

H110608

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic
Field No. PHP-10-1-95
Registry No. H-10608

LOCALITY

State Washington
General Locality Strait of Georgia
Sublocality Sandy Point to Cherry Point

19 95

CHIEF OF PARTY
LT Richard A. Fletcher, NOAA

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DATE AUG 10 1996

HYDROGRAPHIC TITLE SHEET

H-10608

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.

PHP-10-1-95

State Washington

General locality Strait of Georgia

Locality Sandy Point to Cherry Point

Scale 1:10,000 Date of survey May 4 - July 25, 1995

Instructions dated February 14, 1995 Project No. OPR-N247-PHP

Vessel Jensen Launch 1101, (EDP0651), MonArk Launch 1102 (EDP0652)

Chief of party LT Richard A. Fletcher, NOAA

Surveyed by Pacific Hydrographic Parties Personnel

Soundings taken by Side Scan Sonar, Dive echo sounder, ~~back to back~~ pole DSF6000N, Innerspace 448, EG&G Model 260, MOD-III Divers Least Depth Gage

Graphic record scaled by PHP Personnel

Graphic record checked by PHP Personnel

Evaluation by: L. Deodato Automated plot by HP Design Jet 650C

Verification by J. Stringham, D. Doles, L. Deodato

Soundings in fathoms and tenths at MLLW

REMARKS: All times in UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.
All depths listed in this report are referenced to mean lower low water unless otherwise noted.

DSC 8/13/96

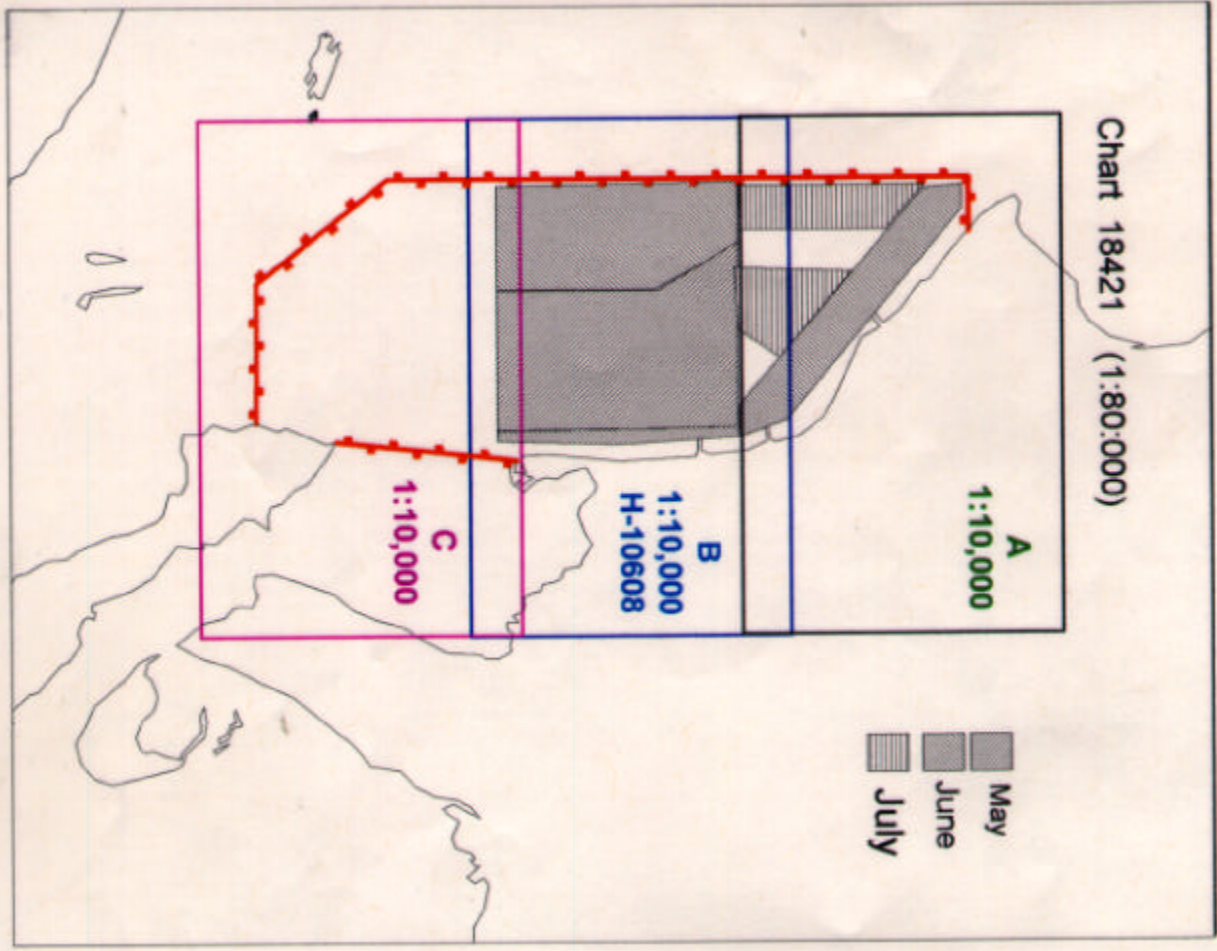
ADVIS/SURF ✓ 8/20/96 by MBA

PACIFIC HYDROGRAPHIC PARTY - PROGRESS SKETCH

OPR-N247-PHP

Cherry Point, WA

Chart 18421 (1:80,000)

