

4807

Diag Cht. No 1019 & 954

4807

Form 504	
DEPARTMENT OF COMMERCE	
U. S. COAST AND GEODETIC SURVEY	
....., Director	
State: Canal Zone	
DESCRIPTIVE REPORT	
Topographic Hydrographic	Sheet No. ² 4807
LOCALITY	
Pacific Entrance to Panama Canal	
Southeast of Panama Harbor	
1928	
CHIEF OF PARTY	
J. Senior	

GOVERNMENT PRINTING OFFICE

S-111 47

1928

DESCRIPTIVE REPORT TO ACCOMPNY HYDROGRAPHIC SHEET

(Field) No. 2. 4807

The survey was made in accordance with instructions from the Director dated March 24, 1928.

The area surveyed lies south-east of Panama Harbor, between Lat. $8^{\circ}55'$ N. and $8^{\circ}57\frac{1}{2}'$ N. and between Long. $79^{\circ}29'W.$ and $79^{\circ}32'W.$

The object of the survey was to determine the least depth over Knocker Rock, Sulphur Rocks, and Danaide Rocks and to verify or disprove certain shoal soundings in the vicinity.

The whole area was surveyed by means of a launch and according to the standard method of hand lead soundings and visual fixes. The lines were run north-and-south with a spacing of fifty meters, except in places where a closer spacing was considered necessary. All signals were triangulation stations of third order accuracy.

No discrepancies were found in depths or location of signals. A few positions did not plot well as recorded but explanatory notes will be found in the record books. It is believed that these positions were plotted satisfactorily.

The principal dangers are those which are at present shown on Chart 952, namely Knocker Rock, Sulphur Rocks and Danaide Rocks. Knocker Rock is shown as an exposed rock. No rock was seen at this point, although a rock awash at low tide was found a little west of it. The least sounding found was -3 ft. on position 68g (Lat. $8^{\circ}56'52''66$ N., Long. $79^{\circ}31'30.1''W.$). Other shoal soundings occur in the immediate vicinity and the easternmost, which would be dangerous for even very small craft, is 5 feet, on position 70g (Lat. $8^{\circ}56'53.15$ N. Long. $79^{\circ}31'23.8$ W.). East of this 5 ft. sounding, separated from it by 18 feet of water, is a 7 ft. sounding, midway between positions 31c and 32c (Lat. $8^{\circ}56'54.5$ N., Long. $79^{\circ}31'06.8$ W.). Soundings of 9 and 10 ft surround this point.

The least depth found on Sulphur Rocks was 6 feet. Several soundings of this depth were found, one of which is on position 7g (Lat. $8^{\circ}57'02.1$, Long. - $79^{\circ}30'23.4$). The rocky shoal is dangerous within a radius of two hundred meters of this position. It breaks heavily in a moderate swell at half tide.

A 13 ft. sounding surrounded by deeper water was found south-west of Sulphur Rocks between positions 60b and 61b (Lat. $8^{\circ}56'52.2$ N., Long. $79^{\circ}30'38.3$ W.).

A search was made for a reported spot with a depth of 11 ft. in Lat. $8^{\circ}57'0$, Long. $79^{\circ}29'8$. This sounding was not found but a 16 ft. spot was found nearby between positions 51e and 52 e in Lat. $8^{\circ}57'02''N.$, Long. $79^{\circ}29'52''$.

The surrounding depth is 22 feet.

On the Danaide Rocks a least depth of 11 feet was found on positions 139j and 140j. (Lat. $8^{\circ}56'21''2$, Long. $79^{\circ}29'34''8$). The surrounding depth is 29 to 32 ft.

Other shoal soundings reported near Danaide Rocks and shown on a photo-stat of sheet No. 3362, were looked for but not obtained. These soundings are 16 feet in Lat. $8^{\circ}56'6''N$, Long. $79^{\circ}29.7''W$; 13 feet in Lat. $8^{\circ}56'5''N$, Long. $79^{\circ}29.5''W$; 14 feet in Lat. $8^{\circ}56.2''N$, Long. $79^{\circ}29.8''W$. However, a spot with a depth of 17 feet was found on position 145j in Lat $8^{\circ}56'09''1$, Long. $79^{\circ}29'32.3$. This spot is surrounded by about 30 feet of water.

Knocker Rock is marked by a buoy which is at present shown in correct position on the chart. The buoy is shown as black, which it should be; however, this buoy was found to be red at the time of the survey.

