-Russia Convention Line.

Approximate Limits:

<u>N. Limit</u>	<u>S. Limit</u>	<u>E. Limit</u>	<u>W. Limit</u>	<u>Line Spacing</u>
63°20'	62°50'	170°00'	171°50'	5 miles
64°05'	62°50'	171°50'	173°50'	5 miles
63°00'	62°30'	170°00'	173°00'	15 miles

Inclusive dates of the survey: 17 June 1970 - 20 September 1970.

Prior Surveys:

H-8558 1:160,000 1960

Contemporary Surveys:

H-9023, 1:100,000, 1969 - no adjoining soundings

H-9027, 1:100,000, 1969 - no adjoining soundings

C. SOUNDING VESSEL

The bathymetry on the sheets included in this report was accomplished by the NOAA Ship RAINIER.

D. SOUNDING EQUIPMENT

Raytheon DE-723 (Serial Numbers 819 and 822) fathometers were used exclusively during this survey. Methods used to determine echo sounder corrections are discussed in the Report on Sounding Corrections, OPR-483, 1970. All soundings were recorded in feet.

Care was exercised to insure that any misadjustment or misalignment of the fathometers would not affect the quality of the soundings obtained on this survey. Frequent underway checks were made on the initial setting, A-F adjustment and fine arc readings with the results later abstracted. These findings are included in the Report on Sounding Corrections, OPR-483, 1970.

E. SMOOTH SHEETS

The smooth sheet projections and the smooth plot of this survey will be machine plotted by the Electronic Data Processing Branch, Pacific Marine Center.

F. CONTROL

Loran C, supplemented by radar, was used for positioning control in the area covered by this report.

The following Loran C stations were used:

SH7	Master	Pribilof Island
SH7-X	Slave	Attu Island
SH7-Y	Slave	Port Clarence
SH7-Z	Slave	Sitkinak Island

Signal quality of SH7-Y was generally good. Quality of SH7-X and SH7-Z ranged from poor to fair. The two best quality signals were used for control, angle of intersection between rates usually not being a consideration. A replot of Loran positions was made to resolve inconsistencies in the sounding lines and to achieve agreement with the dead reckoning plot. The latitude and longitude of each final position was scaled and inserted in a corrector tape.

Five mile spacing instead of one mile spacing between sounding lines was used because of poor Loran signal quality. This spacing is in accordance with Change Number 2 (19 June 1970) to the Project Instructions. Spacing is greater than five miles in some areas due to the lack of adequate control, and because this was the last season of work on this project, an effort was made to obtain some data over the area to be covered by the proposed bathymetric map.

The most common problem with Loran C control was a ten micro-second jump in the readings. This was due to weak signals and the concomitant difficulty in aligning wave envelopes. On the average ten micro-seconds are equivalent to 1.8 miles for the SH7-X and SH7-Z rates and 0.9 miles for SH7-Y in the area of this survey. The jump was usually resolved by correcting readings after improvement of signal quality or by comparing Loran and radar positions.

Radar fixes were taken whenever possible. Chart HO 5819-A, St. Lawrence Island, was used as a source of land feature positions. Error in radar fixes is estimated to range from 0.2 to 1.0 miles with an average of 0.5 miles due to the small scale of charted shoreline and features. Radar was used only to try to resolve ten micro-second jumps and not to resolve inconsistencies between the Loran positions and dead reckoning plot.

Ten micro-second jumps could not be resolved in two cases. Position 132, Sheet H-9162 and the same position on Sheet 1814NC, position 159, differ in location by ten micro-seconds. The plotted location of the sounding lines on Sheet H-9162 from position 58 to position 121 and from position 133 to position 165 is confirmed by a series of radar fixes. The dead reckoning plot indicates a ten micro-second jump between the two lines. Due to the poor quality of Loran control in this

area the exact position of the jump could not be determined and was arbitrarily located at the sheet change.

The second unresolved jump is on sheet H-9162. The crossline from position 639 to position 679 was found to have a ten micro-second jump after a series of radar fixes was obtained at line end. It was decided to maintain a relatively consistent position with the preceding line which had been broken for an oceanographic station. Positions 654 to 679 were moved ten micro-seconds to coincide with the radar fixes. The original location of position 639 was held, with proportional adjustments of zero to ten micro-seconds made between positions 639 and 654.

After resolution of ten micro-second jumps the accuracy of Loran positions is about 0.3 miles. However, because of unresolved jumps and the possibility of undiscovered jumps, the overall accuracy of this survey is considered to be \pm ten micro-seconds or 1.8 miles.

G. SHORELINE

Because of the nature of this bathymetric survey no shoreline investigation was made. All shoreline shown on the boat sheets have been generalized from chart HO 5819A. No attempt was made to define the low water line.

H. CROSSLINES

Soundings on the boatsheets have been reduced for rough draft only. The quality of crossings on all sheets is good, considering no tide reduction has been made (see the Tide Report, OPR-483, 1970). There are 50 crossings, 80% of which had differences between zero and two feet and 20% between two and three feet, with none over three feet. Crosslines accounted for 15.7% of all lines run.

<u>Sheet</u>	<u>%Crosslines</u>	<u>Number of Crossings</u>	<u>Difference in Feet</u>	
			<u>0-2</u>	<u>2-3</u>
H-9023	26.2%	11	7 (64%)	4 (36%)
H-9027	15.8	7	7 (100%)	0
H-9162	16.4	32	26 (81%)	6 (19%)
1814 NC	0			

I. JUNCTIONS

There are no junctions with prior surveys. OPR-483, 1970 lines were run across adjacent sheets and therefore sheet junctions are good.

J. COMPARISON WITH PRIOR SURVEYS

There was no presurvey review. Sheet H-8558, 1960, scale 1:160,000, was the only prior survey available for comparison. The area common to both surveys extends 13 miles west of longitude 172° between latitudes 63°24' and 64°00'.

Depths on H-8558 are generally ten feet less than on H-9023, with a few depths between 10 and 20 feet shoaler. Depths on H-8558 are also about ten feet shoaler than those on H-9162.

There appears to be a systematic difference of ten feet in depth between surveys. It is believed that this difference is due to a lack of common tidal datum between surveys. Also, discrepancies between Loran positioning of this survey and Raydist positioning of H-8558 could cause a relative displacement of tracklines, possibly accounting for depth differences.

K. COMPARISON WITH THE CHART

The following sheets are compared with C&GS 9302, Scale 1:1,534,076, 21 St. Ed., Oct. 28, 1968 and HO 5819A, Scale 1:315,350, 1 St. Ed., 1962, Revised June 13, 1966:

Soundings on HO 5819A have not been reduced to a common datum. A note on this chart states that 12 to 18 feet must be added to some soundings to reduce them to Mean Lower Low Water, while others have been reduced. This discrepancy in datum may explain the variation in depths between the chart and boat sheets. Errors in Loran positioning could also be responsible for depth differences.

H-9023:

Depths on HO 5819A average ten feet less than on H-9023. Differences vary from a few feet in flat-bottomed areas to 20 feet in areas of closely spaced contour lines. Soundings on C&GS 9302 range from 10 to 30 feet less than on H-9023.

H-9027:

Depths on HO 5819A vary from a few feet greater to 20 feet less than on H-9027, with most 10 to 20 feet shoaler.

An uncharted shoal was located at $63^{\circ}20'N$, $170^{\circ}51'W$, four miles southeast of a rock charted as PD. A least depth of 31 feet was registered; however, the shoal rose suddenly from a general depth of 85 feet in smooth bottom. This was found on the final day of the field season and weather conditions precluded investigation of the shoal with a launch to determine the actual least depth.

H-9162:

Depths on HO 5819A and C&GS 9302 compare poorly with H-9162. South of latitude $63^{\circ}15'$ many charted depths are 30 feet less than H-9162. North of $63^{\circ}15'$ charted depths vary from zero to ten feet shoaler than on H-9162.

1814 NC:

Because of the 15 mile line spacing on 1814 NC comparisons with the chart are of questionable validity. Depths on

C&GS 9302 are shoaler than on 1814 NC, in a few cases varying by more than ten feet.