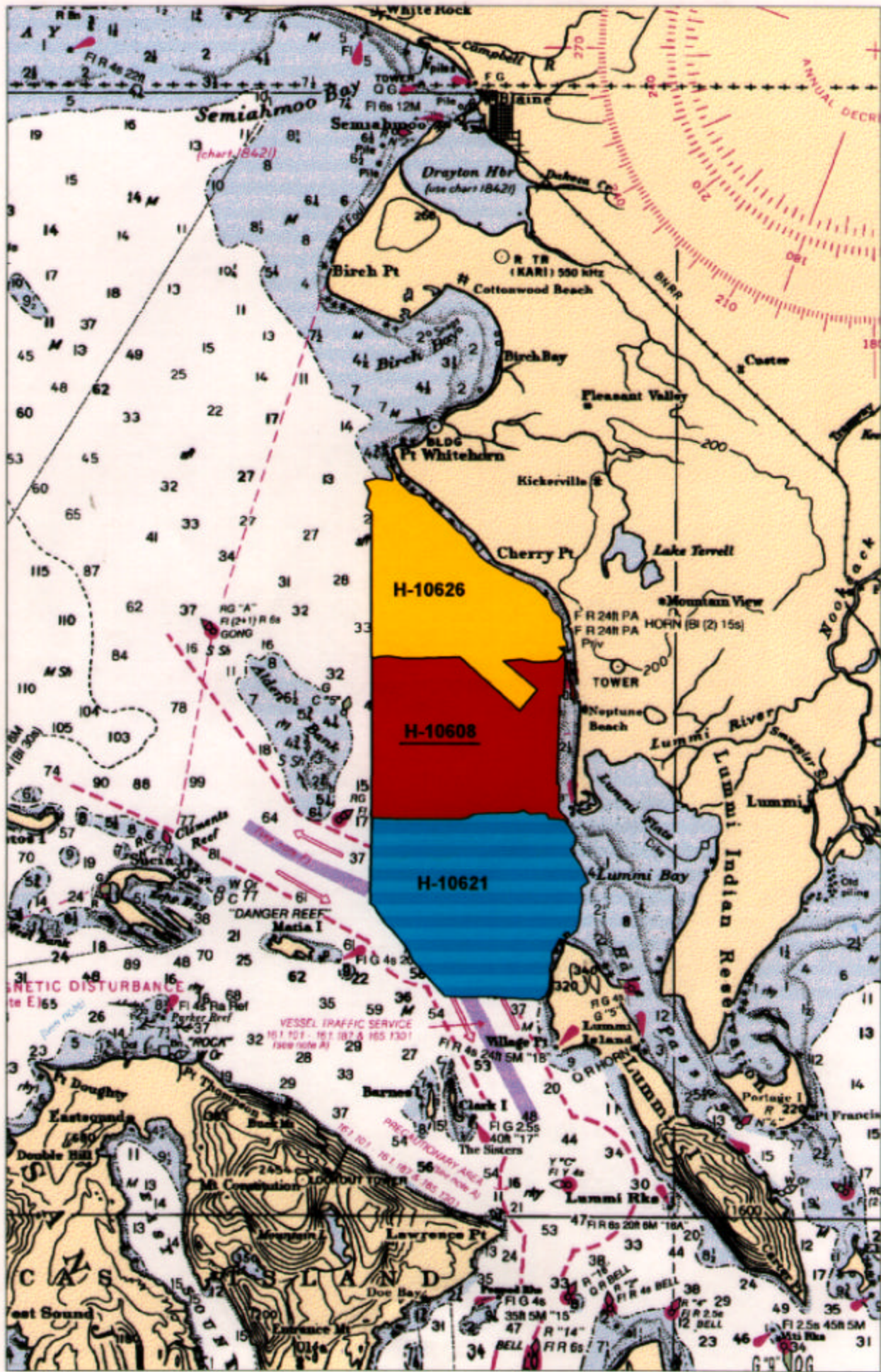


July 1995
LT Rick Fletcher, Chief

Registry No	Started	Percent Comp	Completed	Submitted
H-10608	05/04/1995		100	07/25/1995
H-10626	06/19/1995		75	

Downtime Day	Weather	Electronics	Mechanical
May		5	0
June		2	0

Accomplished	April	May	June	July	August
LNM Hydro	0	25.8	46.9	0	
LNM SSS	0	132.5	68	83.3	
SG, NM	0	8	6	3	
DP	0	0	35	14	
Dives	0	0	5	2	
BS	0	0	10	0	
SV Coats	0	2	2	2	
Control Stations	3	0	0	0	



DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-N247-PHP
PHP-10-1-95
1995
H-10608

PACIFIC HYDROGRAPHIC PARTY
LT Richard A. Fletcher, NOAA
Chief of Party

A. PROJECT ✓

Project OPR-N247-PHP covers the approaches to two oil terminals a cargo loading terminal and the general anchorage off of Cherry Point, Washington. The primary purpose of this survey is to update charted hydrography which dates from 1953 to 1960 and to supersede charted wire drag clearance depths dating from 1972.

Project OPR-N247-PHP is divided into three survey sheets. The survey described in this report was designated Sheet B, Sandy Point to Cherry Point, Strait of Georgia, Washington, and assigned field sheet number PHP-10-1-95 and registry number H-10608.

Survey operations were conducted in accordance with Hydrographic Project Instructions OPR-N247-PHP, Point Migley to Cherry Point, Washington, dated February 14, 1995. Survey H-10608 is registered as a 1:10,000 scale survey and includes a 1:5,000 scale inset.

B. AREA SURVEYED ✓ *See Eval Report, Section B*

Hydrographic survey H-10608 covers the general anchorage off of Neptune Beach and the approaches to the oil and cargo terminals at Cherry Point. The figure that follows shows the approximate survey limits.

48°50'	122°48'	48°50'	122°43'
48°47'	122°48'	48°47'	122°43'

Survey operations began on May 4, 1995 (DN 124) and ended on July 25, 1995 (DN 206).

C. SURVEY VESSELS ✓

NOAA launch 1101 (EDP# 0651) and launch 1102 (EDP# 0652) were used for all sounding data acquired. A field assembled backpack unit was also used to acquire positions on lights.

No unusual vessel configurations were used.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Survey data acquisition were accomplished using PC DAS Version 5.01, HYPACK for Windows Version 5.2 and HDAPS, HDAPS program names and versions listed in Appendix IV. Data collected with HYPACK was converted to HDAPS format using conversion programs written by Hydrographic Surveys Division, N/CS3.

The following non-data acquisition or processing computer programs were used:

<u>Program Name</u>	<u>Version</u>	<u>Date</u>
VELOCITY	2.21	1994
SVP	2.30	1994
NADCON	1.01	1989
INVERS3D	1.00	1991
MONITOR	3.0	1995
GEOID93	1.00	1993

There were no nonstandard automated acquisition or processing methods used.

E. SIDE SCAN SONAR EQUIPMENT ✓

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected SSS recorder and an EG&G 272-T dual-channel, single-frequency towfish. The towfish was operated on the 100-kHz frequency and was configured with a 20° beam depression. The sonar equipment used throughout this survey were:

Towfish: SN 015598
Recorder: SN 015602

On launch 1101, the towfish was deployed from a Superwinch Winch Model W115 from an adjustable davit arm on the stern of the launch. The SSS towfish was towed with Kevlar cable which was connected to the recorder cabling via a slip-ring assembly. The SSS towfish was maintained at a height off the bottom between 8 to 20 percent of the SSS range scale. At times, in depths greater than 50 meters, the towfish height ranged from 21 to 26 percent of the 200-meter range scale. SSS operations were limited to a speed-over-ground of 5 knots or slower on the 75- and 100-meter range scales and 4 knots or slower on the 150- and 200-meter range scales.

Offset, layback and height for the davit arm used to tow the SSS towfish from launch 1101 were measured on March 20, 1995 using the DSF6000 transducer as the reference.

All offset, layback and height data were applied as required by the HDAPS manual. These data can be found in separate IV.*

All side scan sonar data was collected using the 75-, 100-, 150- and 200-meter range scales and 100-Khz frequency. In order to acquire the required 200% SSS coverage from the 5 fathom curve to the 20 fathom curve, main-scheme lines were run at a spacing of 75 meters on the 100-meter range scale and 100 meters on the 150-meter range scale. From the 20 fathom to the 30 fathom curve, where 100% coverage was required, line spacing was run at 200 meters. Lines were split or re-run in all areas where coverage was questionable due to degraded sonargrams. In relatively shallow water, some lines were split using the 75-meter range scale. Degraded sonargrams were usually caused by surface noise or thermalclines.

Adequate coverage was determined by producing an 'A' and 'B' swath plot and ensuring 100% coverage on each plot.

Confidence checks were performed on a routine basis, primarily by noting changes in bottom texture on the outer edges of the sonargram.

F. SOUNDING EQUIPMENT ✓

A Raytheon Digital Survey Fathometer (DSF) 6000N (SN A124N) echo sounder was used on launch 1101 to measure bottom depths during the survey. The DSF 6000N produced an analog trace of the high frequency (100 kHz) and low frequency (24 kHz) bottom depths. Digital depths from the high frequency and low frequency beams were recorded by the acquisition system. High frequency depths were selected as the primary depths and are shown on the sounding plots.

An Innerspace model 448 echosounder (SN 236) was used on launch 1102 to measure bottom depths during the survey. The Innerspace produces an analog trace of the bottom. Digital depths were recorded by the acquisition system and compared on line to the analog trace.

Echograms were carefully reviewed for significant features along the track line. Any significant features on the graphic record that were not selected as primary soundings were manually inserted. These records were also verified using the SSS records.

Preventative maintenance performed on all echosounders allowed them to be operated throughout the survey without any downtime.

A Mod 3 diver least depth gauge (SN 68335) was used by divers to determine least depths on items. The gauge was operated in accordance with section 7.2.2.1 of the Field Procedures Manual.

Field constructed sounding poles were used to determine depths or rocks near the charted shoreline. The sounding poles are graduated in tenths of meters.

