

# 9491

Diag. Cht. No. 902

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. .... MI-5-2-75  
Office No. .... H-9491

### LOCALITY

State ..... PUERTO RICO  
General Locality ..... SOUTH COAST  
Locality ..... BAHIA DE JOBOS

1975

CHIEF OF PARTY  
Ronald M. Buffington

### LIBRARY & ARCHIVES

DATE ..... November 28, 1977

*Area*  
*2538*  
*2.3.77*

HYDROGRAPHIC TITLE SHEET

H-9491

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.

MI-5-2-75

State Puerto Rico

General locality South Coast

Locality Bahia de Jobos

Scale 1 : 5000 Date of survey 2 Feb. 1975 - 2 April 1975

JD 033 092

Instructions dated 1 November 1975 Project No. OPR-423-MI-75

Vessel NOAA Ship MT MITCHELL (MSS-22), Launches 2222, 2224, and 2228  
Jensen 1002, 1204 Monark

Chief of party Ronald M. Buffington, Commander, NOAA

Surveyed by See Remarks

Soundings taken by echo sounder, hand lead, pole All three methods were used

Graphic record scaled by Survey personnel

Graphic record checked by Survey personnel VERIFICATION BRANCH CAME

Protracted by \_\_\_\_\_ Automated plot by CAL COMP 618 (LDRANK)

Soundings penciled by \_\_\_\_\_ CAL COMP 618 PLOTTER

Soundings in fathoms feet at MLW MLLW

REMARKS: ALL CORRECTIONS and notes in red made during verification by LbCom

Surveyed by Ship's Officers

CDR Richard J. De Rycke ENS Richard E. Marriner II

LCDR Martin R. Mulhern ENS Stanely Iwamoto

LTJG David Pasciuti ENS John O'Reilly

LTJG Thomas G. Russel ENS Bruce Woodry

ENS Karen O'Donnell

ENS Evelyn J. Fields

*Applied to std 5/11/78  
CAB*

Miscellaneous Data Filed with Field Records

A. Project:

Hydrographic survey MI-5-2-75 <sup>(H-9491)</sup> was conducted in Bahia de Jobos on the south coast of Puerto Rico, as an inshore portion of OPR-423-MI-75. The survey was conducted in accordance with Project Instructions dated 1 November 1974 as amended by change No.1, dated 7 November 1974, change No. 2, dated 22 November 1974 and change No. 3, dated 2 January 1975. The survey registry number is H-9491.

B. Area Surveyed:

The survey, as conducted, encompassed all of Bahia de Jobos and the associated entrance channel leading to Central Aguirre and Bahia de Jobos. The southernmost survey limit, in the channel entrance, was delineated by the junction between this survey and MI-5-1-75, H-9490, at latitude 17° 55' 45" N. Survey work began on 21 February 1975, Julian Day 052, and was completed on 2 April 1975, Julian Day 092.

C. Sounding Vessels:

All soundings were obtained using survey launch 1002, Vesno 2222, a Jensen, and a 17 foot Monark skiff equipped with an 85 hp outboard engine, Vesno 2228. The Jensen is an automated launch equipped with a Hydroplot system. The Monark was used to obtain inshore and shoal soundings; its data were recorded manually and then reformatted on board the MT MITCHELL. Pacific Plastics launch 1204, Vesno 2224, was used to collect all but two of the sheet's bottom samples, with the remaining two being obtained by the Jensen. Launch 1002 used position numbers 0001-1173, launch 2224 used position numbers 7001-7024 for its bottom samples, while the Monark Vesno 2228 used positions 9000-9814. Final processing of all data was completed on board the MT MITCHELL.

D. Sounding Equipment and Corrections to Echo Soundings:

The Jensen, Vesno 2222, was used to acquire soundings in water in which the depth was five feet or greater, in all areas where control was adequate. The Monark, Vesno 2228, was used for all inshore and shoal work and in all areas where full horizontal control was not established. These two launches were the only two used to obtain sounding data on MI-5-2-75, H-9491.

The Jensen was equipped with a complete Hydroplot system and a Ross model 5000 fathometer. The Monark carried a Raytheon 719-B fathometer which used as its power source a standard twelve volt battery, recharged periodically to insure full operation power to the echo sounder. Pacific Plastics launch 1204, Vesno 2224, was used to obtain all bottom samples but two obtained by the Jensen. Launch 1204 used a Raytheon DE-723-B fathometer. A list of the sounding equipment and their respective serial numbers is given, for each launch, in the appendix.

Phase comparisons were taken on the Jensen's Ross model 5000 fathometer ✓ at one hour intervals. Adjustment to the initial was made whenever these comparisons showed variance from the initial's zero setting. The Monark's 719B fathometer was also periodically adjusted to insure the initial was at the zero mark. In addition, the 719B fathometer carried an adjustment which enabled tide and draft to be entered into the fathogram trace. The tide and draft adjustments were kept at zero at all times. An adjustment which allowed varying the stylus belt speed was set to yield a speed of sound of 800 fathoms per second.

Any variance from the zero setting of the initial while on line was ✓ applied to the graphic records when they were scanned. Peaks and deeps occurring between soundings were also inserted while scanning. The records were scanned and checked by the Survey Department personnel with additional spot checks made by each launch OIC and the plotting watch officer. All corrections and additions to the graphic record were applied on the corrector tape.

Predicted tides used while on line were incorrect. The ASCII tide ✓ gage tape for the gage at Central Aguirre was used for the field smooth plot aboard the MT MITCHELL. Smooth tides were requested for the Central Aguirre tide gage in a letter to be forwarded to Rockville, see appendix.

Velocity corrections and instrument error for the sounding vessels ✓ were determined by bar checks and leadline comparisons. The bar check results for each launch were meaned and any value greater than  $\pm 0.4$  feet from the mean was rejected as per the Hydrographic Manual. Some of the soundings obtained by the Monark were obtained by sounding pole while some of the Jensen's soundings were obtained by leadline. In both cases, the soundings have been corrected for tide only.

Transducer correction, the sum of the corrections for draft, instrument ✓ error, and settlement and squat, was determined for each sounding launch.

Transducer draft was determined for each launch at the beginning of ✓ survey MI-5-2-75 and found to be equal to 1.0 foot on the Jensen, VesNO 2222, and 1.0 foot on the Monark, VesNO 2228. The value determined for each launch was then applied to that vessel's corrector tape.

Settlement and squat correctors were determined for VesNO 2222 during ✓ tests run at Roosevelt Roads, Puerto Rico on 13 and 14 January 1975. A copy of the test results is included in the appendix. Settlement and squat was not determined for the Monark, VesNO 2228, because the skiff was not equipped with a tachometer. Also the shallow depths and slow running speeds were such that any corrections to be applied are assumed to be negligible. The settlement and squat correctors for the Jensen were applied to that vessel's TC/TI tape.

The velocity tape includes corrections for both velocity of sound ✓ through water and instrument error. Velocity table 01 applies to all data obtained by the Jensen, Vesno 2222, tables 02 and 03 apply to all data obtained by Vesno 2228, while table 04 applies to Vesno 2224. Velocity tables 03 and 04 apply to pole soundings and bottom sample data only, thus there are no velocity corrections to be applied.

E. Hydrographic Sheet:

The smooth sheet will be prepared by the Atlantic Marine Center, Norfolk, Virginia. All records necessary to the completion of the hydrographic sheet will be forwarded to the Atlantic Marine Center.

The original survey limits of MI-5-2-75<sup>(H-9491)</sup> were modified slightly prior to the beginning of work on the survey. The coordinates given under MI-5-2-75<sup>(H-9491)</sup> request for registry numbers, are the modified survey limits.

Sounding volume one of Vesno 2222 contained data obtained using visual control during the first two days of survey MI-5-2-75. The information contained in this volume was mistakenly destroyed when Vesno 2222 began work on MI-5-2-75<sup>(H-9491)</sup> using Del Norte electronic control. As a result, the data obtained on Julian Days 052 and 053, contained in sounding volume number one, was rejected.

F. Control Stations:

Visual control and Del Norte calibration were accomplished using stations of at least third order triangulation accuracy. Stations used ✓ were published triangulation stations, stations located by ship's personnel, aerial photographs, and those located by Photo Party 62, an Atlantic Marine Center field party. A copy of the signal list and station names list can be found in the appendix. Reference to Horizontal Control Report for OPR-423-MI-75.

G. Hydrographic Position Control:

Control used for survey MI-5-2-75, H-9491, was composed of visual, range azimuth, and Del Norte, a range-range system operating at a frequency of 9400 MHZ. and "See Bantsheet" later logged as range visual)

Visual control was used by the Jensen, Vesno 2222, at the beginning of the survey on Julian Days 052 and 053 to obtain sounding data. Visual control was also used aboard the Jensen to determine corrections to be carried on each Del Norte pattern. All bottom samples but two obtained by the Jensen, were obtained by Vesno 2224 using visual control.

Range-azimuth control utilized one angle, used to determine an azimuth, which was measured from a Wild T2 theodolite, serial number 35838. The angle was measured from positions of at least third order accuracy to the sounding launch. In addition, a range was measured from each triangulation position to the sounding launch using a Del Norte tri-ponder.

The majority of the sounding lines run by the Monark using range-azimuth control were run by steering the launch along a constant azimuth by means of directions relayed from the theodolite observer to the boat coxswain.