Considerable time was spent in searching for least depths where sudden shoaling occurred and over the reported shoals. Altogether, several hours were spent in drifting and running at very slow speed while the bottom was felt with the lead. It is believed that a more thorough survey could be made only with a wire drag.

Panama Harbor can be entered from the south between Sulphur Rocks and Knocker Rock, or from the east, north of Sulphur Rock. Fifteen feet is the most that can be carried through the former channel but actually no ships of this draft ever use it because Panama Harbor itself is very shoal. Only small fruit boats, probably drawing six or seven feet, were seen to use the channel. The east-and-west channel passing north of the three rocks is undoubtedly the better because it is much wider.

A good many soundings were found which are more shoal than any discovered in the survey of 1912. This is due to the fact that in the earlier survey the sounding lines were spaced 150 meters apart and, because of the uneven bottom, many shoal spots were missed. Where the bottom is sandy, it is fairly uniform but some parts of the bottom are rocky and irregular.

STATISTICS FOR SHEET (FIELD) No.2

Positions.....1714
No. soundings.....7088
Stat. miles of sndgs.....146.4

Respectfully submitted,

J. C. Bose
J. C. BOSE, Jr. H. & G. E.
U. S. M. V. NATOLEA

Approved and Forwarded,

Jack Senior
JACK SENIOR, H. & G. E.
Chief of Party.

SPECIAL REPORT TO ACCOMPANY HYDROGRAPHIC SURVEY.

PACIFIC ENTRANCE, PANAMA CANAL.

1. Hydrographic Sheet No. ⁴⁸⁰⁶ 1 (Field designation).

This sheet and records have been examined and approved. Considerable currents, running in a general NE and SW direction, were noted on the sounding lines.

2. Hydrographic Sheet No. ⁴⁸⁰⁷ 2

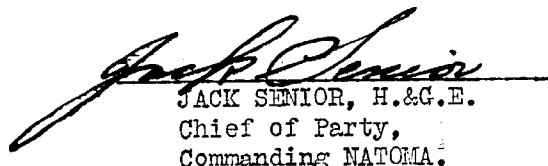
This sheet represents the development made with hand lead to clear up certain shoal soundings in Panama Bay, shown on Chart 952. In addition to regular lines of soundings run, considerable drift sounding with lead line was done in the vicinity of the sunken rock symbols (on Chart) over Sulphur Rocks. The least depth obtained on Sulphur Rocks was 6 feet, rocky bottom. However, the bottom is rocky and very irregular.

The least depth found on Danaide Rocks was a reef with 11 feet of water over it. There is no indication of other shoal soundings on Danaide Rocks. The bottom is muddy and uniformly regular, and it is doubted that other shoal soundings exist.

The least depth found in the vicinity of the 11 foot sounding charted in latitude $8^{\circ}57'0$, longitude $79^{\circ}29'8$, was 16 feet, mud bottom.

The vicinity of Knocker Rk. is very foul and all navigation should keep clear.

This sheet and records have been examined and are approved.


JACK SENIOR, H.&G.E.
Chief of Party,
Commanding NATOMA.

TIDAL DATA

TO ACCOMPANY HYDROGRAPHIC SHEETS NOS. 1 and 2.

4806 4807

Location of tide gauge :-	Balboa pier, C.Z.
Plane of reference :-	7.6 ft.
Highest tide observed :-	+ 10.0 "
Lowest tide observed :-	- 8.1 "

November 1, 1928.

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in
volumes of sounding records for

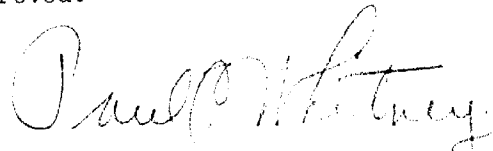
HYDROGRAPHIC SHEET **4807**

Locality: **PACIFIC ENTRANCE TO PANAMA CANAL, C. Z.**

Chief of Party: **Jack Senior in 1928,**
Plane of reference is **Mean low water springs, reading**
7.8 ft. on tide staff at **Pier 18, Balboa.**

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of each day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.



Chief, Division of Tides and Currents.