Field constructed metric lead lines were used for depth comparisons with the echosounders. PHP fabricated the lead lines following Hydrographic Survey Guidline 69. Leadline calibration forms are included in Separate IV of this Descriptive Report.*

G. CORRECTIONS TO SOUNDINGS ✓

Sound velocity profiles of the water column were determined using an Applied Microsystems Laboratories sound velocity profiler (AML), SN 3042.

A Data Quality Assurance (DQA) test was performed for each AML cast by using a thermometer and a bucket of fresh water. Program VELOCITY compared the thermometer temperature to the AML's temperature value to confirm that the velocity probe was working properly. There were no variations in instrument initials.

After each cast, program VELOCITY (version 2.10) was used to process the data, select significant data points, and to create a

** Filed with the hydrographic data 4*

corrector table. The velocity correctors were manually entered into HDAPS velocity tables. Velocity profile data are in the Separates submitted with this survey. * Five velocity casts were conducted for H-10608: *Cast 5 plot outside the survey limits*

DN	Table #	Latitude	Longitude	Depth
124	1	48°49'45"	122°46'01"	54.8
138	2	48°48'59"	122°47'58"	97.6
158	3	48°48'54"	122°46'56"	80.0
172	4	48°49'05"	122°48'04"	100.7
199	5	48°51'36"	122°48'04"	80.5

All sounding corrections were applied to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams and the single Innerspace beam.

Metric leadlines were used for depth comparisons with the echosounders. PHP fabricated the leadlines following hydrographic Survey Guideline (HSG), 69. Leadline calibration forms are included in Separate IV* of this descriptive report.

Lead-line comparisons were performed on launch 1101 and launch 1102 in accordance with the requirements stated in the Field Procedures Manual (FPM). These comparisons are annotated on the echograms and can be found in Separate IV.* No corrections to soundings were applied based on lead-line check data.

The correction for the static draft for launch 1101 is 0.5 meters, as measured on March 20, 1995. The correction for the static draft for launch 1102 is 0.4 meters as measured on April 14, 1994. Supporting data is included in Separate IV.*

Settlement and squat measurements for launch 1101 (Offset Table 1) were conducted and correctors determined on March 20, 1995. Settlement and squat measurements for launch 1102 (Offset Table 2)* were conducted and correctors determined on May 5, 1994. The settlement and squat correctors were applied to the sounding data in real time on each survey platform and reapplied during postprocessing. Settlement and squat corrector tables are in Separate IV.*

The tidal datum for this project is Mean Lower Low Water. The operating tide station at Cherry Point, Washington (944-9424) served as the reference station for predicted tides and will serve as direct control for hydrography. The Survey area is covered by one tide correction zone, tidal corrections were applied in accordance with the project instructions sections 5.8.1 and 5.9.

* Filed with the hydrographic data.⁵

Digital tidal data were received on floppy disk from Hydrographic Surveys Division. Predicted tidal data was applied to the digital data during post processing by HDAPS.

Bracketing levels were not done as per the memorandum concerning primary tidal stations dated March 29, 1995.
Tide Note dated Dec. 8, 1995 is attached to this report.

H. CONTROL STATIONS *See Eval Report, Section H*

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). Two horizontal control stations were used as DGPS reference stations for this survey; Pt Atkinson (Vancouver), British Columbia and Whidbey Island, Washington. The adjusted NAD 83 positions, computed by GPS methods, were provided by the Hydrographic Surveys Division. The positions are as follows:

	<u>Latitude</u>	<u>Longitude</u>	<u>Frequency</u>
Vancouver	49°19'49.402"N	123°15'52.445"W	320 kHz
Whidbey Island	48°18'44.774"N	122°41'46.061"W	302 kHz

Two DGPS fixed point performance check stations were positioned for this project to third order standards in accordance with the DGPS User's Manual (ver 3.0). One on a pile at the USCG station in Squalicum Harbor, Bellingham, Washington and the other at SANDY POINT LIGHT 3. A copy of the horizontal control station table is included in Appendix III.* A separate horizontal control report will be sent along with this Descriptive Report.

** Copy is attached to this report.*

I. HYDROGRAPHIC POSITION CONTROL *See Eval Report, Section I*

A Differential Global Positioning System (DGPS) was used as the primary navigation system for this survey. The serial numbers of the sensors were as follows:

	<u>Device</u>	<u>Serial Number</u>
Launch 1101	Ashtech Sensor CSI Receiver	B0142 X1112
Launch 1102	Ashtech Sensor CSI Receiver	B0143 X1212
Backpack	Ashtech Sensor CSI Receiver	B1044 X1394

An Ashtech Sensor GPS Receiver with a Communications Systems International Inc. (CSI) GPS corrector receiver linked to the acquisition system was used for positioning. DGPS positioning was accomplished in accordance with the FPM,

section 3.4. When the beacon signal was lost for more than 30 seconds, the survey line was broken by the HDAPS system and the line was rerun where control had been unacceptable.

The HYPACK system does not record data if the beacon signal is lost. The operator can easily determine the signal integrity by monitoring the echosounder and SSS traces for fix annotations. The operator can also monitor the GPS with an on screen window which shows the HDOP and number of satellites used. Survey lines were rerun where control was unacceptable.

Performance checks for the positioning systems were accomplished by using a fixed point and comparing an HDAPS position and range to that fixed point. This was done in accordance with the FPM section 3.4.4. Performance checks were conducted on a weekly basis using two performance check stations surveyed by PHP. The stations were established using static survey methods described in the GPS User's Manual version 3.0. All DGPS performance checks confirmed that the DGPS positioning systems were operating properly. A summary of performance checks are in Separate III.*

The Vancouver beacon was used for all data acquisition. MONITOR results for Vancouver and Whidbey Island are in Separate III.*

Horizontal Dilution of Precision (HDOP) limits were computed for each station as required in section 3.4.2 of the Field Procedures Manual (FPM) for Hydrographic Surveying. The HDOP limits for a 1:10,000-scale survey for the Vancouver and Whidbey Island beacons were 3.8⁷⁵. No data were acquired at HDOP values exceeding the 1:10,000 thresholds. *Do not concur.*

DGPS antenna offset, layback and height for launch 1101 were measured on March 20, 1995 using the echosounder transducer as the reference. DGPS antenna offset, layback and height for launch 1102 were measured on April 12, 1994 using the echosounder transducer as the reference. All offset, layback and height data were applied as required by the HDAPS manual.

J. SHORELINE *See Eval Report, Section J.*

No photogrammetric source data for this project was available. Positions for wrecks, ruins, piles, shoals and rocks were verified or disproved as required by the Project Instructions. Shoreline was compared to the charted shoreline for any gross discrepancies using a 1:10,000 enlargement of chart 18421 provided by Hydrographic Surveys Division. Charted rocks were taken from the enlargement of 18421 and assigned reference numbers by PHP for organizational purposes.

* Filed with the hydrographic data.⁷

During the investigation of the charted features all rocks were positioned. It should be noted that PHP was provided with an enlargement of a small scale chart of the area (chart 18421). Chart 18431 is a 1:25,000 scale chart of the area and has more detail on shoreline features. No major discrepancies in shoreline were noted. PHP, feels both charts adequately depict the shoreline in the area. All verified rocks and positions are shown on the field shoreline/DP Plot.

K. **CROSSLINES** ✓

Twenty nautical miles of crosslines were run on H-10608. This amounted to 10 percent of the total linear nautical miles of main-scheme lines.

Crosslines and main-scheme agreement, with predicted tides applied, was good. Most soundings agreed to within 0.2 meters with no errors greater than 0.4 meters.

L. **JUNCTIONS** *See Eval Report, Section L.*

No current surveys which junction with H-10608 have been completed at this time.