Certain portions of the survey did not warrant the establishment of control stations. These areas were surveyed by the Monark using the photo shoreline for control and running on a compass course at an assumed speed. These soundings were later assigned azimuths and ranges, pseudofixes, for incorporation into the master data tapes and for plotting using the Hydroplot system. Position numbers assigned to the pseudofixes are as follows:

| <u>Julian Day</u> | <u>Position Numbers</u>                       |
|-------------------|---|
| 081               | 9561-9565                                     |
| 082               | 9671-9686                                     |
| 084               | 9691-9693, 9743-9749,<br>9756-9761, 9763-9767 |

Range-range control was used by the Jensen for all soundings taken from Julian Day 055 to Julian Day 092, the last day of the survey. This system was also used to collect two bottom samples not collected by Vesno 2224. Correctors to be carried on each Del Norte pattern were determined from daily calibrations made using three point visual fixes with a check angle. Each fix was computed, using program RK 561, Hyperbolic Range Range Geodetic Calibration Program, to determine validity of the fix, inverse distance, and the correctors to be applied to each remote. (Only inverse distances of five meters or less were deemed adequate for the determination of correctors to be applied) to each electronic pattern.

Electronic control stations used by Vesno 2222 for the survey were as follows:

| <u>Julian Day</u> | <u>Remote Serial No.</u> | <u>Station Number</u> |
|-------------------|--------------------------|-----------------------|
| 055-063           | 249                      | 348                   |
|                   | 248                      | 350                   |
| 064               | 248                      | 350                   |
|                   | 249                      | 352                   |
| 065               | 249                      | 336                   |
|                   | 248                      | 344                   |
| 066               | 248                      | 342                   |
|                   | 249                      | 364                   |
| 067               | 248                      | 362                   |
|                   | 249                      | 336                   |
| 083-085           | 216                      | 336                   |
|                   | 252                      | 344                   |
| 086               | 216                      | 344                   |
|                   | 252                      | 350                   |
| 091-092           | 216                      | 350                   |
|                   | 252                      | 352                   |

The geographic positions for each of the above stations appear on the Signal Tape Listing in the appendix.

A listing of the correctors carried, on each Del Norte pattern, for each day's work can be found on the abstract of Del Norte electronic correctors in the appendix.\*

\* Filed with field records

Control and calibration stations used by Vesno 2228 for survey MI-5-2-75 are as follows:

| <u>Julian Day</u> | <u>Station Occupied</u> | <u>Calibration Station</u>                  |
|-------------------|-------------------------|---|
| 068               | OVER, 1975              | INFIERNO 2, 1966                            |
| 080               | OVER, 1975              | INFIERNO 2, 1966                            |
| 081               | P6, 1975                | RICK, 1975                                  |
| 081               | RICK, 1975              | Aguirre Sugar Assoc.<br>Tallest Stack, 1966 |
| 082               | P6, 1975                | RICK, 1975                                  |
| 084               | BUSE, 1975              | INFIERNO 2, 1966                            |

Calibration differences, in meters, between the geodimeter established distance and the Del Norte distance reading were zero for all days listed above.

The Del Norte units were calibrated periodically by setting the units up at specific points to measure a known distance which had been established previously with the use of a geodimeter. In most cases, any error found in the units was corrected by adjustment of the calibration pods located on the front panel of each DMU. One DMU unit, serial number 180, could not be corrected in this manner. The error found in the unit was incorporated into calibration error carried on the DMU.

#### H. Shoreline:

The shoreline was transferred to the field sheets from National Ocean Survey Manuscripts T-13364, T-13365, T-13366, T-13367, and T-13368, photography completed March 1970. The shoreline was run by the Monark, Vesno 2228, using range-azimuth control. Field edit was done by Photo Party 62, an Atlantic Marine Center field party, and the hydrographer. Notes pertaining to the field edit were added to the field edit sheet and the boatsheet where necessary. Shoreline discrepancies were noted on the field edit sheet and described under section K, Comparison with Prior Surveys, of the Descriptive Report.



I. Crosslines:

Crosslines were run to the extent of 10% of the sounding lines. Junction was good, within one foot, with the majority of the sounding agreeing exactly with the regular sounding line values. Del Norte electronic control was used to run all crosslines.

J. Junctions:

Survey MI-5-2-75, Registry number H-9491, junctioned on its southern and western edge with survey MI-5-1-75, H-9490. Junction was good with soundings varying no more than one foot at the junction.

K. Comparison with Prior Surveys:

*- See Verifiers Report, para 4.f, and 7.a.*  
\* Pre-survey review item number 3 on sheet T-13367 has the following modifications to be made. The pier ruins mentioned at latitude  $17^{\circ} 57' 12''$  N, longitude  $66^{\circ} 13' 25''$  W are ~~no longer~~ present. In addition, the ~~obstructions~~ <sup>obstructions</sup> shown at latitude  $17^{\circ} 57' 00''$  N, longitude  $66^{\circ} 13' 30''$  W and ~~foul~~ <sup>foul</sup> areas shown in the immediate vicinity are no longer in existence. The area in the immediate vicinity of pre-survey review item number 3 has been dredged and cleared to accommodate the construction of the Aguirre Steam Plant unloading pier at latitude  $17^{\circ} 56' 56''$  N, longitude  $66^{\circ} 13' 42''$  W. A blueprint of the steam plant pier and its associated turning basin, compiled by the Puerto Rico Water Resources Authority, was used to transfer all relevant changes in this area to sheet T-13367. The blueprint and supporting information will be forwarded by the field editor. \* Photogrammetry people at ~~ARC~~ and field editor recommends this item be retained as shown on field edited T-sheet (T-13367)

Pre-survey review item number 4 is the channel charted at latitude  $17^{\circ} 56' 38''$  N, longitude  $66^{\circ} 11' 16''$  W which shows a controlling depth of 15 feet. Sounding lines run at 50 meter spacing, and sounding lines run at a diagonal to the channel show that it has silted in in many places. Many 15 foot soundings do appear within the channel limits. However, depths within the area ranged from  $12^3$  to  $18^6$  feet. Pre-survey review item number 4 states that several aids to navigation have been ~~installed in the channel~~ <sup>established</sup>. No aids to navigation were found within the confines of the channel with the nearest navigational aid being Punta Rodeo private aid to navigation number 6, see section N, Aids to Navigation. *See Verifiers Report and D.C. Report 4g.*

Development number one was the investigation of a ten foot peak which appeared on the regular sounding lines at latitude  $17^{\circ} 56' 00''$  N, longitude  $66^{\circ} 13' 36''$  W. The peak appeared in an area where the average

*\*\* Obstruction charted as a disposal area presently falls in an area of landfill and a pier.*

*\*\* The foul areas originate with shoreline manuscript T-13367 (10-75), and are shown on the present survey, they are not considered disproved.*

depth was 15 feet. Four development lines were run in the area and three hand lead lines were taken to determine the least depth of the peak. Pos 1019-1021 9 feet was obtained ✓

Development number two was the investigation of an 11 foot sounding which appeared in an area in which the average bottom depth was 14 feet. Two eleven foot soundings were found in the vicinity of Lat.  $17^{\circ} 56' 10''$  N, Long.  $66^{\circ} 13' 30''$  W. No further development of the area is required. Pos 1041-1042 A ten foot sounding was obtained approx. 60 meters south of the 11 foot sounding. ✓

The unnumbered pre-survey review items shown from prior survey H-2421 were found to correspond to the new sounding values. No un-numbered pre-survey review exist ~~in~~ survey area from this prior survey.

Unnumbered soundings taken from C&GS Chart 909, 6th edition, were found to agree with the values obtained by survey MI-5-2-75, H-9491.

Unnumbered pre-survey review items from prior survey H-2423 were in general agreement with survey H-9491 with the exception of a 5-1/2 foot sounding located at Lat.  $17^{\circ} 57' 07''$  N, Long.  $66^{\circ} 13' 36''$  W. This sounding existed in the area encompassed by pre-survey review item number 3. Depth within this area has changed as a result of dredging? operations. C&GS Chart 909, 7th edition, shows no 5-1/2 foot <sup>in this area</sup> sounding within this area. No unnumbered pre-survey review is shown on copy of pre-survey used with this survey.

#### L. Comparison with Charts:

A comparison of survey MI-5-2-75 with C&GS Chart 909, 1:20000, 7th edition, 8 June 1974, shows the soundings in all areas to be in general agreement. Depths in all areas of the survey showed variances of no more than one to two feet. ✓

The shoal marked by private aid to navigation number 6 on chart 909 at latitude  $17^{\circ} 56' 45''$  N, longitude  $66^{\circ} 11' 30''$  W was present as was the shoal marked by buoy number 3 at latitude  $17^{\circ} 56' 53''$  N, longitude  $66^{\circ} 12' 28''$  W. A small mangrove island positioned on the chart at Lat.  $17^{\circ} 57' 12''$  N, Long.  $66^{\circ} 12' 30''$  W was found in its charted position. ✓  
<sub>09 25</sub>

The charted position, Lat.  $17^{\circ} 56' 56''$  N, Long.  $66^{\circ} 13' 42''$  W, of the Aguirre Steam Plant unloading pier agrees with the hydrographers information. ✓

A number of small piers and boat ramps appear in the vicinity of Lat.  $17^{\circ} 57' 12''$  N, Long.  $66^{\circ} 11' 06''$  W, which are not shown on the chart. The largest of the piers is the Guayama fishing and boat club pier at Lat.  $17^{\circ} 57' 10''$  N, Long.  $66^{\circ} 11' 04''$  W. These piers are shown on the shoreline manuscript, sheet T-13364, and the present survey. ✓

M. Adequacy of the Survey:

This survey, conducted on boatsheet MI-5-2-75, Registry Number H-9491, is complete and adequate to supersede all previous surveys.

N. Aids to Navigation:

Comparison of aids to navigation encountered during the survey with those listed in the Light List, CG-160, Vol. II, 1975 shows:

Punta Colchones Cut Buoy 5, described in CG-160 as a black can equipped with a radar and a green reflector, is as described. *No positional information found* ✓

Punta Colchones Cut Buoy 6, described in the Light List as a red nun equipped with a red and radar reflector, is as described. ✓

Central Aguirre Power Plant lighted buoys 1-6, described in sections 1391.05-1391.28 of CG-160 are as described.