Section of Field Records

Report on Sheet No. 4807
Chief of Party Jack Senior
Contracted by W R Porter
Verified and Inked by J Walker

Surveyed in May 1928
Surveyed by J C Bone
Soundings plotted by
W R Porter

The sounding records were very well kept with the following exceptions: Frequent skips in equal time interval as on page 35 volume 2 left some doubt as to their being correct, though the time interval between positions generally indicated that the time was as recorded. The word "miss" or some other note written where the skip in equal time interval occurred would have confirmed it and made it less likely to be overlooked when spacing the soundings.

The plotting was very well done, except some of the positions which were farthest from the signals and most of these checked closely enough not to need changing.

The soundings were well plotted except where skips in equal time interval occurred. These were almost invariably equally spaced, the field plotter apparently not noticing the skip. Practically all the soundings revised were due to this cause.

A 16' sounding between pos. 51 and 52 e surrounded by depths of 22 and 23 feet was plotted. A 22' sounding between pos. 180-181 f falls in the same place. The 16' sounding is mentioned in the descriptive report at the bottom of the first page. A 17' sounding at pos. 20 e, N.E. of the 16' sounding is surrounded by 20 to 22 feet of water.

The sheet was clean and legible when received.

The drafting conformed to General Instructions. A "dog ear" caused the paper to wrinkle but the distortion was negligible. Too much glue was used and it appears rather unsightly. The projection of longitude $79^{\circ}30'$ at the top of the sheet is off but as no signals were plotted from this meridian it is of no consequence.

A buoy, located by cuts, is shown N.E. of the -3' sounding. A note in Vol. 1 page 31 describes this buoy as red and says chart 952 shows it black. It was in bed in outline only.

Several notes in the sounding records give the position of, or cuts to, breakers. The cuts are in the direction of the -3' sounding and the positions of breakers given are in the vicinity of the 6' shoal in Lat. $8^{\circ}57'$, Long $79^{\circ}30'-25''$

51
These breakers were not shown on the sheet as it was already congested and the shoals would indicate breakers anyway.

Time on pos 163 indicates the position is off but it is correctly plotted according to the record. It could not be checked with the boat sheet as the boat sheet is too congested for the point to be found. However the bottom is flat at this point and an erroneous position would not change soundings much.

DEPARTMENT OF COMMERCE

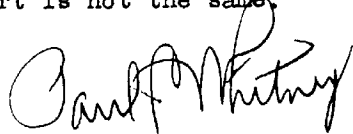
U. S. COAST AND GEODETIC SURVEY

Washington, December 3, 1928

Referred to: The Chief,
Field Record Section.

For: In regard to British
Admiralty Chart No. 1544 for
Panama Road.

It has been the general practice of the British Admiralty to use a datum approximating to mean low water springs and the Division of Tides and Currents has no information which would indicate that the datum of the attached chart is not the same.



Chief, Division of
Tides and Currents.

The plane of Mean Low Water Springs
is 1.8 feet lower than the plane
of Mean Low Water ^{in Panama Road.} Verbal information
from Schureman.
A-L.S.

DEPARTMENT OF COMMERCE

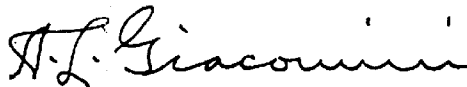
U. S. COAST AND GEODETIC SURVEY

Washington, Dec. 3, 1928.

Referred to: Division of Tides &
Currents (C).

For:

Information is requested as to the difference in feet between the plane of equinoctial spring tides and the plane of mean low water spring tides in the vicinity of Panama (Chart 952).



Chief, Field Records Section.

IN REPLY ADDRESS THE DIRECTOR
U. S. COAST AND GEODETIC SURVEY
AND NOT THE SIGNER OF THIS LETTER

AND REFER TO No. 11-DRM

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

WASHINGTON

January 12, 1929.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4807

Pacific Entrance to Panama Canal

Surveyed in 1928

Instructions dated March 24, 1928 (NATOMA)

Chief of Party, Jack Senior.

Surveyed by J. C. Bose.

Protracted and soundings plotted by W. R. Porter.

Verified and inked by J. T. Walker.