M. **COMPARISONS WITH PRIOR SURVEYS** *See Eval Report, Section M.*

As depicted on the prior surveys, the bottom in this survey area is fairly flat with few bottom features.

Survey H-10608 soundings were compared with prior surveys H-7962 (1953, scale 1:10,000), H-8323 (1956, scale 1:10,000) and H-8481 (1959, 1:10,000). Prior survey H-9281WD (1972, scale 1:20,000) is the source for wire drag ^{cleanings} in the survey area. Prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10608 in accordance with section 7.4 of the FPM (NADCON, version 1.01, January 9, 1989). Comparisons were made between survey H-10608 soundings plotted at predicted MLLW and prior survey sounding sheets plotted at MLLW.

Agreement between H-10608 and H-7962 was good. The average difference between prior soundings and H-10608 soundings 0.3 meters with current survey soundings generally shoaler than prior soundings. Larger differences were noted at the face of the Tosco Refinery pier and just north of the Tosco pier. Current soundings at the face of the pier are deeper than prior survey values, ^{between} ~~up to~~ 1.7 ^{to 3.0} meters. To the North of the pier current soundings are shoaler than prior soundings, up to 1.0 meters. PHP concluded these differences were caused by the construction of the TOSCO refinery pier after the prior surveys. *Concur*

Agreement between H-10608 and H-8323 was good. The common depths between these surveys are over thirty meters. HDAPS rounds these soundings to the nearest meter when plotting. All soundings were within a meter.

Agreement between H-10608 and H-8481 was good. The common depths between these surveys are over thirty meters. HDAPS rounds these soundings to the nearest meter when plotting. All soundings were within a meter.

Rocks from prior survey H-7962 were assigned reference numbers by PHP for organizational purposes. All rocks were positioned. No major discrepancies were noted. *Concur*

N. ITEM INVESTIGATIONS ✓

<u>Section</u>	<u>AWOIS Item</u>	<u>Status</u>
N1.	None	Diver Investigation
N2.	None	Diver Investigation
N3.	None	Diver Investigation
N4.	None	Diver Investigation
N5.	None	Diver Investigation
N6.	52183	E/S Disproval

PHP located six items with SSS which warranted further investigation. Below is a summary of the results of these investigations.

N1. Contact #106.12P

Latitude: 48° 47' 55.143" N
Longitude: 122° 43' 30.383" W
Cross Reference: 153.60P
Position #: 1108, DN 172,
Least depth: 18.76m (10.8 fathoms) (*actual* ~~predicted~~ tides)
Recommendation: ~~Do not chart~~ *Chart 10 Rk*

Contact 106.12P was investigated using divers on DN 172. Divers located a rock approximately 3-meters in diameter with a height off the bottom of 1.2 meters. Least depth measurements were taken using the MOD-III diver least depth gauge (SN 68335). ~~PHP does not recommend charting this item due to its close proximity to shoaler soundings.~~

N2. Contact #801.32P

Latitude: 48° 49' 59.488" N
Longitude: 122° 43' 43.975" W
Cross Reference: 799.25P, 57.15P
Position #: 1109, DN 172
Least depth: 19.5² m (10.5² fathoms) (~~predicted~~ ^{actual} tides)
Recommendation: Do not chart *concur*

Contact 801.32P was investigated with divers on DN 172. Divers located an old tire with a diameter of 3-meters and a height off the bottom of 1 meter. The least depth was measured using a MOD-III diver least depth gauge (SN 68335). PHP does not recommend charting this item as it does not pose a hazard to surface navigation. The item is in 19.5 meters of water.

N3. Contact #546.16S

Latitude: 48° 49' 39.782" N
Longitude: 122° 43' 00.446" W
Cross Reference: None
Position #: 1112, DN 172
Least depth: 7.1⁰ m (3.9⁸ fathoms) (~~predicted~~ ^{actual} tides)
Recommendation: Chart *concur* 35 *Obstn*

Contact 546.16S was investigated by divers on DN 172. Divers located a concrete block about the size of a buoy anchor. The block has a diameter of 2-meters and a height off the bottom of approximately 2-meters. The least depth was measured with a MOD-III diver least depth gauge. Chart dangerous obstruction with least depth known by divers at latitude 48° 49' 39.782" N, longitude 122° 43' 00.446" W.

N4. Contact #572.27S

Latitude: 48° 49' 33.647" N
Longitude: 122° 42' 59.831" W
Cross Reference: None
Position #: 1113³, DN 172
Least depth: 7.3² m (4.0⁸ fathoms) (~~predicted~~ ^{actual} tides)
Recommendation: Chart *concur* 35 *Obstn*

Contact 572.27S was investigated by divers on DN 172. Divers located a concrete block about the size of a buoy anchor. The block has a diameter of 2-meters and a height off the bottom of approximately 2-meters. The least depth was measured with a MOD-III diver least depth gauge. Chart dangerous obstruction with least depth known by divers at latitude 48° 49' 33.647" N, longitude 122° 42' 59.831" W.

N5. Contact #567.72S

Latitude: 48° 47' 19.937" N
Longitude: 122° 43' 00.821" W
Cross Reference: None
Position #: 1115⁶ DN 172
Least depth: 5.3⁶ m (2.9⁶ fathoms) (~~predicted~~ actual tides)
Recommendation: Chart obstruction ~~concur~~ 2.5⁶ Obstr

Contact 567.72S was investigated by divers on DN 172. Divers located a concrete block 2 meters by 2 meters by 1.5 meters high. The least depth was measured with a MOD-III diver least depth gauge (SN 68335). Chart dangerous obstruction with least depth known by divers at latitude 48° 47' 19.937" N, longitude 122° 43' 00.821" W.

N6. AWOIS 52183

Source: H-9281WD (1972, 1:20,000)
Latitude: 48° 49' 53.04" N
Longitude: 122° 44' 18.24" W
Contacts: 276.11P, 292.73S, 1137.08S, 1145.09S
Position #: 1198, DN 180
Latitude: 48° 49' 45.729" N
Longitude: 122° 44' 20.957" W
Least depth: N/A
Recommendation: Remove charted wire drag ~~hang~~ Clearance ~~hang~~ Concur

The above contact numbers are all the same item. This item was investigated with echosounder by drifting over the SSS positions (fixes 1196-1198). The echosounder trace shows a small item rising approximately 0.3 meter off the surrounding bottom. The contacts and DP are 248 meters SSE of the charted position of the AWOIS item. An approximate 300 meter radius around the AWOIS position was covered with 400% SSS coverage. Delete the wire drag ~~hang~~ of 10 fathoms (18.3 meters) charted at 48° 49' 53.04", 122° 44' 18.24" and replace with soundings from this survey. ~~hang~~ Clearance Concur

O. COMPARISON WITH THE CHART See Eval Report, Section O.

Soundings from an enlargement of chart 18421 provided by Hydrographic Surveys Division were compared to H-10608 soundings. Charted soundings agreed with present soundings very well except for a charted 26 fathom (43.9 m) sounding at 48°48.3'N 122°45.0'W. Chart 18431, a 1:25,000 scale chart of the same area shows the depth as 21 fathoms (38.4 m). The prior survey of this area also shows the depth to be 21 fathoms which agrees with present survey depths. PHP believes an error was made during the compilation of chart 18421 and recommends the depth at the above location be superseded with present survey soundings. ~~hang~~ Concur

The mooring buoy charted just south of the TOSCO refinery at approximate position 48°49.5'N 122°43.0'W was not sighted during survey operations. PHP did conduct a dive on an anchor block near the position of this buoy, see section N4. PHP recommends the buoy be deleted. *CONCUR*

No dangers to navigation were found.