L. ADEQUACY OF SURVEY

Due to inherent errors in Loran C positions, the unresolved Loran jumps and apparent differences in tidal datums, it is recommended that this survey be used only for the CONSHELF Program. The survey, consisting of lines spaced at five mile intervals, can be considered complete for the purpose of geophysical and bathymetric mapping.

M. AIDS TO NAVIGATION

There are no aids to navigation within the limits of the survey.

N. STATISTICS

A table of statistical information is shown on the next page.

Statistics:

	<u>H-9023</u>	<u>H-9027</u>	<u>H-9162</u>	<u>1814NC</u>	<u>Total</u>
NM Regular Lines	177	123	579	192	1071
NM X-Lines	63 (26.2%)	23 (15.8%)	114 (16.4%)	0	200 (15.7%)
NM Total	240	146	693	192	1271
Number Positions	265	127	740	275	1407
Area Square NM	625*	375*	2440*	2000**	5440
Number Bottom Samples	4	7	6	1	18
No. Oceo. Stations	0	0	1	0	1
NM Bathymetry	240	146	693	192	1271
NM Gravity	240	146	693	192	1271
NM Magnetics	189	146	693	192	1220
NM SRP	31	0	196	192	419

* 5 mile spacing

** 15 miles spacing

O. DATA PROCESSING

Equipment:

Time, position control, gravity, magnetics and depth were encoded by the DCU and recorded by a teletypewriter unit. The depths were fed into the DCU by a hand logger. The logger also contained the button to put the five minute timing marks on the gravity records.

All tapes with the exception of raw data tapes were produced on flexowriters using electronic data loggers C&GS 65-4 and 63-118.

Procedures:

The following DCU format was used in producing raw data tapes:

<u>Time</u>	<u>Loran Rate 1</u>	<u>Loran Rate 2</u>	<u>Depth</u>	<u>Magnetics & Gravity</u>
040000	046941	029939	0420	097984083210

Loran rates were encoded by the DCU, but control was not of sufficient accuracy to allow rates to be used directly. The Loran positions were replotted and the smoothed boat sheet positions were scaled for inclusion in the GP/DCU corrector tape.

The depths were delayed one minute on the printout because they were entered by means of a manually operated depth logger.

The magnetometer was polarized at twenty second intervals until 0830 Z, 16 July 1970 (JD 197). The twenty second

polarization rate resulted in essentially "on time" data being logged by the DCU system. At the time listed above it became necessary to polarize the magnetometer at one minute intervals because the twenty second rate malfunctioned. This resulted in magnetics data which is delayed by one minute on the printout, i.e., the reading for 0830 will be found at 0831.

For information concerning the gravity data see the special report on Gravity Operations, 1970, NOAA Ship RAINIER. It should be noted that the DCU often misprinted the second gravity digit from the right. This was corrected while relogging the tapes.

After the fathograms were scanned the raw data printouts were checked and corrections were noted on the original printout. The tapes were rerun to make the necessary corrections. The new printouts were then scanned to insure that all required changes had been made.

The DCU format for corrector tapes was modified to include geographic positions for the Loran control.

Loran format:

<u>Time</u>	<u>Ind.</u>	<u>Sndg.</u>	<u>Pos#</u>	<u>Day</u>	<u>Ft.</u>	<u>Lat.</u>	<u>Long.</u>	<u>Spec.</u>	<u>Par.</u>
040000	00	0650	0001	180	0	063275	169294	0501	011 011

DCU logging is further discussed in the enclosed instructions for DCU logging. The TC/TI tape was produced in accordance with the dual indicator format listed on page 68 of the Instruction Manual for Automated Hydrographic Surveys (revised 1968). A velocity correction tape has been produced for this area following the format on page 65 of the Automated Hydrographic Manual. See the special report on Sounding Corrections, OPR-483, 1970.

Bottom samples were logged on the basis of latitude and longitude in accordance with the sample format for visual hydrographic signal control data, page 24, Automated Hydrographic Manual. Seconds of latitude and longitude are in units of arc and the field for name of station is followed by the letters "bot.".

It was found, after all the data had been logged, that the required modification to the teletypewriter for dropping the parity punch when used with the DCU had not been made. To eliminate the parity problem it was necessary to rerun all raw data tapes after the teletypewriter was modified.

P. RECOMMENDATIONS

It is recommended that positive electronic control, i.e., Hi-Fix, Raydist, be used for future surveys of this area. Loran control in the vicinity of St. Lawrence Island is of poor quality and is not adequate for bathymetric surveys.

Positioning by Loran control results in a survey of such low quality that efficient utilization of expensive ship time is not achieved.

It is recommended that the shoal found on sheet H-9027 and located at 63°20'N, 170°51'W be further investigated at the first opportunity. A warning note should be added to the next edition of charts C&GS 9302 and HO 5819-A.

Q. REFERENCES TO REPORTS

Descriptive Report OPR-483 (Norton Sound to St. Lawrence Island), 1970

Sounding Corrections OPR-483, 1970.

Gravity Report, Ship RAINIER, 1970.

Seismic Reflection Profiler Report, RAINIER, 1970.

Tide Report OPR-483, 1970.

TIDE NOTE

One 0-20 foot Bristol Bubbler tide gage was established in the project area covered by this report. This gage was located at Southwest Cape, St. Lawrence Island, $63^{\circ}21.7'N$, $171^{\circ}17.0'W$. Due to the short operational time (13 days) of the gage it may be necessary to reference to the tide gages at Nome, Stuart Island and Northeast Cape. No gages were operational during the first day of work in the area, June 17, and the last two days of work, September 19 and 20.

All gages were set on $150^{\circ} W$ time. Reference planes and zoning are to be established by the Tides Division, Rockville and the Pacific Marine Center. No tide reducers were applied to soundings on any boatsheets. This problem is discussed in detail in the Tide Report, OPR-483, 1970.

TIDE NOTE FOR HYDROGRAPHIC SHEET

April 14, 1971

~~XXXXXXXXXXXXXXXXXXXX~~: Pacific Marine Center

Plane of reference approved in Tide Tape Printout
~~volume of sounding records~~ for

~~XXXXXXXXXXXXXXXXXXXX~~ SHEET OPR 483

Locality: Norton Sound, Alaska

Year
~~Check of data:~~ 1970

Plane of reference is mean lower low water

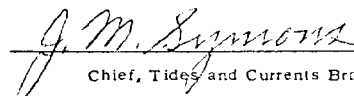
Tide Station Used (Form C&GS-681):

Nome

Height of Mean High Water above Plane of Reference is as follows:

1.6 feet

Remarks


Chief, Tides and Currents Branch

TIDE NOTE FOR HYDROGRAPHIC SHEET

April 16, 1971

~~Nautical Chart Division~~ Pacific Marine Center

Plane of reference approved in
~~number of sounding records~~ for Tide Tape Printout

~~HYDROGRAPHIC SHEET~~ OPR 483

Locality: Norton Sound, Alaska

Year
~~Chart No.~~ 1970

Plane of reference is mean lower low water

Tide Station Used (Form C&GS-681):

N.E. Cape, St. Lawrence I.
S.W. Cape, " " "
Stuart Island

Height of Mean High Water above Plane of Reference is as follows:

N.E. Cape, St. Lawrence I.	=	2.0	ft.
S.W. Cape, " " "		1.6	"
Stuart Island		3.8	"

Remarks

L.C. Wharton

for/ Chief, Tides and Currents Branch



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, Md. 20852

Date: March 5, 1971

Reply to
Attn of: C331W-72-MCFOE

Subject: Tidal Data, Norton Sound, Alaska

Ref: Memorandum Dated January 20, 1971

To: Chief, Processing Division, CFS3
Pacific Marine Center

Listed below are planes of reference, Greenwich lunital intervals and tidal ranges for the four tide stations occupied in Norton Sound in 1970.