The purpose of this survey was to investigate the depths in the vicinity of the Danaide, Sulphur and Knocker Rocks, and to determine which of these are in existence. Each of these groups of rocks will be considered separately in the following paragraphs and appropriate recommendation made as to their disposition:

Danaide Rocks

1. The authority for these rocks as best^{as} can be ascertained at the present time is the B. A. chart 1544 of Panama Road, edition of 1837. These rocks have been carried on our charts since the first printing of chart 951. A comparison of the depths shown on the B. A. chart in this area with our 1912 survey (H. 3362) shows that there is approximately 6 feet more water on our survey than is shown on the B. A. chart. The soundings on the Admiralty chart were assumed to be referred to the plane of low water springs, since two notes appear on the B. A. chart where rocks are referred to this plane (see "Rock dries 4 feet at L. W. Spr." south of Taboguilia Island and the rocky ledge off Panama City marked "Seen only at L. W. Springs.") That this is probably the plane of all the soundings on the chart is borne out by the fact that the difference between the depth on the above mentioned rock, as determined by the 1912 survey (H. 3360, bares 1/2 foot at M. L. W. Springs) and the B. A. determination is approximately the same as the difference between the general depths surrounding the Danaide Rocks on the B. A. Chart and the

depths shown on our latest hydrographic survey (H. 4807). That this assumption is correct is further borne out by a comparison of the B. A. depth on Knocker Rock and the depth given on H. 4807. In the first case 7 feet is noted (presumably bare 7 feet at the plane of reference) and on H. 4807, the rock is noted as baring 3 feet at the plane of M. L. W. Springs. We therefore have the same difference of 4 feet between the two sources of information, and it is reasonable to assume that the plane of reference on B. A. chart 1544, although called "L. W. Springs", which according to the Division of Tides is synonymous with "Mean Low Water Springs", is in reality a plane approximately 4 feet lower than our plane of "Mean Low Water Springs." Therefore, if any of the soundings from the B. A. chart are used in the compilation of chart 952, four feet should first be added to the depths shown on the Admiralty chart.

2. As to the disposition to be made of the Danaide Rocks, two circumstances of importance should be considered before arriving at a definite conclusion:
 - a. The rocks, if existing, are doubtless pinnacles. That this is so is evidenced by the fact that on the 11 foot shoal that was found on this survey, four lines were run squarely across it and the least depth found was 28 feet. These occurred at 162-163 e, at 51-52 j, at 120-121 j and at 127-129 j. In the first instance 20 second soundings were taken (35 meters apart) the successive depths obtained being 29 and 32 feet. But notwithstanding this, two 11 foot soundings were later found between the above two soundings, the depths shoaling from 29 to 11 feet in a horizontal distance of 10 meters. In the second case mentioned above (127-129 j) the two successive depths were 29 and 31 feet (45 meters apart) and later 12 feet was obtained at a point 20 meters away from the 31 foot sounding. In the third instance mentioned above (pos. 51-52 j) the shoal was also completely missed, the two soundings on either side being 28 and 31 feet, the 28 foot sounding being scarcely more than 10 meters from the 12 foot sounding subsequently found. In the fourth instance (120-121 j) the line ran across the western part of the shoal, and 30 feet was obtained at a point about 7 meters from an 11 foot sounding previously obtained (175-176 e). In addition to the above the 1912 survey (H. 3362) shows a 32 foot sounding very close to the above mentioned 12. This demonstrates conclusively how easily small rocks and shoals can be missed with the ordinary hand lead method when 20 to 30 second sounding intervals are used. The four lines run across this shoal

would ordinarily have been considered quite sufficient to disprove any rock or shoal of doubtful origin. That a shoal was actually found is considered nothing more than mere chance.

Further evidence that the rocks in this locality are pinacles is obtained by an examination of the original sounding records (Vol. 1, page 19, H. 3363) locating the rock with 1/2 foot water over it south of Taboguilla Island (Chart 952). The hydrographer notes that "about 8 square feet showing in wash of sea. At about 30 meters distance 17 fathoms was obtained."

- b. Another circumstance of importance is the fact that the rocks may not be in the position as indicated on chart 952. As has already been noted, these were transferred from the B. A. chart on which no projection is shown and any such transfer would necessarily be accompanied by a certain amount of error, which error would be magnified four times in transferring it to the field sheet. So that while the development might appear fairly close with regard to the charted position (although in view of what has been said above, even such development would be inadequate), there are areas close by the positions of these rocks where the soundings are too sparse for this class of work.

It is submitted that upon the strength of what has been brought out above, there seems to be no justification for removing these rocks from the charts and it is therefore recommended that the rocks be charted in the best position available, with the modification in depth as noted above, until such time as they are definitely disproved.