P. ADEQUACY OF SURVEY *See Eval Report, Section P*

This survey is considered complete, and the data acquired are adequate to supersede all prior surveys of the common area. *CONCUR*

Q. AIDS TO NAVIGATION ✓

Four fixed aids to navigation were positioned during this survey, fixes 9000-9010. One aid was positioned using third order methods described in the GPS User's Manual (Ver. 3.0). The following table summarizes the items positioned.

LL#	Name and Location	Structure	Position Standards	Position
19880	SANDY POINT LIGHT 2	TR on Pile	Hydrographic	48°47'12.563" 122°42'45.009"
19886	SANDY POINT LIGHT 3	SG on pile	Third Order	48°47'16.332" 122°42'43.018"
19890	TOSCO NORTHWEST NORTH LIGHT	NW on dolphin	Hydrographic	48°49'37.527" 122°43' 15.041 10.386
19890	TOSCO NORTHWEST SOUTH LIGHT	NW on dolphin	Hydrographic	48°49'29.356" 122°43' 10.386 15.041

The two aids on the TOSCO refinery pier are privately maintained aids.

R. STATISTICS ✓

Number of Positions.....	1405
Main-scheme Sounding Lines (Nautical Miles).....	196
Crosslines (Nautical Miles).....	19.7
Square Nautical Miles Surveyed.....	10.7
Days of Production.....	19
Detached Positions.....	55
Bottom Samples.....	9
Tide Stations Installed.....	0
Number of CTD Casts.....	5

S. MISCELLANEOUS ✓

Bottom samples for the survey area were acquired in accordance with the Project Instructions. *Filed with the hydrographic data.*

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area.


T. RECOMMENDATIONS ✓

Recommendations concerning specific items are located in section **N** of this report.

U. REFERRAL TO OTHER REPORTS ✓

Horizontal Control Report

Submitted By:


Eric W. Berkowitz
Lieutenant (Junior Grade), NOAA



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Seattle, Washington 98115-0070
Pacific Hydrographic Party
Post Office Box 5803
Bellingham, WA 98227

May 10, 1995

Commander G. F. Greene, USCG
Chief, Aids to Navigation and Waterways Management Branch
Thirteenth Coast Guard District (oan)
915 Second Avenue
Seattle, WA 98174-1067

Dear Sir:

Please include the following notice in the next Local Notice to Mariners (LNM):

STRAIT OF GEORGIA - SURVEY OPERATIONS - The NOAA Pacific Hydrographic Party will conduct hydrographic survey operations in the Strait of Georgia, between Lummi Island and Cherry Point, from early May 1995 through September 1995. Mariners may contact the survey vessels on VHF Channel 16 or 13 and are asked to keep clear during survey operations. Any person with knowledge of chart deficiencies which should be investigated during this survey may contact the Chief-of-Party at:

NOAA Pacific Hydrographic Party
Post Office Box 5803
Bellingham, WA 98227-5803

VOICE (360) 650-9095
FAX (360) 650-9134

Affected Charts: 18400, 18421, 18424, 18430, 18431

Please continue to publish this notice in the monthly LNM through September 1995.

Sincerely,

Richard A. Fletcher
Lieutenant, NOAA
Chief-of-Party



OPR - N247-PHP
 Pt Migley to Cherry Point, WA

Registry # H-10608

LL#	Name and Location	Structure	Position Standards	Position
19880	SANDY POINT LIGHT 2	TR on Pile	Hydrographic	48°47'12.563" 122°42'45.009"
19886	SANDY POINT LIGHT 3	SG on pile	Third Order	48°47'16.332" 122°42'43.018"
19890	TOSCO NORTHWEST NORTH LIGHT SOUTH	NW on dolphin	Hydrographic	48°49'29.356" 122°43'15.041"
19890	TOSCO NORTHWEST SOUTH LIGHT NORTH	NW on dolphin	Hydrographic	48°49'37.527" 122°43'10.386"

Hydrographic Position: Based on average of two positions (DGPS) both with HDOPs less than 2.0 & a minimum of 5 satellites used in position computations.

NOAA FORM 76-40
(8-74)

Replaces C&GS Form 567.

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
Goid Ferry, Ship Office,
Pacific Hydrographic
Party

STATE

WA

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

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

DATE

8-17-95

LOCALITY

Sandy Point to
Cherry Point

ORIGINATING ACTIVITY

HYDROGRAPHIC PARTY
 GEODETIC PARTY
 PHOTO FIELD PARTY
 COMPILATION ACTIVITY
 FINAL REVIEWER
 QUALITY CONTROL & REVIEW GRP.
 COAST PILOT BRANCH
(See reverse for responsible personnel)

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.

OPR-N247-RHP

JOB NUMBER

PHP-10-1-95

SURVEY NUMBER

14-10008

DATUM

NAD 83

POSITION

DESCRIPTION
(Record reason for deletion of landmark or aid to navigation.
Show triangulation station names, where applicable, in parentheses)

Green Square on Pile

Fl 6 2.5s LL # 19886

FR

Private Aid LL # 19890

LL # 19880

LL # 19890

CHARTING NAME

Sandy Point

Light 3

TOSCO NORTH-
WEST SOUTH

LIGHT

Sandy Point

Light 2

TOSCO NORTH-

WEST NORTH
LIGHT

LATITUDE
D.M. Meters

48 47

48 49

48 47

48 49

LONGITUDE

D.P. Meters

122 42

122 43

122 42

122 43

122 42

122 43

OFFICE

FIELD

F-06PS-L

4-24-95

F-06PS-L

7-25-95

METHOD AND DATE OF LOCATION
(See instructions on reverse side)

CHARTS AFFECTED

18421, 18431

18423,

18424

18431

18421

18431

18431

18431



March 29, 1995

MEMORANDUM FOR: Captain Andrew A. Armstrong
Chief, Hydrographic Surveys Branch N/CG24

FROM: William M. Gibson *William M. Gibson*
Chief, Datums Section, N/OES231

SUBJECT: Changes To Field Procedures For Tide Stations
Used For Hydrographic Surveys

Due to new technology field equipment and data processing procedures several changes to field procedures need to be implemented. Three areas of change are documented below.

I. Requirements For Vertical Stability Verification And Operation
Monitoring Of Primary (Control) Tide Stations

National Water Level Observation Network (NWLON) primary stations typically provide control for datum determination at subordinate short-term "hydro" tide stations. Project instructions have usually required the hydrographic field crews to visit the primary station to ensure proper gauge operation, to take independent staff/etg readings from the local tide observer, and to perform stability checks by conducting 3rd-order differential levels between the staff/etg and the bench marks.

The implementation and operation of the Next Generation Water Level Measurement System (NGWLMS) in the NWLON over the past few years has provided the opportunity to change the field requirements due to the automated near real-time data collection provided by the system and due to changes in how the water levels are measured relative to station datum. Data are reviewed through automatic QC within hours and manually reviewed within days instead of weeks for the old systems. Tide staffs and tide observers are no longer required and the gauges have proven to operate for long periods without intensive day-to-day manual care. The new systems use sensors which are calibrated in the shop and referenced through direct leveling to the bench marks. The leveling is more complicated because of the need to dismantle the sensor and use a special leveling fixture. Additional vertical stability checks of the primary sensor can also be obtained through comparison of data with the independent NGWLMS backup sensor. NGWLMS leveling histories across the NWLON have shown very few examples of vertical shifts that cannot be explained and that would jeopardize control for a hydrographic survey.