Location	HWI Hrs.	LWI Hrs.	Mn ft.	GT ft.	MLLW on Tide Staff (ft.)
Nome	12.46	8.16 (20.58)	---	1.6	1.8 Staff #1 4.3 " #2
NE. Cape St. Lawrence I.	9.42	3.91	2.0	2.5	2.2
SW. Cape St. Lawrence I.	4.12	9.81	1.6	2.1	3.0
Stuart Island	7.04	3.27	---	3.8	0.8

L. C. Wharton

L. C. Wharton
Tides & Currents Branch
Oceanography Division
National Ocean Survey

ABSTRACT OF CORRECTIONS TO ECHO SOUNDINGS

See OPR-483, Special Report on Sounding Corrections, 1970.

The following table is applicable to all boat sheets covered by this report.

Velocity Correction Table

<u>Correction-</u> <u>feet</u>	<u>Depth at which corrector</u> <u>ends - feet</u>
0.0	105
-0.5	116
-1.0	142
-1.5	168
-2.0	194
-2.5	Maximum depth

Table 1. Initial and Draft Corrections, OPR-483

Sheet No. H-9162 (RA-100-1-70)

Time	Draft	Initial	Day	Time	Draft	Initial	Day
0325	13.7	0	172	2025	13.6	0	174
0355		-0.1		2012		-0.1	
0425		0		2239		0	
0534		-0.1		2300		-0.1	
0752		-0.2		2340		-0.2	
1010		-0.3		0020		-0.3	175
1121		0		0100		-0.4	
1407		-0.1		0122		0	
1939		-0.2		0134		-0.1	
2226		0		0158		-0.2	
2300		0.1		0222		-0.3	
2335		0		0236		0	
0008		-0.1	173	0300		-0.1	
0042		0		0325		0	
0117		-0.1		0655		0.1	
0153		0		1024		0	
0155		-0.1		1036		-0.1	
0159		-0.2		1100		-0.2	
0202		0		1115		0	
0222		-0.1		1149		-0.1	
0243		0		1224		0	
0623		0.1		0300	13.2		183
1343		0.2		0340		0	
1726		0		0828		-0.1	
1738		0.1		1317		0	
1750		0		1500	13.1		
1753		-0.1		1759		0.1	
1757		-0.2		2240		0	
1800		0		0000	12.9		184
1805		0.1		0058		0.1	
1815		0.2		0156		0	
1821		0		1742		-0.1	262
1918		-0.1		1745		0	
2016		0		1800		0	
2038		-0.1		1830		-0.1	
2122		-0.2		1833		0	
2206		-0.3		2002		-0.1	
2226		0		2011		0	
0125		0	174	0117		-0.1	263
0448		-0.1		0119		0	
0810		0		0125		-0.1	
1500	13.6			0138		-0.2	
1742		0.1		0145		0	
				1042		-0.1	
				1045		0	

Table 1 (cont'd)

Sheet No. RA-100-6-70
(H-9166)

Time	Draft	Initial	Day
0545	12.8	0	243
0411	12.9	0	258
0315		0	259
0433		0.1	
0550		0	
0555		0.1	
0600		0	
0605		0	
0657		-0.1	
0748		0	
0949		-0.1	
1149		0	
1155		-0.1	
1200		0	

Sheet No. H-9023

1000	13.8	0	168
1022		-0.1	
1108		-0.2	
1130		0	
1151		-0.1	
1212		0	
0600	13.7	0	172
0608		-0.1	
0623		-0.2	
0638		-0.3	
0646		0	
0711		0.1	
0736		0	
0833		-0.1	
0930		0	
1052		-0.1	
1213		0	
1224		-0.1	
1246		-0.2	
1258		0	
0000		0	173
0625	13.2	0	183

Sheet No. H-9026

Time	Draft	Initial	Day
1040	12.9	0	243
2235	13.3	0	245
0000		0	246
1805	12.9	0	257
1809		0	
1850		-0.1	
1931		0	

Sheet No. RA-100-5-70
(H-9165)

0235	12.8	0	243
0600	12.9	0	258
1200		0	
1240		-0.1	
1320		0	
0000	13.0	0	259
0022		-0.1	
0107		-0.2	
0129		0	

Sheet No. H-9027

1420	12.9	0	262
0200		0	263
0230		-0.1	
0330		-0.2	
0400		0	
0500	12.8		
0529		-0.1	
0626		-0.2	
0655		0	
0703		-0.1	
0710		0	
0745		-0.1	
0855		-0.2	
0930		0	

Table 1 (cont'd)

Sheet No. 1814-NC

Time	Draft	Initial	Day
0350	13.7	0	173
0418		-0.1	
0512		-0.2	
0540		0	
0610		-0.1	
0639		0	
0700		-0.1	
0720		0	
0759		-0.1	
0835		0	
0839		0.1	
0847		0.2	
0850		0	
0854		-0.1	
0857		0	
0859		-0.1	
0901		-0.2	
0903		-0.3	
0906		0	
0911		-0.1	
0921		-0.2	
0926		0	
0959		-0.1	
1032		0	
1037		-0.1	
1042		0	
1051		0.1	
1100		0	
1122		-0.1	
1145		0	
1205		-0.1	
1226		0	
1346		-0.1	
1505		0	
0855		0	174
1004		-0.1	
1224		-0.2	
1332		0	
1500	13.6	0	
1510		0.1	
1520		0	
1540		-0.1	
1601		0	

Table 2. Computed Arc Correction, OPR-483

Sheet No. H-9162 (RA-100-1-70)

Day	Time	Correction
172	0325	0
173	0000	-0.1
	1800	-0.1
174	0600	-0.2
175	0815	-0.1
	1200	0.2
183	0340	-0.2
	0600	0
	1200	-0.1
	1800	-0.2
	2325	-0.1
184	0335	0.1
262	1800	0.2
263	0000	-0.1

Sheet No. H-9163 (RA-100-2-70)

223	1655	0
	1800	0
224	0000	-0.2
	0600	0.2
	1200	0
	1800	0.1
225	0030	0.5
	0600	0
	1635	-0.1
	1800	0
226	0000	0.2
	0600	0.1
	1105	0
	1515	0
237	0440	-0.1
	1645	0.1
	2120	0
238	0000	0
	1205	-0.3
	1800	-0.1
	2210	0
239	0000	0
240	1415	0
	1915	-0.1
241	1109	-0.2
	0600	0

Sheet No. H-9163 (cont'd)

Day	Time	Correction
	0932	0
	1200	-0.1
	1640	0.2
	1800	-0.2
	2130	0
242	0112	-0.6
	0121	-0.3
255	1800	0.2

Sheet No. H-9048
(RA-100-3-70)

238	0600	-0.2
	1200	0
239	0600	0
	1200	0
240	0425	0
	0600	0
242	0745	-0.1
244	1105	-0.2
	1800	-0.1
245	0000	0
	0600	-0.2
	1200	-0.3
251	1725	0
252	0000	-0.1
253	0000	0
	1556	-0.3
	1800	-0.2
254	0000	-0.1
	0600	0
	1550	-0.3
	1800	0
	1905	0
255	0000	0
	0600	0
	1200	0.2

Table 2 (cont'd)

Sheet No. H-9164 (RA-100-4-70)

Day	Time	Correction
246	0600	0.1
	1200	-0.2
	1800	-0.2
247	0000	-0.4
	0600	0
	1120	0
	1800	0
252	1450	-0.2
	1800	0.1
253	0505	-0.2
	0600	0
	1200	0.2
254	1052	-0.1
	1200	0
256	1055	0
	1800	0.2
257	0640	0
	1200	0

Sheet No. H-9165 (RA-100-5-70)

243	0235	0
258	0600	0
	1200	-0.1
	1800	0
259	0000	0

Sheet No. H-9166 (RA-100-6-70)

243	0600	-0.2
258	0411	0
	0555	0
259	0600	-0.2
	1200	0

Sheet No. H-9023

Day	Time	Correction
168	1000	0.2
	1200	-0.1
	1410	0
172	0600	-0.2
	1200	0
	1830	-0.1
173	0000	-0.1
183	0625	0.2