Punta Rodeo private aids to navigation <sup>2,3,5,6</sup> 1-6, are present and their positions conform to those shown on C&GS Chart 909, 7th edition. The configuration of these buoys does not however match the Light List description. The odd numbered buoys are composed of 1X2 foot metal rectangles which bisect each other at right angles. The even numbered buoys are formed by two triangular sheets of metal which bisect at right angles to their bases. Height of each triangle in approximately two feet with the base width equal to the height. *See Q.C. Report, p. 5. C.(4)* ✓

In addition to the aids to navigation mentioned in CG-160, one other aid was located. At Lat. 17° 56' 02"N, Long. 66° 13' 42"W an elongated triangular shaped buoy with (red and white horizontal stripes) was found moored 100 feet east of Punta Colchones Cut Buoy ~~5~~ ✓

O. Statistics:

| Vessel Number                              | <u>2222</u> | <u>2224</u> | <u>2228</u> | <u>Total</u> |
|--|-------------|-------------|-------------|--------------|
| Sounding Lines (including Cross Lines) LNM | 130.8       | ----        | 64.8        | 195.6        |
| Area Surveyed Sq. NM                       | 2.8         | ----        | 2.0         | 4.8          |
| Crosslines LNM                             | 18.7        | ----        | ----        | 18.7         |
| Number of Positions                        | 1174        | 24          | 814         | 2012         |
| Number of Bottom Samples                   | 2           | 24          | ----        | 26           |

P. Miscellaneous:

All times and dates referred to are Greenwich Mean Time. ✓

Hydrographic operations logs (sounding volumes) were used to record remarks and supplemental data. A total of ~~five~~ <sup>Six</sup> sounding volumes accompany this report.

Sounding lines run on Julian Day 057 from position number 259 to position number 303 and on Julian Day 065 from position number ~~398~~ to position number 630 have unequal spacing due to the inversion ✓ of the electronic correctors which were applied on line. When the true correctors were applied to each electronic pattern on the corrector tape for each of the two days it resulted in a shift in the smooth plotted position of the affected lines approximately thirty meters.

Sounding lines run on Julian Day 058 from position number 379 to ✓ position number 389 are skewed and do not plot as true vertical lines. The error was caused when the half scale deflection for a turn was mistakenly thumbed into the pdp8e thumbwheels for the electronic correctors to be applied to remote "D", serial number 248. The mistake was corrected on that day's corrector tape.

A small portion of Vesno 2228's work on Julian Day 084 is not ✓ plotted on the field sheet because the soundings extend beyond the limits of survey MI-5-2-75. The work was run at the junction between surveys MI-5-2-75 and MI-5-1-75 and appear on the field sheet of the latter.

A comparison of leadline to echo-sounder readings taken on the Jensen during the survey yielded a substantial variance in instrument error, ✓ However, comparison of the velocity corrections for all sheets on which the Jensen was used substantiated the validity of the echo-sounder measurements. Therefore the leadline comparisons for all work done by the Jensen have been rejected. Probable cause for the error found was attributed to improper reading of the leadline values by inexperienced personnel.

The Abstract of Bar Checks, Leadline Comparison Abstract for the Monark, Settlement and Squat Report for 1975, and the Record of Daily Statistics ✓ for each launch are included in a separate folder which will accompany this report.

All soundings have been corrected for predicted tides, draft, settlement and squat, and velocity corrections.

Bottom samples were obtained using a snapper cup sampler. All samples were bagged, labeled and described, form 733m was completed and the originals accompany this report. The samples were forwarded to Dr. J. W. Pierce, Division of Sedimentology, Smithsonian Institution, Washington, D. C., as per standing NOS instructions.

Q. Recommendations:

None

R. Automated Data Processing:

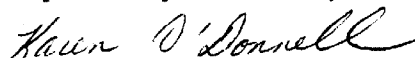
The following programs were used on survey MI-5-2-75:

| <u>Program Number</u> | <u>Program Name</u>                      | <u>Version Date</u> |
|-----------------------|--|---------------------|
| RK 111                | Range-Range Real Time Hydroplot          | 8-7-74              |
| RK 201                | Grid and H/R Lattice Plot                | 3-17-75             |
| RK 211                | Range-Range Non-Real Time Plot           | 8-16-74             |
| RK 212                | Visual Station Table Land and Plot       | 4-1-74              |
| RK 215                | Visual Position and Sounding Plot        | 8-16-74             |
| RK 216                | Range-Azimuth Position and Sounding Plot | 2-14-75             |
| RK 337-X              | Unscrambler (modified for Range-Azimuth) | 10-29-74            |

R. Reference to Reports:

Reports to electronic control and corrections to echo soundings have been incorporated into this descriptive report. Reference should be made to the horizontal control report for OPR-423-MI-75.

Respectfully submitted,

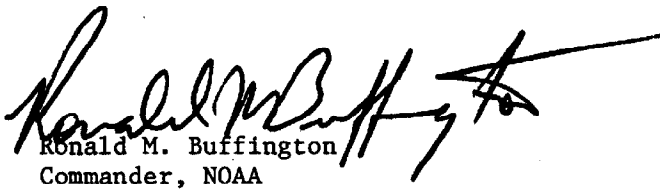


Karen O'Donnell  
Ensign, NOAA

Approval Sheet

Field Number MI-5-2-75  
Registry Number H-9491

The field work on this hydrographic survey was under my daily supervision.  
The boat sheet and records have been reviewed and approved by me.

  
Ronald M. Buffington  
Commander, NOAA

SIGNAL TAPE - SO. COAST PUERTO RICO

OPR-423-MI-75

MI-5-2-75

H-9491

|     |   |    |    |       |     |    |       |     |      |        |                        |
|-----|---|----|----|-------|-----|----|-------|-----|------|--------|------------------------|
| 048 | 7 | 17 | 57 | 18137 | 066 | 13 | 21221 | 139 | 0000 | 000000 | (VISUAL)               |
| 050 | 7 | 17 | 55 | 24289 | 066 | 12 | 54369 | 139 | 0000 | 000000 |                        |
| 054 | 7 | 17 | 55 | 01621 | 066 | 14 | 25019 | 139 | 0000 | 149835 |                        |
| 056 | 7 | 17 | 57 | 54896 | 066 | 14 | 08038 | 139 | 0000 | 000000 |                        |
| 336 | 7 | 17 | 56 | 05210 | 066 | 13 | 49660 | 243 | 0000 | 149835 | (ELECTRONIC) DEL-NORTE |
| 342 | 7 | 17 | 56 | 48795 | 066 | 12 | 49756 | 243 | 0000 | 149835 | (Electronic Del-Norte) |
| 344 | 7 | 17 | 57 | 03980 | 066 | 13 | 20420 | 243 | 0000 | 149835 | ELECTRONIC (OSCAR)     |
| 348 | 7 | 17 | 56 | 48965 | 066 | 12 | 11110 | 243 | 0000 | 149835 | Electronic (Del-Norte) |
| 350 | 7 | 17 | 57 | 31913 | 066 | 11 | 43050 | 243 | 0000 | 149835 | Electronic (Del-Norte) |
| 352 | 7 | 17 | 57 | 09695 | 066 | 11 | 03697 | 243 | 0000 | 149835 | Electronic (Del-Norte) |
| 354 | 7 | 17 | 56 | 29042 | 066 | 10 | 54582 | 243 | 0000 | 149835 | Electronic (Del-Norte) |
| 356 | 7 | 17 | 56 | 28130 | 066 | 11 | 30480 | 139 | 0000 | 000000 |                        |
| 362 | 7 | 17 | 55 | 03200 | 066 | 13 | 33790 | 243 | 0000 | 149835 |                        |
| 364 | 7 | 17 | 55 | 36600 | 066 | 12 | 56150 | 243 | 0000 | 149835 | Electronic (Del-Norte) |
| 425 | 7 | 17 | 56 | 31626 | 066 | 11 | 19740 | 243 | 0000 | 149835 | ✓                      |