There is now less of a need for on-site inspection and leveling. Additionally, if the leveling requirement were to remain, there



would be an increased need for ongoing comprehensive training for all field crews. Therefore, the requirement for leveling the NWLON control stations, where the NGWLMS sensor is the primary sensor for that station, is removed for hydrographic surveying projects. The Commanding Officer or Chief of Party is still responsible for ensuring the acquisition of valid tide data at NWLON control stations during periods of hydrography. In cases where a NGWLMS is the operational sensor, site inspections are not required, however, communication should be maintained with the either Atlantic Operations Section (AOS) for Atlantic Coast, Gulf Coast and Caribbean stations or Pacific Operations Section (POS) for Pacific Coast, Alaska and Pacific Island stations to ensure proper operation during periods of hydrography. AOS and POS will coordinate with the Commanding Officer or Chief of Party before interrupting the acquisition of tide data during periods of hydrography.

At some stations, though NGWLMS's exist, they have not yet been accepted as operational and the ADR gauges are still the primary sensors. At these locations, leveling from the staff/ETG to a minimum of three bench marks (including the primary bench mark) will still be required by the hydro field crews. Also, leveling to all subordinate "hydro" gauges is still required from the staff to five bench marks or directly to the sensor in the case of portable acoustic sensors.

II. Required Procedures When Installing Portable Acoustic Or Digital Bubbler Water Level Sensors With Satellite Capability

When planning field operations please note that portable acoustic sensors or ADR gauges are required wherever structures exist which allow their installation. In estuaries, in particular, seasonal and tidal cycle water density variations can cause significant errors in the water level measurement when using bubbler systems which are calibrated for standard sea water. "Digibubs" and conventional bubbler gauges should only be used when it is not possible to install portable acoustic sensors or ADR gauges. If bubbler systems are used (including Digibubs) staffs must be installed and leveled and staff readings taken at regular intervals as per current SOP's.

Real-Time Portable Acoustic or "Digibub" systems with satellite capability have been distributed for use during some of the upcoming hydrographic survey projects. When these are utilized, information about the gauge and site are needed at OLLD prior to data transmission. This information is required to configure the station in OLLD's Data Processing and Analysis Subsystem (DPAS) database before data transmission can be started. This allows

DPAS to recognize the incoming data and channel it into the proper files for processing. It is imperative that this procedure be followed, otherwise the data may be unidentifiable and subsequently lost. Additionally, GOES satellite ID's for the planned gauges should be requested from the appropriate OLLD contact prior to field operations (see section III).

Before initiating data transmission, please contact OLLD, Measurement Branch (Attn: Thomas F. Landon for East Coast, Gulf and Caribbean stations or Manoj Samant for West Coast, Alaska and Pacific Island stations) at voice phone 301-713-2897 or FAX 301-713-4435). Provide the appropriate contact the station number, platform ID, transmit time and channel. Also, transmit, via FAX, a copy of the site report before beginning transmission.

III.. OLLD Contacts for Inquiries From Hydrographic Field Personnel

There has been a vacancy in the Datums Section, Hydrographic Coordinator Position since I became the Datums Section Chief. I have been trying to keep up with the duties of both positions and it has been very trying at times. Cary Wong, currently working in the Tidal Analysis Branch, has accepted the position as the Hydrographic Coordinator and will be joining the Datums Section shortly. This will have a significant positive effect on the current short-staffed situation. I will still be heavily involved in support to hydrographic surveying projects until Cary is fully trained and up to speed on procedures.

The addition of "short fuse" projects is not infrequent and trying to juggle the prioritization of non-hydro related projects and duties with planned hydro projects and "need ASAP projects" causes ongoing frustration. Also, the field units call into the Datums Section frequently to discuss changes to tide requirements and verification of predictions vs. observed data when crossline comparisons are not in reasonable agreement. Responding to these calls on a daily basis contributes to the backlogged workload.

A change to the current communication network will help this situation and allow OLLD to more efficiently respond to HSB needs. For changes to tide station locations or assistance with site selection and the subsequent assignment of station numbers; to request GOES satellite ID's; or, for any questions concerning gauges or bench marks, contact OLLD, Measurement Branch (Attn: Thomas F. Landon for East Coast, Gulf and Caribbean stations or Manoj Samant for West Coast, Alaska and Pacific Island stations) at voice phone 301-713-2897 or FAX 301-713-4435). The Measurement Branch contacts maintain communication with me and will discuss any necessary actions.

For comparing predictions vs. observed during field operations, utilize the REALDATA software for stations where it is available. This has already been implemented on some field units. In the near future the availability of the "HYDRO" software will also help with this assessment. At primary stations where NGWLMS's do not exist yet, Mike Gibson or Cary Wong will still try to help when this comparison is needed. REALDATA software or additional station access can be requested by memorandum to Donald C. Beaumariage, Chief, Ocean and Lake Levels Division.

Request for project instructions and requests for "smooth Tides" should still be directed to me. Please try to give me as much lead time as possible so that we can respond within the appropriate time frames.

Douglas Martin of OLLD is the Liaison between OLLD and NCD. Any topics other than routine operations which require division level coordination should be directed through him.

Please advise all field units of the above procedures.

cc:

LCDR John Humphrey (N\CG241)
CDR Nicholas Perugini (N\CG244)
CDR Kathryn A. Timmons (N\CG245)
Donald C. Beaumariage (N/OES2)
Stephen Gill (N\OES22)
Philip C. Morris (N\OES21)
Michael O'Hargan (N\OES212)
Douglas M. Martin (N/OES212)
Thomas F. Landon (N/OES212)
Manoj R. Samant (N/OES212)
Cary R. Wong (N\OES222, N/OES231 after 4/2/95)
James C. Dixon (N\OES213)
LT Duane Timmons (N\OES214)

To: PHP Chief@PHP@NCG245
Cc:
Rec:
From: Maurice Hickson@HYDRO@NCG24
Subject: re: prior technology
Date: Tuesday, May 9, 1995 10:15:41 PDT
Attach:
Certify: N
Forwarded by:

The 1959-60 surveying (H-8478, H-8481, & H-8518) used 808 and EDO (UQN and Mod.255) fathometers. Position control was by SHORAN and by sextant (visual). H-9281 & H-9282 are both wire drag surveys that used RADIST and sextants for position control.

The EDO fathometers complimented the 808 fathometers in that the 808's were inshore units and the EDO's were for deeper water. Shoran was an ranging electronic positioning system (I believe HF) that measured time delay between transmitted signal to the received return signal. Raydist was an electro/mechanical phase measurement (measured the sinusoidal phase shift of the transmitted signal as a vessel moved) system. Raydist could be either ranging or hyperbolic. The ranging setup required two shore stations and the vessel to transmit a initial signal and the ranging phase would be broadcast in concentric arcs from the two shore stations. The hyperbolic setup required an onshore master and 2 shore slave stations and transmitted hyperbolic phased arcs from the shore station to the passive vessel. This setup is like Loran.

... - You're scratching my rusty memory. Hope this suits your n

To: PHP Chief@PHP@NCG245
Cc:
From: Maurice Hickson@HYDRO@NCG24
Subject: re: prior technology
Date: Tuesday, May 9, 1995 4:43:46 PDT
Attach:
Certify: N
Forwarded by:

H-7962 (1953) by the Ship PATTON was accomplished using 808-type recording fathometers for soundings, an electric sounding machine and hand lead for bottom samples, position control by 3-point sextant (visual) fixes on shore stations, and planetable traverse with theodolite cuts to establish hydrographic control stations.

H-8321 (1956) & H-8322 (1956) by the Ship LESTER JONES were accomplished using 808 recording fathometers operated with reed tachometers* calibrated for the speed of sound of 800 fathoms per second, position control by 3-point sextant (visual) fixes on shore stations, and theodolite cuts to establish hydrographic control stations.

*A reed tachometer was a reed in the fathometer that was calibrated to vibrate when the fathometer was running at a speed that would be equivalent to 800 fathoms per second. Apparently there was more than one calibrated reed as the hydrographers were required to annotate the volumes periodically with the "MRV" notation (Middle Reed Vibrating). Reed info. courtesy of Mr. George Myers.