Sheet No. H-9026

243	1200	-0.2
245	2235	-0.1
246	0000	0
257	1805	0
258	0025	0.2

Sheet No. H-9027

262	1420	0
263	0600	0.1

Sheet No. 1714-NA

211	1800	-0.2
212	0300	0
	0600	0.1
	1200	0.1
	1800	0

Table 2 (cont'd)

Sheet No. 1714-NB

Day	Time	Correction
211	0250	0
	0600	0
	1200	0
217	0500	0
	1200	0
	1800	0
218	0000	0
	0600	-0.2
	1200	0
219	1800	0
	0300	0
	0600	0
220	1200	0.1
	0805	0.2
	1200	0
221	1800	0.2
	0605	0.1
	1200	0.1
260	1800	0.1
	0140	0
	0600	0
261	1200	0
	0330	0.5
	0600	0
	1200	0

Sheet No. 1814-NC

Day	Time	Correction
173	0600	-0.1
	1200	0
174	1200	-0.1
	1800	0

Table 3. Phase Corrections, OPR-483

Fathometer No. 819

Scale Change	Correction
A-B	-0.02
B-C	-0.01
C-D	-0.06
D-E	0.07
E-F	0.00

Fathometer No. 822

Scale Change	Correction
A-B	-0.02
B-C	-0.01
C-D	0.03
D-E	-0.04
E-F	0.10

BOTTOM SAMPLE NOTE

During OPR-483 a three man party from the U.S. Geological Survey came aboard to conduct a one week bottom sampling and seismic profiling survey of the Norton Sound and St. Lawrence Island area. The GP's of samples taken in areas covered by the sheets in this survey were recorded and the information was then plotted on the boat sheets. The actual samples were removed from the ship by the Geological Survey personnel for further study.

by sounding interval (in seconds).

For example, 0503 with a 20 second DCU sampling rate provides 1 minute soundings and 5 minute positions.

- #2 - First two digits are magnetic sampling frequency determined in the same manner as the sounding frequency. Last digit is the raw data tape indicator, 0 - soundings in whole units, 1 - soundings in units and tenths
- #3 - First two digits are gravity sampling frequency, determined in the same manner as the sounding frequency. Last digit is sounding data source indicator, 0 - soundings from automatic digital depth sounding.
1 - soundings entered by thumbwheel with one ~~or two~~ word delay.

Long words are logged:

1. At beginning of each day to change the day
2. When there is a change in any parameter from column 21 through 52.
3. When there is a change of position number for reasons other than standard interval from previous position.

Short words are to add in between sndgs or correct sndgs. The sounding recorded with the long word must also be the correct sounding.

*The time for beginning a new day is always 000000. The computer does not recognize 240000.

HYPERBOLIC ELECTRONIC CONTROL,
 APPROXIMATE POSITION FORMAT - CORRECTOR TAPE
 (for logging approximate G.P. of position at
 beginning of sounding lines)

TIME	I N D	SND	POS. NO. IND.	DAY OF YR.	FT / FM	LAT.	LONG.	SPEC IND	not used	not used
140200	00	0000	0000	129	0	056231	144523	9000	000	000

EXAMPLE:

TIME	IND	SNDG	POS#	DAY	FT FM	LAT	LONG	SPEC IND
140200	00	0000	0000	129	0	056231	144523	9000

not used,
log zeros

not used,
log zeros

TIME: Hour, Minute, Second

IND: Not used, log zeros

SNDG: Not used, log zeros

POS#: Position number, not used by computer but necessary as an identification or reference number

DAY: Julian date

FT/FM: Not used, log zeros

LAT: Latitude of first position of sounding line, in degrees and minutes (to nearest tenth) with leading zero

LONG: Longitude of first position of sounding line, in degrees and minutes (to nearest tenth) with leading zero if less than 100°

SPEC IND: Special Indicator is 9000, indicating that this long word only lists an approximate position to initiate G.P. computations for a hyperbolic control system

All remaining fields not used, log zeros.

Hyperbolic approximate position long words are logged:

1. At the beginning of a day's operations.
2. At all other times when the next previous logged position is more than 5 miles from the present position.

This word does not enter sounding data. Any sounding correction, either additional or revised and/or calibration correction change and/or change of day that may be otherwise required at the time of logging a hyperbolic approximate position must also be logged in the appropriate long or short word format. The hyperbolic approximate position must precede any additional corrector word to be logged with the same record time.

PARAMETERS FOR DIGITAL CORRECTING POLYNOMIAL PROJECTION

(3) Loop (1)

(1) Project No. OPR-483 (4) Requested by OPERATIONS, PMC

(2) # No. 1102 (5) Ship or Office SU, & OC

(3) Field No. 70 10 8 (N) S(1970) (6) Date Required ASAP

(7) Visual (8) Electronic (fill out form #3)

(10) XKN (SP 5) Distance from CMER to East Edge (NYX = 1) or West Edge (NYX = 0). 76,491.0 Meters

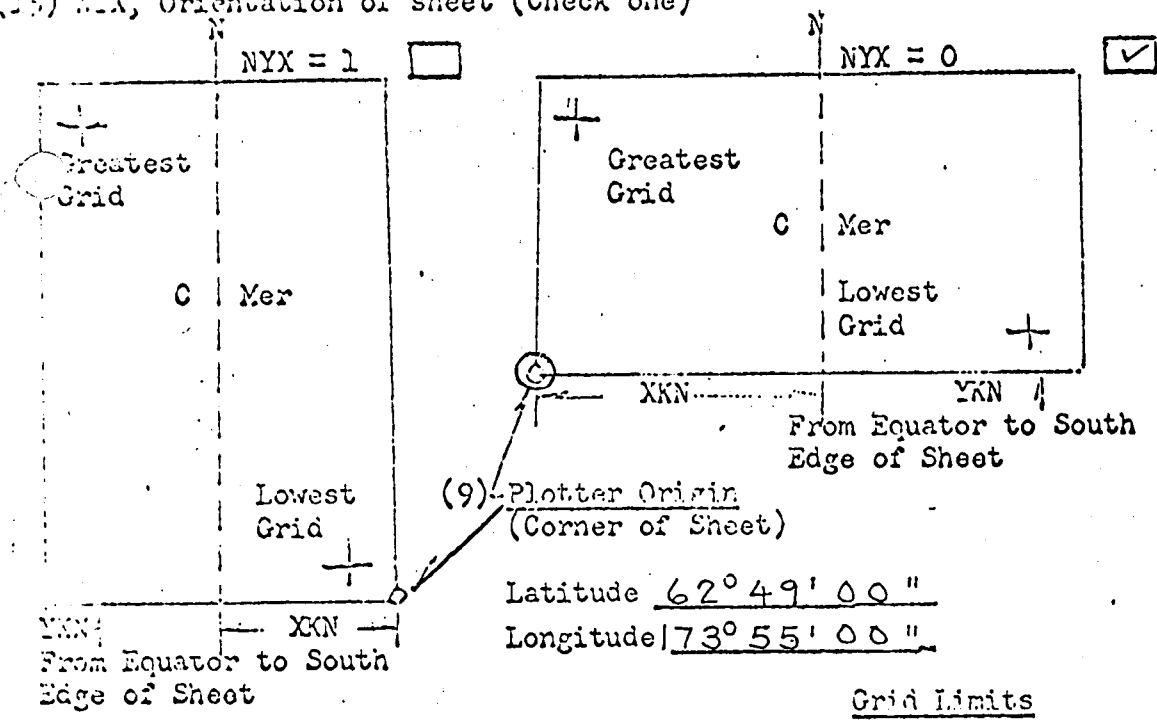
(11) YKN (SP 241) Distance from Equator to South Edge of Sheet. 6,967,750.6 Meters

(12) Central Meridian 172°25'00"