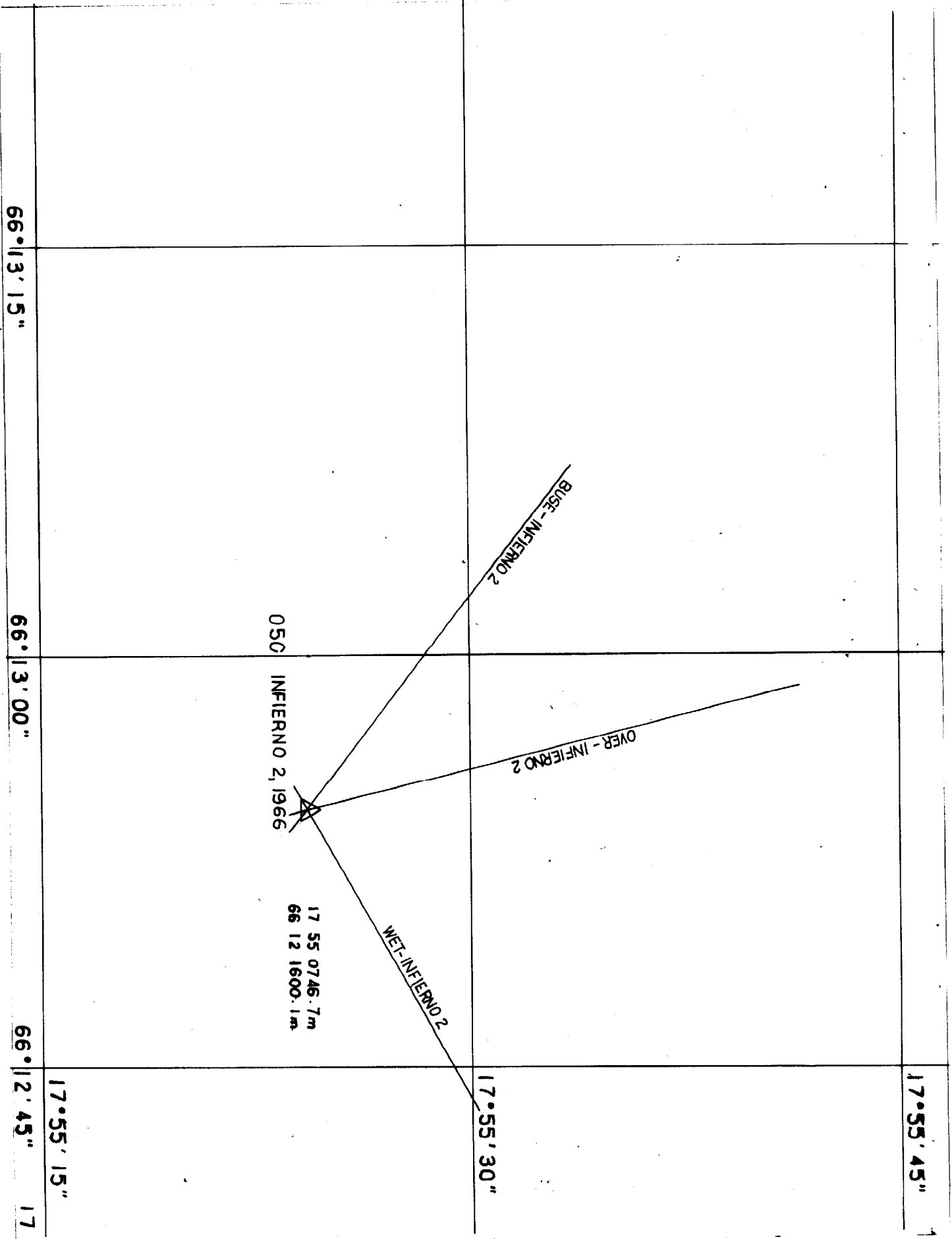
SIGNAL NAMES LIST - SOUTH COAST OF PUERTO RICO

OPR-423-MI-75 5/15/75

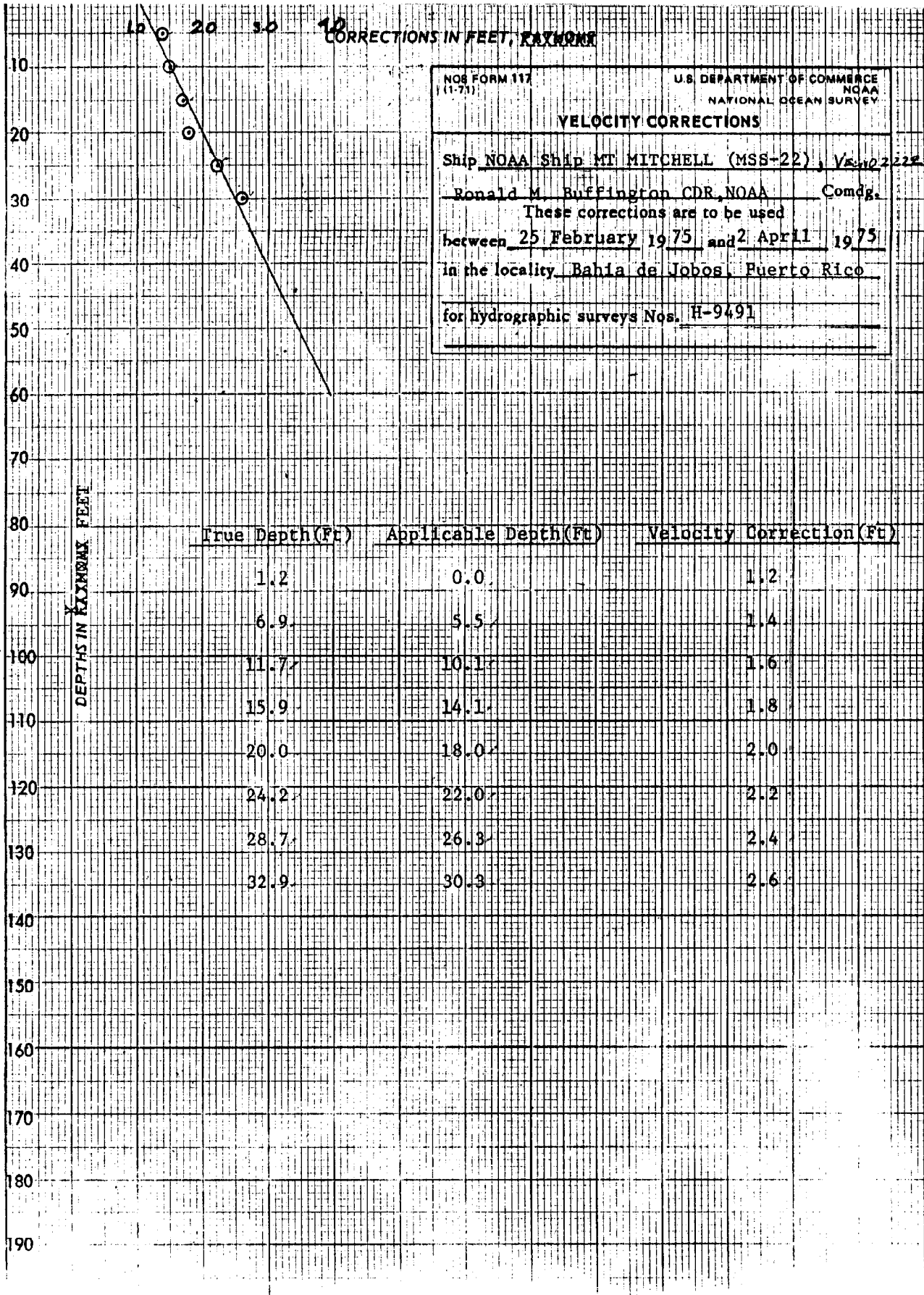
| SIGNAL<br>NUMBER | STATION NAME                             | QUAD*  | R/T   | ORDER |
|------------------|--|--------|-------|-------|
| 048              | AGUIRRE SUGAR ASSN TALLEST STACK 1966    | 170661 | 1020  | R 3   |
| 050              | INFIERNO 2 1966                          | 170661 | 1006A | R 3   |
| 054              | BAHIA DE JOBOS RANGE B REAR LIGHT 1966   | 170661 | 1013  | R 3   |
| 056              | TOWER 2 1975                             | 170661 | RESEC | R 3   |
| 336              | BUSE 1975                                | 170661 | RESEC | T 3   |
| 342              | ZEB 1975                                 | 170661 | TRAV  | T 3   |
| 344              | OVER 1975                                | 170661 | RESEC | R 3   |
| 348              | YAM 1975                                 | 170661 | TRAV  | T 3   |
| 350              | MUD 1975                                 | 170661 | TRAV  | T 3   |
| 352              | RICK 1975                                | 170661 | TRAV  | T 3   |
| 354              | WET 1975                                 | 170661 | TRAV  | T 3   |
| 356              | BOX 1975                                 | 170661 | RESEC | R 3   |
| 362              | FIER 1975                                | 170661 | RESEC | T 3   |
| 364              | JAN 1975                                 | 170661 | RESEC | T 3   |
| 425              | P6 (SAND SPIT, SOUTH SHORE OF JOBOS BAY) | 170661 | PHOTO | T     |

T-13364





(For deep water add a 0 to these figures)



NOS FORM 117  
(1-71)

U.S. DEPARTMENT OF COMMERCE  
NOAA  
NATIONAL OCEAN SURVEY

**VELOCITY CORRECTIONS**

Ship NOAA Ship MT MITCHELL (MSS-22), VS-402222  
Ronald M. Buffington CDR, NOAA Comdg.  
 These corrections are to be used  
 between 25 February 1975 and 2 April 1975  
 in the locality Bahia de Jobos, Puerto Rico  
 for hydrographic surveys Nos. H-9491

| True Depth (Ft) | Applicable Depth (Ft) | Velocity Correction (Ft) |
|-----------------|-----------------------|--------------------------|
| 1.2             | 0.0                   | 1.2                      |
| 6.9             | 5.5                   | 1.4                      |
| 11.7            | 10.1                  | 1.6                      |
| 15.9            | 14.1                  | 1.8                      |
| 20.0            | 18.0                  | 2.0                      |
| 24.2            | 22.0                  | 2.2                      |
| 28.7            | 26.3                  | 2.4                      |
| 32.9            | 30.3                  | 2.6                      |

0.0 1.0 2.0 3.0  
CORRECTIONS IN FEET, XANOMS

5  
10  
15  
20  
25  
30  
35  
40  
45  
50  
55  
60

For depth water 0 to these figures

FEET  
DEPTHS IN FATHOMS

NOS FORM 117  
(1-73)

U.S. DEPARTMENT OF COMMERCE  
NOAA  
NATIONAL OCEAN SURVEY

**VELOCITY CORRECTIONS**

Ship MT MITCHELL Skiff VESNO 2228

R. M. Buffington, CDR, NOAA Comdg.

These corrections are to be used  
between Feb. 22 1975 and Mar. 26 1975  
in the locality Puerto Rico (South Coast)  
for hydrographic surveys Nos. H-9267, H-9485  
H-9490, H-9491