Also hand leads were used in bottom sampling by coating the bottom of the lead with a grease or tallow type of substance to pick up some of the bottom material. White lead, a thick white grease similar to zinc oxide, was being used on the drag boats during my earlier years with NOAA. No one here knows anything about an electric sounding machine for bottom sampling - it is suspected that it was an electric winch used to drop and retrieve a sounding lead in deep water.



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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

March 10, 1995

MEMORANDUM FOR: Commander Kathy Timmons, NOAA
Chief, Pacific Hydrographic Party
FROM: *Melvin Asato*
Melvin Asato
Chief, Electronics Engineering Division
SUBJECT: Ashtech GPS Sensor Firmware Upgrade

The updated firmware, as described in the attachment, has been installed in your Ashtech GPS sensors modules. If you have any questions, please contact Ed Jones at 553-0192.

Attachment





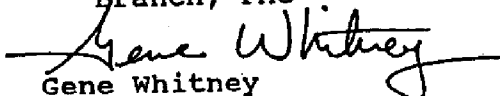
UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS

02 FEB 1995 NC22:GEW

MEMORANDUM FOR: Frank Colohan
Chief, Navigation and Communications Systems
Branch, AMC

Ed Jones
Chief, Navigation and Communications Systems
Branch, PMC

FROM: 
Gene Whitney
Electronics Engineer, Systems Engineering Branch

SUBJECT: Ashtech GPS Sensor Firmware Update

Ashtech, Inc. has formally released firmware update, version 1E89D-P, for GPS sensors. This firmware release has been tested/certified by NC22 and agreed upon by the C&GS, Hydrographic Survey Branch, for use by NOAA field units. Attached you will find thirteen (13) sets of EPROMs for PMC3 and twenty eight (28) sets of EPROMs for AMC3.

Please provided this firmware update to all field units, including the Atlantic and Pacific Hydrographic Field Parties, to ensure future compatibility with the U.S. Coast Guard's (USCG) new beacon DGPS installations. These new USCG beacon installations will provide users with a type 9 RTCM SC-104 corrector message in lieu of the current type 1 message. This firmware update does not affect NOAA's continued ability to use DGPS reference sites providing type 1 RTCM SC-104 messages, such as the current USCG's prototype beacon sites, NOAA's HF and VHF flyaway systems, etc.

Upon receipt of this memorandum, sign the attached acknowledgement form and return it to the Office of NOAA Corps Operations, Systems Engineering Branch. Should you have any questions, contact me at 301-413-0702.

Attachments.

cc: N/CG242 - S. DeBow





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
Seattle, Washington 98115-0070

**ADVANCE
INFORMATION**

August 31, 1995

Commander
Thirteenth Coast Guard District (OAN)
Federal Building, Room 3410
915 Second Avenue
Seattle, WA 98174-1067

Dear Sir:

Three dangers to navigation have been identified by Pacific Hydrographic Branch regarding Project OPR-N247-PHP (Pacific Hydrographic Party, July, 1995) within the limits of hydrographic survey H-10608. These dangers affect the following charts:

<u>Chart</u>	<u>Edition/Date</u>	<u>Scale</u>	<u>Datum</u>
18421	38th Ed./Oct 31, 1992	1:80,000	NAD83
18431	3rd Ed./Jul 31, 1993	1:25,000	NAD83

The attached information is provided for publication in the Local Notice to Mariners. A copy of chart 18431 showing the area in which the dangers exist is also attached.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6853.

Sincerely,

Kathryn Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Enclosures

cc: DMAHTC
N/CS261
PMC



**ADVANCE
INFORMATION**

Hydrographic Survey Registry Number: H-10608

Survey Title: State: Washington
Locality: Strait of Georgia
Sublocality: Sandy Point to Cherry Point

Project Number: OPR-N247-PHP

Survey Date: May 4 - July 25, 1995

Features are reduced to Mean Lower Low Water using predicted tides.

Charts Affected: 18421 38th Edition/October 31, 1992 1:80,000 NAD83
18431 3rd Edition/July 31, 1993 1:25,000 NAD83

<u>ITEM</u>	<u>DANGER</u>	<u>DEPTH</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
A.	Obstruction	3 fms 5 ft	48°49'39.8"	122°43'00.4"
B.	Obstruction	4 fms 0 ft	48°49'33.6"	122°42'59.8"
C.	Obstruction	2 fms 5 ft	48°47'19.9"	122°43'00.8"

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 526-6853.

ADVANCE INFORMATION

Chart 18431
1:25,000

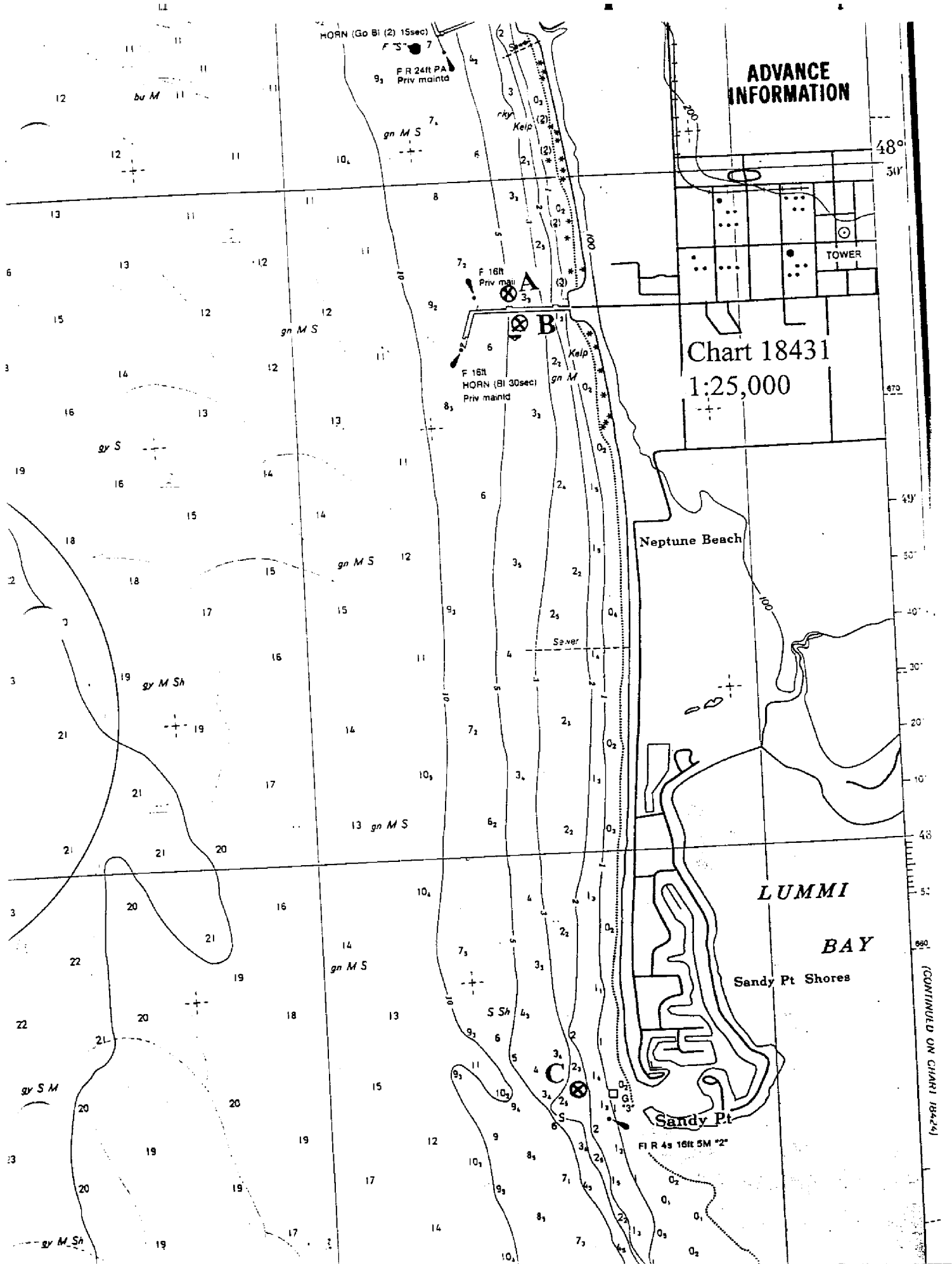
Neptune Beach

LUMMI
BAY

Sandy Pt Shores

Sandy Pt

Fl R 4s 16ft 5M "2"