3. About 3/4 mile north of the Danaide group in lat. 8° 57', long. 79° 29' 1520 m., there is a charted 11 foot spot. The authority for this sounding is the same as for the Danaide Rocks (B. A. chart 1544, shown as 2 1/4 fathoms here) and it was one of the soundings retained on chart 952 after the 1912 survey (H. 3362) was applied. The difference in depth is due to an erroneous correction applied to the B. A. soundings. By adding four feet as explained previously the sounding becomes 17 feet and this depth bears the same relation to the depths shown on the latest survey as the original 2 1/4 fathom sounding on B. A. 1544 bore to the surrounding depths on that chart. The present survey (H. 4807) shows 16 feet about 140 meters to the northward, and considering the difficulty of transferring the sounding accurately, it is reasonable to assume that the two shoals are identical and it is therefore recommended that the present charted 11 foot sounding be disregarded in future compilations. ✓

Sulphur Rocks

1. The area in this vicinity presents no special cartographic problem. With the exception of the two sunken rocks at present charted (authority, B. A. chart 1544), the information shown on the new survey corroborates all the soundings at present charted in this vicinity. In addition the new survey shows numerous other soundings of a shoaler nature. Comparing the depths surrounding the Sulphur Rocks on the Admiralty chart and the depth surrounding the 6 foot spots in this vicinity on the new survey, it appears that the sunken rocks belong within the 12 foot area on the new survey. It is therefore recommended that on future compilations the sunken rocks be omitted and the selection in this area be made entirely from the new survey (H. 4807). *✓ ans*
2. From the standpoint of field work there are three places within this area that should have been further examined. They are as follows:
 - a. The 17 foot soundings in lat. $8^{\circ} 56' 1040$ m., long. $79^{\circ} 30' 740$ m. These soundings fall well outside the general 18 foot curve and are surrounded by deeper water. *✓ ans*
 - b. The 14 foot sounding in lat. $08^{\circ} 56' 1480$ m., long. $79^{\circ} 30' 1070$ m. This is also surrounded by deeper water and the development here is not very close. *✓ ans*
 - c. The 11 foot soundings, rocky bottom, in approx. lat. $08^{\circ} 57' 1/2'$, long. $79^{\circ} 30' 1/4'$ are practically isolated soundings surrounded by depths about 1 fathom greater. The work should have been extended to the eastward and westward to at least define the limits of these shoal spots, as these spots might be menacing to boats entering Panama Harbor from the east. *✓ ans*

Knocker Rock

1. This rock which is shown on the present chart as a rock bare at high water should be changed to a rock awash to conform to the information given on the latest survey (H. 4807). This bare rock symbol is probably the result of a misinterpretation of T. 3244. It appears that the topographer was attempting to indicate a rocky ledge which bares at some stage of the tide. That the rock is covered at high water is also borne out by the Navy survey of 1900 (see H. O. chart 1950). The statement in the descriptive report that "No exposed rock was seen at this point" is corroborative of the above. *✓ ans*

2. The small islet charted just north of the buoy east of Knocker Rock should be expunged from the chart. This islet is neither shown on the present survey, on the topographic sheet for this area (T. 3244), nor on the Navy survey of 1900. The only authority that could be found was H. 3362 where it is clearly shown as an islet. It is not mentioned in the sounding records for this sheet and the only inference that suggests itself is that the plotter of the smooth sheet in tracing the shore line from the topographic sheet (T. 3244) misinterpreted the buoy symbol and inked it as a bare rock on the hydrographic sheet. This inference is based on the fact that the islet agrees in position and general shape with the buoy symbol. *✓ams*
3. The rock awash shown on the present charts between Knocker Rock and Knocker Rock Buoy should be retained. The authority for this rock is H. O. chart 1950 (Navy survey of 1900). The fact that it is not shown on H. 3362 (survey of 1912) is no criterion, since this survey missed many shoals subsequently found. Our latest survey, H. 4807 shows a 5 foot shoal in approximately the same position and the height of the tide at the time of sounding being about 10 feet, it does not follow that the surveyor would have seen this rock, since it may be awash at half tide or less. *✓ams*
4. The junction of the work in this area with H. 3362 (1912 survey) is generally adequate. The old survey appears to be 1 to 2 feet deeper throughout than the new survey. A possible error in the tidal plane. *✓ams*
5. Additional development should have been done within the 12 foot area in lat. 08° 57', long. 79° 31' 200 m. The least depth found here in a sparse development was 7 feet. It lies in the southern approach to Panama Harbor and if much less water exists here it might even be a menace to small boats using the bay. *✓ams*
6. The charted wreck in lat. 08° 55 1/2', long. 79° 31 1/4' should be retained. This wreck has appeared on our charts since the first edition of chart 951 (1909) and the authority is probably H. O. chart 1042. The wreck was marked by two buoys and in 1912 (H. 3362) the two buoys marking the wreck were located. The hydrographer on that survey notes in his report that "there would be small likelihood of any wrecks occurring in Panama Bay being broken up by the sea" (see page 8, descriptive report, H. 3362). The soundings, however, showed very little evidence of a wreck. The two buoys marking this wreck were removed from our charts in April, 1926 upon authority of letter 141 of 1926. This letter making no mention of the wreck, the symbol was retained. Since this letter, no other information has been