Total Error included

| True Depth<br>(ft) | Applicable Depth<br>(ft) | Velocity Correction<br>(ft) |
|--------------------|--------------------------|-----------------------------|
| 1.6                | 1.6                      | + 0.0                       |
| 5.1                | 4.9                      | + 0.2                       |
| 8.9                | 8.5                      | + 0.4                       |
| 12.7               | 12.1                     | + 0.6                       |
| 16.7               | 15.9                     | + 0.8                       |
| 20.9               | 19.9                     | + 1.0                       |
| 25.6               | 24.4                     | + 1.2                       |
| 31.1               | 29.7                     | + 1.4                       |
| 37.5               | 35.9                     | + 1.6                       |
| 53.4               | 51.6                     | + 1.8                       |

20 X 20 TO THE INCH 45 1240  
7 X 10 INCHES  
KEUFFEL & ESSER CO  
MADE IN U.S.A.

VELOCITY TAPE LISTING

TABLE 01

000054 0 0012 0001 000 222200 009491  
000100 0 0014  
000140 0 0016  
000179 0 0018  
000219 0 0020  
000262 0 0022  
000302 0 0024  
000346 0 0026  
999999 0 0028

TABLE 02

000016 0 0000 0002 000 222500 009491  
000049 0 0002  
000085 0 0004  
000121 0 0006  
000159 0 0008  
000199 0 0010  
000244 0 0012  
000297 0 0014  
000359 0 0016  
000516 0 0018  
999999 0 0020

TABLE 03

999999 0 0000 0003 000 222800 009491

TABLE 04

999999 0 0000 0004 000 222400 009491

TC/TI TAPE LISTING

124039 0 0001 0001 055 222200 001975  
 113905 0 0000 0001 056 222200 001975  
 115212 0 0001  
 125925 0 0000  
 113525 0 0001 0001 057 222200 001975  
 161206 0 0000  
 164320 0 0001  
 135331 0 0001 0001 058 222200 001975  
 145845 0 0001 0001 063 222200 001975  
 122115 0 0001 0001 064 222200 001975  
 143353 0 0000  
 160123 0 0001  
 114514 0 0001 0001 065 222200 001975  
 162133 0 0002  
 111723 0 0001 0001 066 222200 001975  
 114252 0 0000  
 142059 0 0001  
 162542 0 0001  
 122155 0 0001 0001 067 222200 001975  
 123359 0 0002  
 165320 0 0000 0001 084 222200 001975  
 111841 0 0000 0001 085 222200 001975  
 112458 0 0001  
 120835 0 0000  
 121725 0 0001  
 132238 0 0000  
 132409 0 0002  
 133247 0 0000  
 134144 0 0002  
 124910 0 0001 0001 086 222200 001975  
 125730 0 0002  
 130419 0 0000  
 131034 0 0001  
 133618 0 0000  
 140451 0 0001  
 114856 0 0001 0001 092 222200 001975  
 115059 0 0002  
 115352 0 0001  
 121007 0 0002  
 122901 0 0001

13 and 14 January, 1975

| <u>LAUNCH 1002</u> |                  | <u>LAUNCH 1261</u> |                  | <u>LAUNCH 1204</u> |                  |
|--------------------|------------------|--------------------|------------------|--------------------|------------------|
| <u>RPMS</u>        | <u>CORRECTOR</u> | <u>RPMS</u>        | <u>CORRECTOR</u> | <u>RPMS</u>        | <u>CORRECTOR</u> |
| 1000               | + 0.1            | 800                | + 0.1            | 1400               | + 0.1            |
| 1100               | + 0.1            | 900                | + 0.1            | 1500               | + 0.1            |
| 1200               | + 0.1            | 1000               | + 0.1            | 1600               | + 0.1            |
| 1300               | + 0.1            | 1100               | + 0.1            | 1700               | + 0.1            |
| 1400               | + 0.2            | 1200               | + 0.2            | 1800               | + 0.2            |
| 1500               | + 0.2            | 1300               | + 0.2            | 1900               | + 0.2            |
| 1600               | + 0.2            | 1400               | + 0.3            | 2000               | + 0.2            |
| 1700               | + 0.2            | 1500               | + 0.3            | 2100               | + 0.2            |
| 1800               | + 0.2            | 1600               | + 0.3            | 2200               | + 0.2            |
| 1900               | + 0.2            | 1700               | + 0.3            | 2300               | + 0.2            |
| 2000               | + 0.2            | 1800               | + 0.3            | 2400               | + 0.3            |
| 2100               | + 0.1            | 1900               | + 0.3            |                    |                  |
| 2200               | + 0.1            | 2000               | + 0.3            |                    |                  |
| 2300               | 0.0              | 2100               | + 0.3            |                    |                  |
| 2400               | - 0.2            | 2200               | + 0.3            |                    |                  |
|                    |                  | 2300               | + 0.3            |                    |                  |
|                    |                  | 2400               | + 0.2            |                    |                  |
|                    |                  | 2500               | + 0.2            |                    |                  |
|                    |                  | 2600               | + 0.1            |                    |                  |
|                    |                  | 2700               | 0.0              |                    |                  |
|                    |                  | 2800               | - 0.1            |                    |                  |
|                    |                  | 2900               | - 0.6            |                    |                  |

## TIDE NOTE

Field tide reductions for all soundings have been applied. Reductions based on predicted tides from Santa Isabel, Central Aguirre, and Arroyo, Puerto Rico, as interpolated by program AM-500 on a PDP-8E computer. Tide predictions for these three stations, along with data from the reference station at Magueyes Island, were forwarded to The NOAA Ship MT MITCHELL from the Tidal Datum Planes Section, C3311, Oceanographic Division, NOS, Rockville, Maryland on 22 January 1975. Only the times of high and low tide differ for these locations. There is no difference in height of high and low tide at these four locations. Initially, reduced tides were based on data found in Tide Tables, High and Low Water Predictions, 1975 for Playa Cortada, Puerto Rico. The tidal datum in these tables was referenced to Galveston, Texas. During the course of OPR-423, it was noted that the times of predicted high and low tides differ quite markedly from the actual observed tides. It was then discovered that the tides at Galveston, Texas are largely semi-diurnal; the tide for the south coast of Puerto Rico is mainly diurnal. At that time, the predicted tide tapes based on Playa Cortada were replaced with the data received from AMC. All work done prior to the change over was corrected with the new predicted tides in the off line processing. All times of predicted tides are in GMT.

Three Fisher-Porter ADR Tide Gages were installed along the south coast of Puerto Rico to provide actual tide information throughout the course of this survey. Location and period of operation of the tide gages are as follows:

| <u>Site</u>      | <u>Location</u>            | <u>Period</u>  |
|------------------|----------------------------|--|
| Santa Isabel     | 17° 57.3' N<br>66° 24.4' W | 77 Days<br>15 Jan. to 2 Apr. 1975                        |
| Central Aguirree | 17° 57.4' N<br>66° 13.1' W | 78 Days<br>15 Jan. to 3 Apr. 1975                        |
| Arroyo           | 17° 57. ' N<br>66° 03.9' W | 45 Days<br>17 to 21 Feb. 1975 and<br>16 to 28 April 1975 |

All gages were installed by Ship's Officers. Tide gage observers were hired from the local populace to keep daily records of wind, time of observations, tide heights, and to inform the ship if any malfunction of the gage was noticed. Gages were periodically checked by Ship's Officers and adjustments made when necessary. All gages were set at LMT 60° W.

Santa Isabel

A Fisher-Porter analog to digital recorder tide gage (S/N 711A3389M4) was installed and placed in operation of 15 January 1975. The records obtained from 15 January to 13 February were found by Rockville to be "no good". On 8 March 1975, the Santa Isabel gage was removed and replaced by ADR Gage (S/N 6511A1632M14). The gage was observed to be working properly except for a maladjusted lost motion coupler which was noted on 10 March and reset at that time. The gage was removed on 2 April. Records were scanned and appeared to be in good order. Code disks set to correspond with staff readings.

Central Aguirre

ADR Tide Gage (S/N 7304A3908M4) was installed and set in operation on 15 January 1975. No problems were encountered with this gage, and tide records from 15 January to 3 April 1975 were obtained with no breaks. The gage was removed on 3 April. Code disks were set to correspond with staff readings.

Arroyo

The original ADR Tide Gage (S/N 7304A3908M9) was installed on 19 February 1975. At that time it was noted that the high order code disk was not incrementing as it should when the low order code disk completed one complete revolution. Efforts were made to repair the gage in the field. On 21 February, the gage was removed and taken to the ship for repairs. A message was forwarded to the Tides Division at AMC explaining the nature of the gage's trouble on 27 February. The return message received on 28 February stated that the gage was "beyond field repair capability" and that it was to be sent to AMC. Another gage, (S/N 7206A2664M7) was received from AMC, and it was installed at Arroyo on 16 March 1975. The gage was observed to be sluggish in transferring tide changes to the code disk. On 18 March, the lost motion coupler was removed and replaced. The tide gage was left in place after completion of the hydrographic survey through 28 April 1975, in order to provide at least 30 days of continuous records.



Levels

Upon installation of tide gages, levels were run between bench marks and rod stop at vetrified scale. Levels were run again at the three sites when the gages were removed.

Comparrison of level records indicated a negligible shift of 0.002 Ft. of the Arroyo staff and no differences of Santa Isable and Central Aguirre.

9/3/75

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): Central Aguirre

Period: February 24 - April 2, 1975

HYDROGRAPHIC SHEET: H-9491

OPR: 423

Locality: Jobos Bay, Puerto Rico

Plane of reference (mean ~~lower~~ low water): 3.14 ft.

Height of Mean High Water above Plane of Reference is 0.9 ft.

Remarks: Zone direct.