(13) Survey Scale 1:100,000

(14) Size of Sheet (Check one) 36x50 42x60

(15) NYX, Orientation of sheet (Check one) NYX = 1 NYX = 0



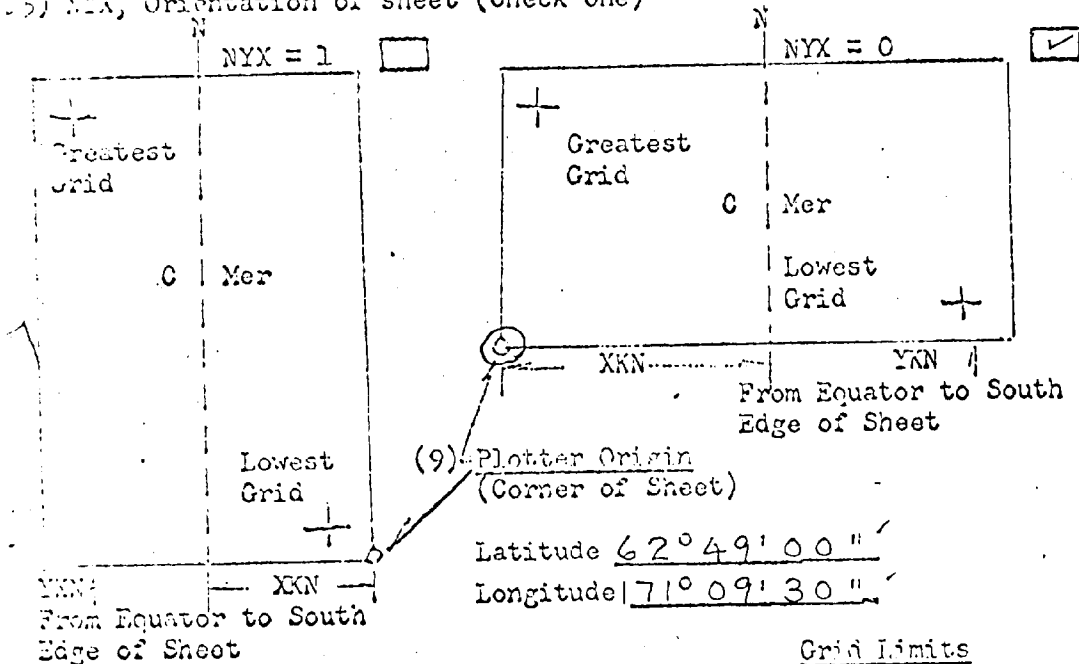
Grid Limits	
(16) Greatest Latitude	<u>63°35'00"</u> (Projection Line Interval Page 4 Hydro Manual)
(17) Lowest Latitude	<u>62°50'00"</u>
(18) Difference	<u>045'00"</u>
(19)	<u>05'00"</u>
(20)	<u>9' YSN</u>
(21) Greatest Longitude	<u>173°50'00"</u>
(22) Lowest Longitude	<u>170°55'00"</u>
(23) Difference	<u>02°55'00"</u>
(24)	<u>05'00"</u>
(25)	<u>35' XSN</u>

Comp. by: G.L.F.
by: [Signature]

PARAMETERS FOR DIGITAL CONIC
POLYNOMIC PROJECTION

Revised 10/1/67

- (1) Project No. OPR-483 (4) Requested by OPERATIONS, PMC
- (2) H No. 9027 (5) Ship Office SU. & OC.
- (3) Field No. 70 11 8 (J) (6) Date Required ASAP
- (7) Visual (8) Electronic (fill out form #3)
- (9) XKN (SP 5) Distance from CMER to East Edge (NYX = 1) or West Edge (NYX = 0). 80,315.6 Meters
- (10) YKN (SP 241) Distance from Equator to South Edge of Sheet. 6,967,750.6 Meters
- (11) Central Meridian 169° 35' 00"
- (12) Survey Scale 1:100,000
- (13) Size of Sheet (Check one) 36x60 42x60
- (14) NYX, Orientation of sheet (Check one)



(9) Plotter Origin
(Corner of Sheet)

Latitude 62° 49' 00"
Longitude 71° 09' 30"

Grid Limits

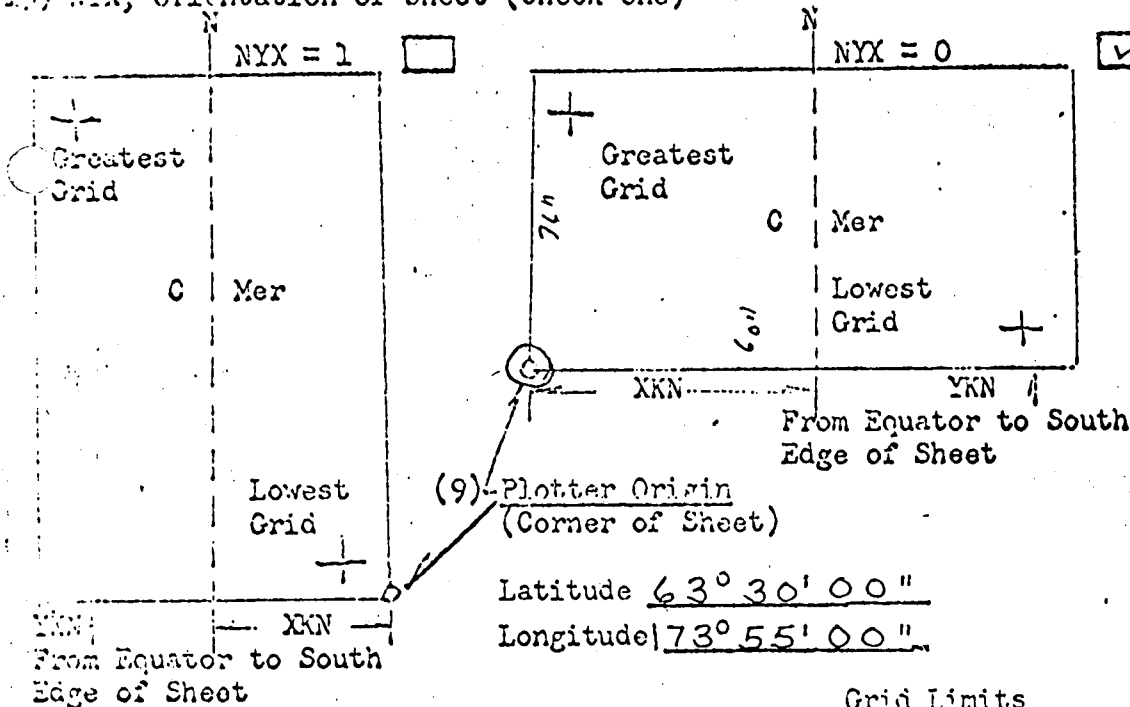
- | | | |
|------------------------|--------------------|-------------------------|
| (16) Greatest Latitude | <u>63° 35' 00"</u> | (19) <u>05' 00"</u> |
| (17) Lowest Latitude | <u>62° 50' 00"</u> | (20) <u>9</u> XSN |
| (18) Difference | <u>045' 00"</u> | (21) Greatest Longitude |
| | | <u>171° 005' 00"</u> |
| (22) Lowest Longitude | <u>68° 05' 00"</u> | (24) <u>05' 00"</u> |
| (23) Difference | <u>03° 00' 00"</u> | (25) <u>36</u> XSN |

Comp. by: G.L.F.
by: [Signature]

PARAMETERS FOR DIGITAL COMPUTED
PSEUDO-CYCLIC PROJECTION

Revised 10/1/67

- (1) Project No. OPR-483 (4) Requested by OPERATIONS, PMC
 (2) H No. 9023 (5) Ship or Office SU. & OC.
 (3) Field No. 70 06 8 (D) (6) Date Required ASAP
 (7) Visual (8) Electronic (fill out form #3)
 (10) XKN (SP 5) Distance from CMER to East Edge (NYX = 1)
 or West Edge (NYX = 0). 74,709.0 Meters
 (11) YKN (SP 241) Distance from Equator to South Edge
 of Sheet. 7,043,919.7 Meters
 (12) Central Meridian 172° 25' 00"
 (13) Survey Scale 1:100,000
 (14) Size of Sheet (Check one) 36x50 42x60
 (15) NYX, Orientation of sheet (Check one)



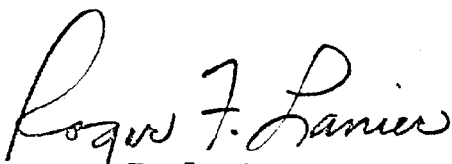
Grid Limits	
(16) Greatest Latitude	<u>64° 15' 00"</u> (Projection Line Interval Page 4 Hydro Manual)
(17) Lowest Latitude	<u>63° 35' 00"</u>
(18) Difference	<u>040' 00"</u>
(19)	<u>05' 00"</u>
(20)	<u>8 XSN</u>
(21) Greatest Longitude	<u>173° 50' 00"</u>
(22) Lowest Longitude	<u>170° 55' 00"</u>
(23) Difference	<u>02° 55' 00"</u>
(24)	<u>05' 00"</u>
(25)	<u>35 XSN</u>

Comp. by: G.L.F.
 ✓ by: [Signature]

APPROVAL SHEET

This report is approved as submitted, with the comment that while it appears the major reason for disagreement of soundings with the previous survey is a vertical datum difference, the source of the earlier datum is not known to us on the RAINIER. The reason for such a large difference in an area of relatively small range of tide is not understood.