received in this office tending to show that the wreck no longer exists. The present survey affords no guide since the depths in the vicinity of the wreck agree with the depths as shown on the 1912 survey. It is therefore believed that ^{as} a precautionary measure the wreck symbol should be carried on our charts until such time as more definite information of its non-existence is available. *amns.*

Recapitulation

For the guidance of the compiler, the recommendations made above will be summarized as follows:

1. Add 4 feet to all soundings on B. A. chart 1544 before applying them to the new chart. *✓ amns*
2. Retain the Danaide Rocks in toto. *✓ amns*
3. Omit the charted 11 foot sounding in lat. 08° 57', long. 79° 29' 1520 m. *✓ amns*
4. Omit the sunken rock symbols in the vicinity of the Sulphur Rocks. *✓ amns*
5. Change Knocker Rock from a dry to a rock awash. *✓ amns*
6. Expunge the charted islet north of the Knocker Rock buoy. *✓ amns*
7. Retain the charted rock awash between Knocker Rock and Knocker Rock buoy. *✓ amns*
8. Retain the charted wreck symbol in lat. 08° 55 1/2', long. 79° 31 1/4'. *✓ amns*

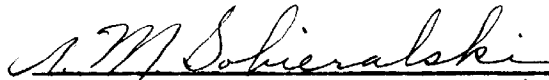
Conclusion

In conclusion it should be said that while this survey makes several valuable contributions to our hydrographic knowledge of this locality, it cannot be considered that the main purpose has been accomplished. Without criticizing the execution of the work, the fact remains that with three parties operating in this locality at different times (two in 1912, one in 1928) there still remains uncertainty as to the existence of the Danaide Rocks, the most important of the inshore dangers in

this area. It should also be clearly evident from the foregoing remarks that for the purpose of disproving rocks, radical departures must be made from the customary methods used in hydrographic surveying. Fifty meter lines with the same spacing for soundings may be more than sufficient to give a fair representation of the bottom in even a broken area, but when the problem is one of removing rocks already published on a chart, the slightest doubt must be resolved in favor of retaining the rocks, and hence no real good will have been accomplished. It would therefore appear that in such cases parties should be specifically instructed to drag the areas affected to a depth sufficient to eliminate all doubt.

Reviewed by A. L. Shalowitz, January, 1929.

Approved:


Chief, Section of Field Records (Charts)


Chief, Section of Field Work (H. & T.)

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 4807

HYDROGRAPHIC TITLE SHEET

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. 2

REGISTER NO. 4807

State Canal Zone & Republic of Panama

General locality Pacific side Entrance to Panama Canal

Locality South-east of Panama Harbor

Scale 1 : 10000 Date of survey May, 1928

Vessel NATOMA

Chief of Party JACK SENIOR

Surveyed by J.C. BOSE, Jr. H.&G.E.

Protracted by W. R. PORTER, Aid.

Soundings penciled by W. R. Porter

Soundings in ~~fathoms~~ feet

Plane of reference Low Water Springs (76 on Balboa staff)

Subdivision of wire dragged areas by

Inked by

Verified by

Instructions dated March 24-th, 1928

Remarks:

Field Records Section (Charts)

HYDROGRAPHIC SHEET No. 4807

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

Number of positions on sheet .1714.
Number of positions checked .483.
Number of positions revised .23.
Number of soundings recorded .7088.
Number of soundings revised .19!
Number of signals erroneously
plotted or transferred 0.

Date: Nov 15, 1928
Cartographer: J. T. Walker