  
\_\_\_\_\_  
for Chief, Tides Branch

GEOGRAPHIC NAMES

H-9491

| Name on Survey    | Source of Name |                        |                          |                        |               |                   |                     |                 |   |    |
|-------------------|----------------|------------------------|--------------------------|------------------------|---------------|-------------------|---------------------|-----------------|---|----|
|                   | A              | B                      | C                        | D                      | E             | F                 | G                   | H               | K |    |
|                   | ON CHART NO.   | ON PREVIOUS SURVEY NO. | CON U.S. QUADRANGLE MAPS | FROM LOCAL INFORMATION | ON LOCAL MAPS | P.O. GUIDE OR MAP | GRAND NAGALLY ATLAS | U.S. LIGHT LIST |   |    |
| BAHIA DE JOBOS ✓  |                |                        |                          |                        |               |                   |                     |                 |   | 1  |
| CAYOS CARIBES ✓   |                |                        |                          |                        |               |                   |                     |                 |   | 2  |
| CENTRAL AGUIRRE ✓ |                |                        |                          |                        |               |                   |                     |                 |   | 3  |
| PUERTO DE JOBOS ✓ |                |                        |                          |                        |               |                   |                     |                 |   | 4  |
| PUNTA POZUELO ✓   |                |                        |                          |                        |               |                   |                     |                 |   | 5  |
| PUNTA RODEO ✓     |                |                        |                          |                        |               |                   |                     |                 |   | 6  |
| PUNTA COLCHONES ✓ |                |                        |                          |                        |               |                   |                     |                 |   | 7  |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 8  |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 9  |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 10 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 11 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 12 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 13 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 14 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 15 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 16 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 17 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 18 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 19 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 20 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 21 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 22 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 23 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 24 |
|                   |                |                        |                          |                        |               |                   |                     |                 |   | 25 |

APPROVED

*Chas. E. Harrington*

STAFF GEOGRAPHER - CS142

30 Nov 1977

APPROVAL SHEET  
FOR  
SURVEY H- 9491

- 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 printout has/~~has not~~ been made. A new final sounding printout has/~~has not~~ been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Provisional Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date: Oct 11, 1977

Signed: William J. Jones  
Title: Chief, Verification Branch

## HYDROGRAPHIC SURVEY STATISTICS

H-9491

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

| RECORD DESCRIPTION |                  | AMOUNT                  | RECORD DESCRIPTION                 |            | AMOUNT        |                                   |
|--------------------|------------------|-------------------------|------------------------------------|------------|---------------|-----------------------------------|
| SMOOTH SHEET       |                  | 1                       | BOAT SHEETS & PRELIMINARY OVERLAYS |            | 27            |                                   |
| DESCRIPTIVE REPORT |                  | 1                       | SMOOTH OVERLAYS: POS. ARC, EXCESS  |            | 3             |                                   |
| DESCRIP-<br>TION   | DEPTH<br>RECORDS | HORIZ. CONT.<br>RECORDS | PRINTOUTS                          | TAPE ROLLS | PUNCHED CARDS | ABSTRACTS/<br>SOURCE<br>DOCUMENTS |
| ENVELOPES          | 1                |                         | 1                                  |            |               | 1-misc.data                       |
| CAHIERS            | 1                |                         | 1-file                             |            |               |                                   |
| VOLUMES            | 6                |                         |                                    |            |               |                                   |
| BOXES              |                  |                         | 1-smooth                           |            |               |                                   |

T-SHEET PRINTS (List) T-13364, T-13365, T-13366, T-13367, T-13368

SPECIAL REPORTS (List) 1-chart mark-up, 1-reduction of survey

## OFFICE PROCESSING ACTIVITIES

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

| PROCESSING ACTIVITY   | AMOUNTS                    |                         |        |
|---|----------------------------|-------------------------|--------|
|   | PRE-<br>VERIFICATION       | VERIFICATION            | TOTALS |
| POSITIONS ON SHEET  |                            |                         | 2012   |
| POSITIONS CHECKED   | 201                        | 50                      | 251    |
| POSITIONS REVISED   | 35                         | 15                      | 50     |
| SOUNDINGS REVISED   | 40                         | 20                      | 60     |
| SOUNDINGS ERRONEOUSLY SPACED                                      |                            |                         |        |
| SIGNALS (CONTROL) ERRONEOUSLY PLOTTED                             |                            |                         |        |
|   | TIME - HOURS               |                         |        |
| CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)                 | 13                         | 0                       | 13     |
| VERIFICATION OF CONTROL   |                            | 8                       | 8      |
| VERIFICATION OF POSITIONS   |                            | 97                      | 97     |
| VERIFICATION OF SOUNDINGS   |                            | 95                      | 95     |
| COMPILATION OF SMOOTH SHEET                                       |                            | 73                      | 73     |
| APPLICATION OF TOPOGRAPHY   |                            | 11                      | 11     |
| APPLICATION OF PHOTOBATHYMETRY                                    |                            | 0                       | 0      |
| JUNCTIONS   |                            | 2                       | 2      |
| COMPARISON WITH PRIOR SURVEYS & CHARTS                            |                            | 3                       | 3      |
| VERIFIER'S REPORT   |                            | 18                      | 18     |
| OTHER   |                            | --                      | --     |
|   |                            |                         |        |
| TOTALS  | 13                         | 307                     | 320    |
| Pre-Verification by<br>C. Meekins, F. Saunders                    | Beginning Date<br>06/02/75 | Ending Date<br>07/21/75 |        |
| Verification by<br>L. Cram  | Beginning Date<br>07/30/77 | Ending Date<br>08/18/77 |        |
| Verification Check by<br>W. Jonns                                 | Time (Hours)<br>8          | Date<br>10/07/77        |        |
| Marine Center Inspection by<br>Hydrographic Inspection Team (AMC) | Time (Hours)<br>40         | Date<br>10/12/77        |        |
| Quality Control Inspection by<br>R.W. Derkagan                    | Time (Hours)<br>64         | Date<br>12/14/77        |        |
| Requirements Evaluation by<br>D.J. Hill                           | Time (Hours)<br>4          | Date<br>4/20/78         |        |

Cartoons 13 hr 4/11/78

Reg. No. H-9491

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 REQ'D \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

Pos 792  
912  
932  
994

Reg. No. H-9491

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 10-12-82 TIME REQ'D. \_\_\_\_\_ INITIALS JAC

REMARKS:

H-9491

Information for Future Presurvey Reviews

Future surveys should expect little change in this area of stable bottom, except for possible man-made improvements.

A closer development of the several channels and shoals would be desirable and development of the areas mentioned in the Verifier's Report and Quality Control Report.

| <u>Position Index</u> |              | <u>Bottom Change</u> | <u>Use</u>   | <u>Resurvey</u> |
|-----------------------|--------------|----------------------|--------------|-----------------|
| <u>Lat.</u>           | <u>Long.</u> | <u>Index</u>         | <u>Index</u> | <u>Cycle</u>    |
| 175                   | 662          | 2                    | 1            | 50 years        |

ATLANTIC MARINE CENTER  
VERIFIER'S REPORT

REGISTRY NO. H-9491

FIELD NO. MI-5-1-75

Puerto Rico, South Coast; Bahía de Jobos

SURVEYED: February 2 through April 2, 1975

SCALE: 1:5,000

PROJECT NO.: OPR-423

SOUNDINGS: Ross Model 5,000,  
Raytheon 719B and 723B,  
Leadline, Pole

CONTROL: Visual (Sextant  
fixes on shore  
signals), Range-  
Azimuth (Del-Norte/  
Theodolite), Range-  
Range (Del-Norte),  
See Boat sheet

Chief of Party ..... CDR R. M. Buffington  
Surveyed by ..... CDR R. J. DeRycke  
..... LCDR M. R. Mulhern  
..... LTJG D. Pascuti  
..... LTJG T. G. Russel  
..... ENS K. O'Donnell  
..... ENS E. J. Fields  
..... ENS R. E. Marriner, II  
..... ENS S. Iwamoto  
..... ENS J. O'Reilly  
..... ENS B. Woodry  
Automated Plot by ..... Calcomp Plotter #618 (AMC)  
Verified and Inked by ..... L. G. Cram  
August 19, 1977

1. Introduction

a. This survey is considered to be a marginal basic survey. Deficiencies reflecting this condition will be discussed under "Hydrography" and "Condition of Survey" below.

b. This survey was conducted and processed under the provision of the Hydrographic Manual, Publication 20-2.

c. Some of the nonstandard procedures used on this survey are as follows:

- (1) Locating buoys<sup>wqs</sup> by running<sup>a</sup> hydro line by ~~and giving distance to buoy,~~ rather than getting a true detached position <sup>on several buoys located.</sup>
- (2) Incomplete boat sheet due to hydro lines being run outside the physical limits of boat sheet



(3) Position numbers were not readable on boat sheet; could be attributed to the plotter. No detached positions for buoys or pipes, piles, etc. on boat sheet ✓

(4) ~~No control stations were plotted on any boat sheet or overlay from the field~~ Stations were very lightly printed on the boat sheet. ✓

(5) It is believed that no serious attempt was made to delineate <sup>all</sup> shoals, reefs, or the low water line on this survey ✓

d. The projection parameters were revised in the Descriptive Report. ✓

## 2. Control and Shoreline

a. The Descriptive Report in Section F, "Control Stations", implies that visual control and calibration stations are of third order geodetic accuracy. Some of the stations used were located from aerial photographs and some are nonrecoverable stations located by methods used for third order geodetic accuracy. These stations do not meet the criteria outlined in Classification, Standards of Accuracy, and General Specification of Geodetic Control Surveys, prepared by the Federal Geodetic Control Committee, February, 1974. Only those stations meeting that criteria should be so described. Otherwise, the control is adequately described.

b. Shoreline for this survey came from Class I, unreviewed photogrammetric manuscripts T-13364 through T-13368 of 1970-75. There was one problem area on <sup>\*</sup>T-13365; the hydro line extended across the shoreline. It was determined at the time of verification that this shoreline was mangrove and that it may have been possible to penetrate into it with a boat. However, the soundings were excessed to level 9 so as not to appear within the shoreline; this leaves no holidays or disagreements on the smooth sheet in that area. The Photogrammetric Branch of the Atlantic Marine Center was consulted about this problem; the only result being that this area is mangrove and appears as hard shoreline on photographs.