Note should be made of the shoal found at $63^{\circ}20'N$, $170^{\circ}51'W$, on the south side of St. Lawrence. It is suspected from this, the PD rock to the NW, and the rocky area charted to the SE that much of the near shore bottom in this vicinity is broken and should be avoided by shipping.


Roger F. Lanier
Capt., NOAA

OPR-483 Norton Sound
St Lawrence Island Area
Processing Notes.

H-9023

Tide correctors used for this sheet are based on S.W. Cape tides plus one hour with no correction for height. Agreement of crosslines appear satisfactory.

H-9027

Tide correctors used for this survey are based on S.W. Cape tides direct.

Since the area surveyed in 1970 was entirely separate from the previous years' work, a separate sheet was plotted with only the 1970 work and transmitted as H-9027A.

The shoal sounding at Lat $63^{\circ}20'N$, Long $170^{\circ}51'W$ reduces to 32 feet on the smooth sheet. Also it appears on JD 262 (9/19/70) which was the day before the last of work on this sheet.

H-9162

Tide correctors for this sheet were taken from S.W. Cape tides direct.

H-9178

Tide correctors for this survey were taken from S.W. Cape tides with a minus one hour correction.

Since the soundings on the smooth sheets were so close to

the same depths shown on the boatsheets, no comparison was made with the Chart 9302 and no copy of HO Chart, 5819-A was available at PMC.

Crosslines on these sheets are generally in agreement within two feet or less.

On hundred eighty one (181) hours were spent on these four sheets; 63 on H-9023, 23 on H-9027, 78 on H-9162, and 17 on H-9178 all on 1970 work.

Respectfully submitted,

William M. Martin
Supervisory Cart. Tech.

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FORM C&GS-504

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

ADDENDUM
DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. OPR-483 Office No. _____

LOCALITY

State ALASKA

General locality BERING SEA

Locality NORTON SOUND

19.68 & 1969

CHIEF OF PARTY

E. W. Richards

LIBRARY & ARCHIVES

DATE 14 SEP 1970

Processing Office Notes - OPR-483, Norton Sound, Alaska

H-9020

The Ship SURVEYOR worked on this sheet in 1968 and 1969.

This sheet was relatively free of major discrepancies. Crosslines were within allowable limits and junctions were satisfactory.

There is a series of ridges running in a Northwest to Southeast direction and approximately at Lat. $64^{\circ}57'30''$, Long. $167^{\circ}45'00''$.

This sheet junctions with H-9021 and H-9022 (1968-1969).

H-9021

Work on this sheet was by the Ship SURVEYOR in 1968 and 1969.

The 1968 work on this sheet had differences of up to 3 feet in deeper water (D scale), most of which were eliminated by adjustment in depths. The 1969 work appears to agree quite well within itself. Generally the differences between the 1968 and 1969 work is a maximum of two feet, which is about the maximum in each year's work by itself.

This sheet junctions with H-9020, H-9022, H-9024 (1968-1969).

H-9022

This is the inshore sheet that had the R. Station on it. Not much trouble was encountered on the sheet, other than the normal things. Both baselines were on this sheet and there were some instances when the positions were computed on the wrong side of the baseline. Very little difference in the 1968 and 1969 soundings was found. Only the Ship SURVEYOR worked on this sheet. This sheet joins H-9020, H-9021, H-9024, H-9025 and H-9026 (1968-1969).

H-9023

This survey was accomplished by the Ship SURVEYOR in 1968 and 1969.

No particular difficulties were encountered on this sheet. The soundings are in good agreement, with a maximum discrepancy of about two feet.

This sheet junctions with H-9021 and H-9024 (1968-1969).

This sheet is an incomplete survey.

H-9024

The work on this sheet was accomplished by the Ship OCEANOGRAPHER and SURVEYOR in 1968 and by the SURVEYOR in 1969.

No adjustments were made to the SURVEYOR's 1969 soundings. Up to four feet was added to the SURVEYOR 1968 work to get agreement with the 1969 soundings. One to five feet was added to the 1968 OCEANOGRAPHER soundings to get agreement with the 1968 and 1969 soundings by the SURVEYOR.

Corrections to the soundings on this sheet were applied as outlined in the memorandum from the Chief of the Chart Division, dated 5-4-70 and referenced C324.

This sheet junctions with H-9021, H-9022, H-9023, H-9025, and H-9027.

H-9025

The work on this sheet was by the OCEANOGRAPHER and SURVEYOR in 1968 and by the SURVEYOR in 1969.

The same adjustments were made on this sheet as were mentioned for H-9024.

This sheet joins H-9022, H-9024, H-9026 and H-9048.

H-9026

The work on this sheet was accomplished by the Ship SURVEYOR in both 1968 and 1969..

The 1968 work consisted of only about 40 positions which were in satisfactory agreement with the 1969 work.

The 1969 work agree very well with itself with the maximum difference at crossing only one foot.

This is an incomplete sheet and will be finished in 1970.

This sheet joins H-9022 and H-9025.

H-9027

This sheet was accomplished by the OCEANOGRAPHER and SURVEYOR in 1968 and the SURVEYOR in 1969.

Adjustments were made to the 1968 soundings as were made on H-9024 and H-9025.

There is a series of ridges east of Northeast Cape at about Lat. $63^{\circ}15'N$ and Long. $168^{\circ}20'$ and $168^{\circ}30'W$. that lie in a N.E., S.W. direction. This area was not thoroughly developed and it was recommended, by the Hydrographer, that it be done later.

This sheet junctions with H-9024 and H-9048.

This is an incomplete survey.

H-9048

All the work on this sheet was done by the Ship SURVEYOR in 1969.

The soundings appear to agree very well, at crossings, with the maximum difference being about one foot.

This is an incomplete sheet and makes junctions with H-9025 and H-9027.

JUNCTIONS

The junctions on all sheets were butt junctions because the whole project was run as though it was one sheet. We believe all junctions to be in satisfactory agreement.

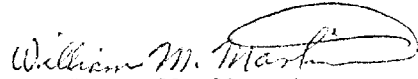
SHORELINE

No shoreline was applied to these sheets because there was no inshore hydrography.


CONTROL

The control for the Ship OCEANOGRAPHER in 1968 was mostly Loran-C with some Raydist, when the SURVEYOR wasn't on the working area. The control for the Ship SURVEYOR in both 1968 and 1969 was Raydist. There was, however, a change of frequency from 3281 Khz in 1968 to 3300.4 Khz in 1969.

Respectfully submitted,


William M. Martin
Supervisory Carto. Tech.
Pacific Marine Center

Approved and Forwarded,


K. William Jeffers, ~~CDR~~, USESSA
Chief, Processing Division
Pacific Marine Center

Memorandum

TO : Chief, Processing Division *MMJ*
Pacific Marine Center

DATE: May 4, 1970

In reply refer to: C324

FROM : Chief, Marine Chart Division

SUBJECT: Norton Sound Survey Processing

The smooth sheets H-9020, 9021, 9022, and 9023 have been examined with special attention to crossing differences between the SURVEYOR's 1968 and 1969 work.