\* Vicinity of Lat. 17°57.6',  
Long. 66°12.7'

## 3. Hydrography

a. The agreement of soundings at crossings is adequate. ✓

b. Only the 12- and 18-foot curves could be adequately drawn. Portions of the 6-foot and supplemental 3-foot curve ✓

are, at best, approximations based upon minimal survey data. It is apparent that the low water line could not be shown because over 90% of the shoreline consists of mangrove. This condition makes verification of the low water line by the hydrographer virtually impossible.

c. The development of the bottom configuration and investigation of least depths outside of the 12-foot curve is adequate. Line spacing inside this curve and development of shoals to ascertain least depths does not comply with basic requirements as stated in Section ~~5-26~~ of the Hydrographic Manual.

4.3.4.1

#### 4. Condition of Survey

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate and conform to the requirements of the Hydrographic Manual and other pertinent requirements. However, the following is a list of deficiencies found in field procedures, survey records, and the Descriptive Report with respect to requirements and procedures prescribed by the Hydrographic Manual.

a. Sounding volume indexes were not filled out. Incomplete notes on detached positions in sounding volumes. Notation was incomplete in regards to course changes and speed changes in volumes.

b. Line spacing and development of shoal areas was inadequate for the reasons stated in Section 3A, "Hydrography", of this report.

c. Holiday areas exist in the vicinity of latitude 17° 57' 03", longitude 66° 13' 05", which is off the end of a pier and in latitude 17° 56' 57" 10", longitude 66° 13' 50", which is a newly developed area west of Aguirre Steam Power Plant. It would have been desirable if the hydrographer stated the reasons these areas were not or could not be developed.

d. All floating aids to navigation were not located in accordance with Sections ~~1-50~~ and ~~5-20~~ of the Hydrographic Manual.

1.6.15

4.5.3.2

e. Extensive areas of inshore limits of hydrography were not extended as close to the high water line as practicable as required by Section 5-17 of the Hydrographic Manual. This section requires that if the hydrographer cannot delineate the low water line the areas should be fully described in the Descriptive Report with an explanation of the condition preventing extension of the survey close inshore. That was not done.

f. The Descriptive Report, under Section K, reports that Presurvey Review Item Number 3, pier ruins, in the vicinity of latitude 17° 57' 12", longitude 66° 13' 25", are no longer present. However, the field editor verified the existence of the ruins and noted this on the field edit ozalid of T-13367. There were other apparent instances where field edit and hydrographic discrepancies were not resolved to bring the field data into agreement for a final field presentation on the field sheet and in the Descriptive Report.

g. Presurvey Review Item Number 4 required the dredged channel in the vicinity of latitude 17° 56' 38", longitude 66° 11' 18" to be well developed to determine its present controlling depths. Sounding lines were not run in such a manner as prescribed in Section 5-24 of the Hydrographic Manual, which requires a system of closely spaced lines parallel to the axis of a channel. Additionally, this channel was not developed along its entire length. See Q.C. Report, para 5.b.

#### 5. Junctions

This survey junctions with H-9490 (1975) to the southwest; the junction is adequate and complete. No further consideration is necessary.

#### 6. Comparison with Prior Survey

H-2423 (1899) 1:10,000

A comparison of the above prior survey and the present survey reveals only minor differences of one to two feet in the general bottom configuration, with the present survey being somewhat shoaler. These differences can in most part be attributed to differences in survey equipment, methods, and control improvements, and the larger scale and development of the present survey. A major change in the area occurred in the vicinity of latitude 17° 57.0', longitude 66° 13.75' with the development of a port facility, associated dredging, and bulkheading.

With the addition of several shoal soundings brought forward from the above prior survey to supplement the present survey, the present survey is adequate to supersede the prior survey in the common area.

#### 7. Comparison with Chart 25687 (8th Edition, March 1, 1975)

##### a. Hydrography

The charted hydrography originates primarily with the previously discussed prior survey, supplemented by BP-91240-42 and Chart

Letter No. 1195 of 1966 which includes a report dated March 3, 1967: channel and depth information.

The present survey is adequate to supersede the above charted hydrography with the exceptions noted below:

The pier ruins, Presurvey Review Item No. 3, charted in latitude  $17^{\circ} 57' 14.5''$ , longitude  $66^{\circ} 13' 25''$ , originating with air photo corrections of 1937 (Chart Letter No. 802 of 1937), have not been disproved by the present survey and should be retained as charted. See Section 4f of this report. *Shown on the present survey and topographic survey T-13367 (90-75).*

b. Controlling Depths

(1) The controlling depths of 27 feet, charted for the channel to Central Aguirre, is up to ~~7~~ feet deeper than depths found by the present survey. *Depths of 20-22 feet have been obtained in the vicinity of lat.  $16^{\circ} 56.59'$ , long  $66^{\circ} 13.37'$ .*

(2) The channel with 15 feet, May 1967 in latitude  $17^{\circ} 56' 38''$ , longitude  $66^{\circ} 11' 16''$  is three to four feet deeper than the findings of the present survey. See Q.C. Report, para 5.B.

The above controlling depths should be revised to reflect the present survey information. Attention is also directed to Section 4g of this report.

c. Aids to Navigation

The aids to navigation appear to adequately mark the intended features on this survey. There appears to be a serious problem with the method of locating the floating aids to navigation. ~~Four buoys were not plotted on the smooth sheet because of a complete lack of accurate means of locating these buoys by the field. Punta Colchones Cut Buoy #5 had no positional information accurate enough to plot. Central Aguirre Power Plant Lighted Buoy #5, when plotted using field information, was found to be seriously out of position. No information could be found for buoys #1 and #4 for Punta Rodeo. The method used to locate some of these buoys was by a running position and giving bearing and distance to the buoy. This is in conflict with the proscribed manner described in the Hydrographic Manual. It is felt that had the field attempted to plot these buoys it would have resolved these problems. There was one buoy which does not appear on the chart nor in the light list for this area. It is described in the Descriptive Report as a triangular shaped red and white buoy. It was not plotted on the smooth sheet as the location is questionable and it is believed to be a private temporary marker of some sort. Recommend the buoys on this survey be charted as published in the light list.~~

### 8. Compliance with Instructions

This survey does not comply with the Project Instructions in a number of areas, most of which have been described under other sections of this report. In general, some of the areas are line spacing, delineation of low water line, development of shoals, detached positional information, and compliance with Presurvey Review instructions.

### 9. Additional Field Work See Q.C. Report, para 7.

This survey is considered an adequate basic survey. It is recommended that additional field work be done in the following areas:

a. More hydrographic data is needed in the area of the Central Aguirre Steam Plant and the sugar company dock; latitude 17° 56' 45", longitude 66° 14' 05" to latitude 17° 57' 30", longitude 66° 13' 00".

b. Additional development is desirable for the channel in the vicinity of latitude 17° 56' 40", longitude 66° 11' 22".

c. Development of at least four shoals in the survey area:  
*Not necessary, see Q.C. Report, para 6.*

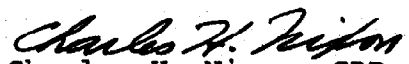
- (1) latitude 17° 57' 06", longitude 66° 13' 05"
- (2) latitude 17° 57' 00", longitude 66° 12' 47"
- (3) latitude 17° 57' 08", longitude 66° 12' 25"
- (4) latitude 17° 56' 58", longitude 66° 12' 30"


Inspection Report  
H- 9491

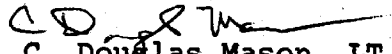
Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the survey have been incorporated within the Verifier's Report.

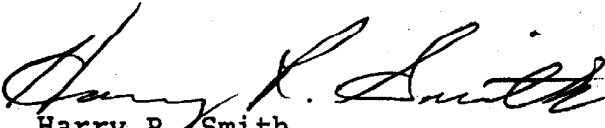
Examined and Approved:  
Hydrographic Inspection Team  
Date: 10/12/77

  
Robert A. Trauschke, CDR, NOAA  
Chief, Processing Division

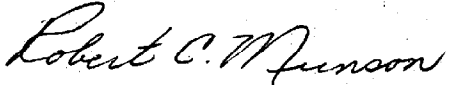
  
Charles H. Nixon, CDR, NOAA  
Chief, Operations Division

  
R. D. Sanocki  
Technical Assistant  
Processing Division

  
C. Douglas Mason, LT, NOAA  
Chief, Electronic Data  
Processing Branch

  
Harry R. Smith  
Team Leader  
Verification Branch

Approved/Forwarded

  
Robert C. Munson  
RADM, NOAA  
Director, Atlantic Marine Center



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

C352/RWD

December 14, 1977

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

THRU: Chief, Quality Control Branch

FROM: R. W. DerKazarian *R. W. DerKazarian*  
Quality Evaluator

SUBJECT: Quality Control Report for H-9491 (1975), Bahia de Jobos,  
South Coast, Puerto Rico

Survey H-9491 was inspected to evaluate the accuracy and adequacy of the survey 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, the survey was found to conform to the National Ocean Survey's standards and requirements except as stated in the report by the Verifier and the Hydrographic Inspection Team and as follows:

1. It was necessary to complete the junction with H-9490 (1975) during the quality evaluation. The 6-foot curve and several soundings have been added in the vicinity of latitude  $17^{\circ}56.00'$ , longitude  $66^{\circ}13.85'$ , and latitude  $17^{\circ}55.75'$ , longitude  $66^{\circ}13.00'$ , to the present survey.
2. The smooth sheet size did not conform to the standards set forth in section 7.2.3 of the Provisional Hydrographic Manual; hydrography fell within 3 inches of both the top and bottom of the sheet. A dog ear was appended to the Descriptive Report for signal, Infierno 2, 1966, station 50. This station was used as a base station for range-azimuth control of positions on the present smooth sheet.
3. A marine railway and a ramp as shown and inked on the boat sheet has been added to the smooth sheet during the quality evaluation in the vicinity of latitude  $17^{\circ}57.12'$ , longitude  $66^{\circ}11.01'$ .
4. The following information supplements the comparison with prior survey H-2423 (1899) in the Verifier's Report. Several (dashed circle Presurvey Review) soundings falling within the limits of the present survey have been verified by shoaler or like depths on the present survey.