Although we were without benefit of the original sounding records our examination disclosed general agreement within \pm two feet as you report, together with a few discrepancies of about three feet. In many crossings the addition of a plus two-foot correction to the 1968 work would improve the crossings and very few would have suffered by this revision.

During our verification of the 1960 surveys we have attempted to bring the soundings on surveys H-8558 and H-8559 into reasonable agreement with the SURVEYOR's 1969 overlapping work. To a large extent this was possible by applying a plus four-foot correction to the 1960 soundings. On some lines, however, the plus four foot did not adequately satisfy conditions and where this occurred an additional plus or minus correction was applied. The reason for this variation has not been determined but in general the crossings between the 1960 and 1969 work will hopefully be \pm two feet which under the circumstances we will consider as acceptable.

The examination of the preliminary sounding overlay for H-9025 revealed some crossing differences of two feet within the 1969 work but approximately 95 percent of the crossings are within one foot. Crossing differences within the 1968 work were within the same range and ratio and similarly between the 1968 and 1969 work. No definite pattern of disagreement is apparent and as exact agreement occurs in such a large percent of the crossings, no constant can be applied to advantage.

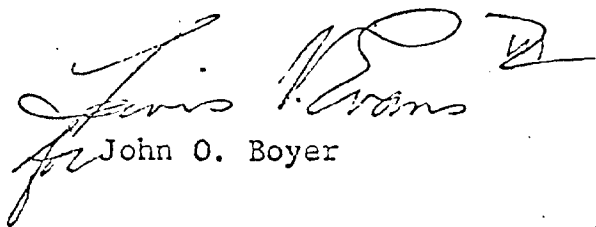


One section of a line of 1968 soundings identified by annotation on the position overlay is deeper than the 1969 soundings by three feet and should be verified in the records. From a comparison with H-9024 it appears that end sections of some sounding lines on H-9025 have been adjusted. The adjustments required on H-9024 will generally bring the junctional soundings into better agreement.

It is recommended that no general adjustment of soundings be made on H-9025 inasmuch as the crossing discrepancies are within \pm two feet.

Assuming the 1969 work to be of better quality and more rigidly controlled than the 1968 work, a comparison of the sounding lines for the two seasons on H-9024 reveals some consistency in crossing differences. On the preliminary position overlay of H-9024, there has been annotated corrections for the 1968 lines applicable in reducing crossing differences within \pm two feet. Some variation in the correction must be accepted to do this but the trend is apparent. An examination of the records may justify changing some of the annotations. It is recommended that this type of study be extended to complete this sheet and that correctors so obtained be applied to the soundings. The maximum additional corrector probably will be about plus four feet and the minimum will be plus two feet. The OCEANOGRAPHER's work should be corrected as necessary to bring it into line.

This solution to the problem does not indicate the reason for the discrepancies and it may be considered arbitrary but at least it will bring about a relative consistency in the data that is desirable for our main purpose in making the survey.


John O. Boyer

HYDROGRAPHIC SURVEY STATISTICS
 HYDROGRAPHIC SURVEY NO. 9027

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET (& 2-PNO)	1	BOAT SHEETS	4
DESCRIPTIVE REPORT		OVERLAYS	

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS						
VOLUMES						
BOXES			2			

T-SHEET PRINTS (List)

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	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				
POSITIONS CHECKED				
POSITIONS REVISED				
DEPTH SOUNDINGS REVISED				
DEPTH SOUNDINGS ERRONEOUSLY SPACED				
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED				
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS				
JUNCTIONS				
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS				
SPECIAL ADJUSTMENTS				
ALL OTHER WORK				
TOTALS				

PRE-VERIFICATION BY	BEGINNING DATE	ENDING DATE
VERIFICATION BY	BEGINNING DATE	ENDING DATE
REVIEW BY	BEGINNING DATE	ENDING DATE

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. ~~9027a~~ 9027a

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET & PNO	1	BOAT SHEETS	1
DESCRIPTIVE REPORT		OVERLAYS (Tracings)	3

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS						
VOLUMES						
BOXES						

T-SHEET PRINTS (List)

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	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				
POSITIONS CHECKED				
POSITIONS REVISED				
DEPTH SOUNDINGS REVISED				
DEPTH SOUNDINGS ERRONEOUSLY SPACED				
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED				

PROCESSING ACTIVITY	TIME (MANHOURS)			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
TOPOGRAPHIC DETAILS				
JUNCTIONS				
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS				
SPECIAL ADJUSTMENTS				
ALL OTHER WORK				
TOTALS				

PRE-VERIFICATION BY	BEGINNING DATE	ENDING DATE
VERIFICATION BY	BEGINNING DATE	ENDING DATE
REVIEW BY	BEGINNING DATE	ENDING DATE

VERIFIER'S REPORT
HYDROGRAPHIC SURVEY, H-9027 a 9027a

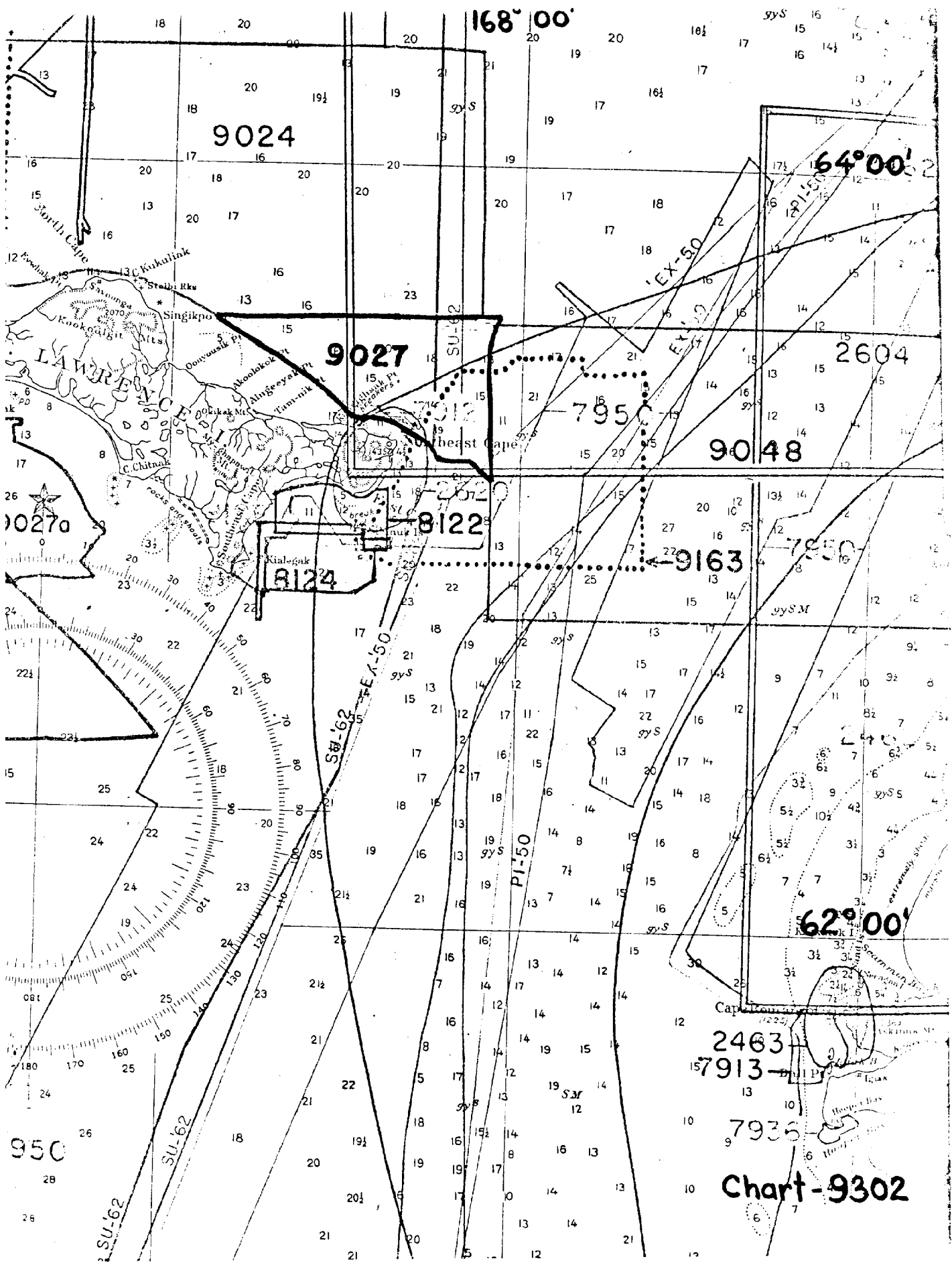
INSTRUCTIONS - This form serves to identify items of a check list in verification together with items which are separately reported to the Reviewer. The form is not to be forwarded to the Reviewer. A report, which is prepared for the Reviewer, should identify items by number and letter and will be filed in the Descriptive Report until the survey is reviewed.

CL - Check List Items: should be checked as having been completed during the verification processes.

R - Report Item: This column refers to those items reported to the reviewer and is used to indicate the items discussed.

Part I - DESCRIPTIVE REPORT	CL	R	Part III - JUNCTIONS (Continued)	CL	R
<p>Note: The verifier should first read the Descriptive Report for general information and problems.</p> <p>1. The Descriptive Report was consulted, paragraphs checked if found satisfactory, and notations were made in soft black pencil regarding action taken. Remarks Required: -- None</p>			<p>10. Junctions with contemporary surveys were satisfactory except as follows: Remarks Required: -- Consider conditions after adjustments have been made; note adjustments made. Make special notes of Butt junctions and areas which are SUPERSEDED.</p>		
<p>2. Soundings originating with the survey and mentioned in the Descriptive Report have been verified and checked in soft black pencil, including latitude and longitude, together with position identification. Remarks Required: -- None</p>			<p>Part IV - VOLUMES</p> <p>11. All items affecting the plotting of the survey which are entered in the remarks columns of the sounding records were noted and check marked. In all cases appropriate action was taken and exceptions noted in the volumes. Remarks Required: -- None</p>		
<p>3. All reference to survey sheets mentioned in the Descriptive Report should include registry number and year. Remarks Required: -- None</p>			<p>12. Condition of sounding records was satisfactory except as follows: Remarks Required: -- Mention deficiencies in completeness of notes or actions for the following: (a) rocks (b) line turns (c) position values of beginning and ending of lines (d) bar check or velocity correctors (e) time recording (f) notes or markings on fathograms (g) was reduction of soundings accurately done? (h) was scanning accurate? (i) were peaks at uneven intervals missed? (j) were stamps completed? (k) references to adjacent features</p>		
<p>Part II - SHORELINE AND SIGNALS</p> <p>4. Source of shoreline signals Remarks Required: -- List all surveys a. Give earliest and latest dates of photographs b. Field inspection date c. Field Edit date d. Reviewed-Unreviewed</p>					
<p>5. The transfer of contemporary topographic information was carefully examined and reconciled with the hydrography. Remarks Required: -- Discuss remaining differences.</p>					
<p>6. The plotting of all triangulation stations, topographic stations and hydrographic signals has been checked and noted in processing stamp No. 42 on the smooth sheet. Remarks Required: -- None</p>					
<p>7. Objects on which signals are located and which fall outside of the high-water line have been described on the sheet. Remarks Required: -- List those signals still unidentified.</p>			<p>Part V - PROTRACTING</p> <p>13. All positions verified instrumentally were check marked in color in the sounding records, and verifier initialed the processing stamp. Remarks Required: -- None</p>		
<p>Part III - JUNCTIONS</p> <p>Note: Make a cursory comparison preliminary to inking soundings in area of overlap.</p> <p>8. All junctions of contemporary or overlapping sheets were transferred in colored ink and overlapping curves were made identical. Remarks Required: -- None</p>			<p>14. The protracting and plotting of all unsatisfactory crossings were verified. Remarks Required: -- None</p>		
<p>9. The notation in slanted lettering "JOINS H--- (19)" was added in colored ink for all verified contemporary adjoining or overlapping sheets. Those not verified are shown in pencil. Remarks Required: -- None</p>			<p>15. All detached positions locating critical soundings, rocks, buoys, breakers, obstructions, kelp, etc., were verified and the position numbers are legible. Remarks Required: -- None</p>		

Part V - PROTRACTING (Continued)	CL	R	Part VIII - AIDS TO NAVIGATION	CL	R
<p>16. The protracting was satisfactory except as follows: Remarks Required: -- Refers to protracting in general except for specific faults repeated often, or faults in control information, which required considerable replotting or adjustments.</p>			<p>26. All fixed aids located together with those on the contemporary topographic sheets, have been shown on the survey. Remarks Required: -- Conflicts of any nature listed.</p>		
<p>17. The protractor has been checked within the last three months. Remarks Required: -- Date of check, type of protractor and number.</p>			<p>27. All floating aids listed in the Descriptive Report should be verified and checked in soft black pencil, including latitude and longitude and position identification. Remarks Required: -- None</p>		
<p>Part VI - SOUNDINGS 18. All soundings are clear and legible, and critical soundings are a little larger than adjacent soundings. Remarks Required: -- None</p>			<p>Part IX - BOAT SHEET 28. The boat sheet was constantly compared with the smooth sheet with reference to notes, position of sounding lines and supplemental information. Remarks Required: -- None</p>		
<p>19. Sounding line crossings were satisfactory except as follows: Remarks Required: -- Discuss adjustments.</p>			<p>29. Heights of rocks awash were correctly reduced and compared with topographic information. Remarks Required: -- Note excessive conflicts with topographic information.</p>		
<p>20. The spacing of soundings as recorded in the records was closely followed; Remarks Required: -- None</p>			<p>Part X - GENERAL 30. All information on the sheet is shown in accordance with figures 82 and 83 in the Hydrographic Manual (Pub. 20-2). Remarks Required: -- None</p>		
<p>21. The scanning, reduction, spacing, plotting of questionable soundings have been verified. Remarks Required: -- None</p>			<p>31. Unnecessary pencil notes have been removed from the sheet. Remarks Required: -- None</p>		
<p>22. The smooth plotting of soundings was satisfactory except as follows: Remarks Required: -- Refer to legibility, errors in spacing, and errors in numbers - but not to errors in scanning.</p>			<p>32. Degree, minute values and symbols have been checked; also electronic distance arcs have been properly identified and checked on the smooth sheet. Remarks Required: -- None</p>		
<p>Part VII - CURVES 23. The depth curves have been inspected before inking. Remarks Required: -- By whom was the penciled curves inspected.</p> <p>24. The low-water line and delineation of shoal areas have been properly shown in accordance with the following: a. From T-Sheet in dotted black lines b. From soundings in orange c. Approximate position of sketched curve is dashed orange d. Approximate position of shoal area not sounded in black dashed Remarks Required: -- None</p>			<p>33. The bottom characteristics are adequately shown. Remarks Required: -- None</p>		
<p>25. Depth curves were satisfactory except as follows: (This statement should not refer to the manner in which the curves were drawn). Remarks Required: -- Indicate areas where curves could not be drawn completely because of lack of soundings. For some inshore areas a general statement is sufficient.</p>			<p>Part XI - NOTES TO THE REVIEWER 34. Unresolved discrepancies and questionable soundings.</p>		
<p>Verified by</p>			<p>35. Notation of discrepancies with photogrammetric survey inserted in report of unreviewed photogrammetric survey or on copy.</p>		
			<p>36. Supplemental information.</p>		
<p>Date</p>					



9024

9027

8122

8124

7950

9163

64°00'

2604

9048

62°00'

2463

157913

7936

Chart-9302

168°00'



950

SU-62

EX-50

PI-50

EX-50

EX-50

yyS.M

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