Several others--three 2-foot soundings and a 5-foot sounding--falling in the vicinity of latitude  $17^{\circ}57.45'$ , longitude  $66^{\circ}12.00'$ , and latitude  $17^{\circ}57.25'$ , longitude  $66^{\circ}13.14'$ , have not been disproved and have been carried forward.

A half-foot sounding (dashed circle Presurvey Review) charted in latitude  $17^{\circ}55.92'$ , longitude  $66^{\circ}12.75'$  was searched for in the original records. This revealed the sounding to be less than the draft of the launch and highly questionable. The half-foot should be disregarded.

5. This section of the quality evaluation discusses both supplemental information and deficiencies noted in the Comparison with Charts of the Verifier's Report.

a. Hydrography

The verifier did not use the same chart edition used by the hydrographer which was chart 909, 6th and 7th edition, June 27, 1970, and June 8, 1974, respectively.

The following blueprints are also sources of the charted information, Bp's 58520, 58917, 69312, and 69313. The present survey is adequate to supersede these blueprints. Attention is directed to the following:

(1) The prior mangrove islet charted in latitude  $17^{\circ}57.09'$ , longitude  $66^{\circ}12.25'$  from a U.S. Geological Survey Quad is now covered by depths of 0.5 to 2 feet. Present survey information should be charted. ✓

(2) The disposal area in latitude  $16^{\circ}56.35'$ , longitude  $66^{\circ}13.75'$  originates with an unascertainable source and has not been disproved. It should be retained as charted. ✓

(3) The early coral reef symbols charted along the southeast shore of Punta Colchones in the vicinity of latitude  $17^{\circ}56.15'$ , longitude  $66^{\circ}13.50'$  from H-2423 (1899) were not investigated by the hydrographer nor is the area adequately delineated on T-13368. This deficiency should have been addressed during verification. Due to the lack of a field determination of this feature, the deficiency was referred to the Coastal Mapping Division during the quality evaluation. An examination of photography proved the existence of ledge in this area. A recommendation to the effect that necessary revisions be made during the final review of the photogrammetric manuscript and others in the project area was submitted by the quality evaluator. In the interim, the limit of the reef has been retained from H-2423.

b. Controlling Depths

This additional information should be noted under paragraph 7.b(2) of the Verifier's Report:



The channel as shown on the present survey should be charted.

c. Aids to Navigation

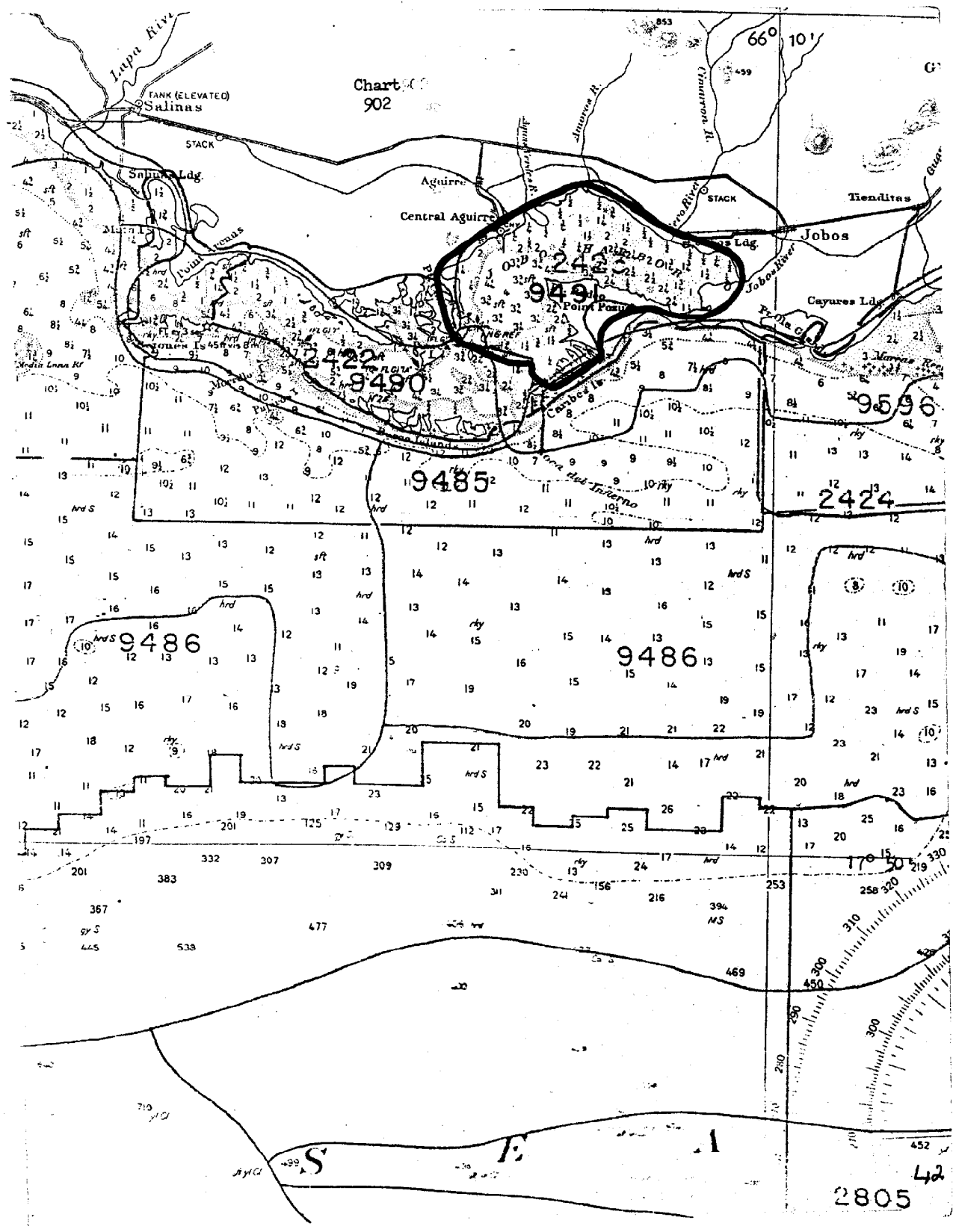
During the quality evaluation of the aids to navigation, several omissions of buoys on the smooth sheet and erroneous statements in the Verifier's Report were noticed. The following statements supplement or supersede parts of the Verifier's Report, paragraph 7.c.

- (1) Punta Colchones Cut Buoy No. 5 was found in the raw data printout (detach position 792) and was added to the smooth sheet.
- (2) Central Aguirre Power Plant Lighted Buoy No. 5 was described as being "seriously out of position." This does not relieve the verifier from plotting the buoy because it does not mark the intended feature. The buoy has been plotted during the quality evaluation.
- (3) During verification the Central Aguirre Power Plant Lighted Buoy No. 3 was erroneously plotted in the position now occupied by buoy No. 5. Buoy No. 3 has been properly plotted during the quality evaluation.
- (4) The Punta Rodeo buoys were shown on the smooth sheet as either "can" or "nun" in nomenclature. The Descriptive Report, paragraph N, clearly describes them to be of another nature. The "C" and "N" designations have been removed from the smooth sheet.
- (5) The remaining buoys located by the present survey adequately mark their intended features and channels.
- (6) Inference to the inaccuracy of the method of location of the buoys made in the Verifier's Report was correct, but the method described was not the method used by the field. Of the 12 buoys located by this survey all were positioned using the range-range mode of the Del Norte positioning system, 5 of which were actual detached positions. Seven of the buoys were of marginal accuracy, but acceptable. These were located while passing the buoy and obtaining a position on-line or at the start of a line. The Provisional Hydrographic Manual, section 1.6.5, states that "the most accurate means of positional control available should be employed for this purpose, and check observations be taken if practical." This was not done by the field.

6. Additional development is not considered necessary on the four coral shoals covered by 1 to 2 feet of water as recommended in the Verifier's Report.

7. Of particular significance would be development of the foul area and 7-foot shoal in the vicinity of latitude 17°57.04', longitude 64°13.45'.

cc:  
C351



RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. 9191

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   |
|-------|-----------|-----------------|---|
| 25687 | 10 Oct 79 | Aex. Radichentz | Full <del>Part Before</del> After Verification Review Inspection Signed Via |
|       |           |                 | Drawing No. 9 FULLY APPLIED DIRECTLY FROM                                   |
|       |           |                 | 4-sheet (then Photo reduction)  |
|       |           |                 | Full Part Before After Verification Review Inspection Signed Via            |
|       |           |                 | Drawing No.   |
|       |           |                 | Full Part Before After Verification Review Inspection Signed Via            |
|       |           |                 | Drawing No.   |
|       |           |                 | Full Part Before After Verification Review Inspection Signed Via            |
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