(CONTINUED ON CHART 184424)

APPROVAL SHEET

for

SURVEY H-10608

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1995. The data were reviewed daily during acquisition and processing.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and Forwarded,

DATE: August 16, 1995



Richard A. Fletcher
Lieutenant, NOAA
Chief, Pacific Hydrographic Party



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

ORIGINAL

DATE: December 8, 1995

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-N247-PHP

HYDROGRAPHIC SHEET: H-10608

LOCALITY: Washington, Sandy Point to Cherry Point, Strait of
Georgia

TIME PERIOD: May 4 - July 25, 1995

TIDE STATION USED: 944-9424 Cherry Point, Wa.
Lat. 48° 51.8'N Lon. 122° 45.4'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 6.25 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 8.3 ft.

REMARKS: RECOMMENDED ZONING

1. South of 48° 54.5'N, and north of 48° 50.0'N, times and heights are direct using Cherry Point, Wa. (944-9424).
2. South of 48° 50.0'N, and north of 48° 46.5'N, times are direct, and apply a X0.96 range ratio to heights using Cherry Point, Wa. (944-9424).
3. South of 48° 46.5'N, apply a -10 minute time correction, and a X0.93 range ratio to heights using Cherry Point, Wa. (944-9424).

Notes: Times are tabulated in Greenwich Mean Time.
The data for Cherry Point, Wa. (944-9424) is stored in
Next Generation Water Level Measurement System temporary
file #744-9424.

William M. Hobbs
CHIEF, DATUMS SECTION



H-10608

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 18421 B ON PREVIOUS SURVEY NO. 18421 C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K										
	A	B	C	D	E	F	G	H	K		
GEORGIA, STRAIT OF	X		X							1	
NEPTUNE BEACH (pp1)	X		X							2	
SANDY POINT	X		X							3	
SANDY POINT SHORES	X		X							4	
(locale)										5	
WASHINGTON (title)	X		X							6	
										7	
										8	
										9	
										10	
										11	
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										23	
										24	
										25	

Approved

Chris Boyer
Chief Geographer

APR 30 1996

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	2				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

SHORELINE DATA

- SHORELINE MAPS (List):
- PHOTOBATHYMETRIC MAPS (List):
- NOTES TO THE HYDROGRAPHER (List):
- SPECIAL REPORTS (List):
- NAUTICAL CHARTS (List):

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			1405
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	156.5		156.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		10	10
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		10	10
GEOGRAPHIC NAMES			
OTHER:			
USE OTHER SIDE OF FORM FOR REMARKS			
	TOTALS	156.5	20
			176.5

Pre-processing Examination by Bob Mihailov	Beginning Date 8/30/95	Ending Date 9/1/95
Verification of Field Data by J. Stringham, D. Doles, L. Deodato	Time (Hours) 120.5	Ending Date 5/11/96
Verification Check by B. Olmstead	Time (Hours) 3	Ending Date 6/3/96
Evaluation and Analysis by L. Deodato	Time (Hours) 20	Ending Date 5/17/96
Inspection by B. Olmstead	Time (Hours) 11	Ending Date 6/6/96

EVALUATION REPORT

H-10608

A. PROJECT

Project information is discussed in the hydrographer's report.

B. AREA SURVEYED

This survey was conducted in Washington, and is located between Cherry Point and Sandy Point. Specifically, the surveyed area is bounded by latitude 48/50/06N to the north and latitude 48/46/54N to the south. The eastern limit is longitude 122/42/38W and the western limit is longitude 122/48/00W. Depths range from 0.6 to 42 fathoms.

C. SURVEY VESSELS

Survey vessel information is found in the hydrographer's report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using the same Hydrographic Data Acquisition/Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS) and AutoCad, Version 12.0.

At the time of the survey certification the format for transmission of digital data had not been formally approved. In the interim, digital data for this survey exists in the standard HPS format which is a database format using the .dbf extension. In addition, the sounding plot was created with .dbf (extension) and enhanced using the AutoCad system, are filed both in the AutoCad drawing format, .dwg (extension); and in the more universally recognized graphics transfer format, .dxf (extension). Copies of these files will be retained at PHS until data transfer protocols are developed and improved.

The drawing files necessarily contain information which is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes, remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 75.

The field sheet parameters have been revised to center the hydrography on the office plot. The data is plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was used on survey H-10608. Refer to section E of the hydrographer's report concerning set-up and operation.

F. SOUNDING EQUIPMENT

Sounding equipment is discussed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

The sounding data have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, dynamic draft, and sound velocity. These reducers have been reviewed and are consistent with NOS specifications. Actual tide reduction is derived from the Cherry Point, Washington, gage 944-9424.

H. CONTROL STATIONS

Control stations are discussed in the hydrographer's report and separates. A list of control stations used on survey H-10608 is attached to this report.

The positions of horizontal control stations used during hydrographic operations are field values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON.

Data based on NAD 27 may be referenced to this survey by applying the following corrections:

Latitude: -0.611 seconds (-18.882 meters)
Longitude: 4.650 seconds (94.886 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. The quality of several positions exceeds limits in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data, however, suggests that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable. Performance checks were accomplished by the fixed point method.

J. SHORELINE

There are no photogrammetric source data for this survey. The shoreline shown in brown on the smooth sheet was taken from the latest edition of NOS chart 18431 for orientation only.

K. CROSSLINES

Crosslines are discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10608 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10626	1995	1:10,000	north
H-10621	1995	1:10,000	south

The junctions with surveys H-10621 and H-10626 are complete. Soundings and depth curves are in good agreement within the common area. Five mainscheme lines from H-10626 overlap a portion of this survey from 800 to 1600 meters. These survey lines were run beyond the required sheet limits for H-10626 and extend from longitude 122/44/00W to longitude 122/45/00.8W and from latitude 48/49/00N to latitude 48/50/00N. Agreement within the common area is good.

M. COMPARISON WITH PRIOR SURVEYS

H-7962 (1953) 1:10,000
H-8323 (1956) 1:10,000
H-8481 (1959) 1:10,000

The prior surveys listed above cover the entire area of the present survey and have been adequately addressed in the hydrographer's report. However, the present survey specification defines the inshore limit of soundings to be the 5-fathom (9-meter) depth curve. With the exception of the few rocks located during this survey, the soundings and features within the area of the exclusion zone between the present hydrography and the high water line are not superseded. Differences are largely attributed to less accurate positioning and sounding methods available in 1953-59. Except in the vicinity of TOSCO refinery pier no significant changes in bottom configuration of the area were noted.

H-9281WD (1972) 1:20,000

A 100 and 200-percent side scan sonar coverage specified in the project instruction were accomplished during the survey to supplement basic hydrography. Based on the adequacy of the combined sonar and echo sounding coverages it is recommended that the wire drag clearance information originating from the 1972 wire drag survey be superseded.

H-10608 is adequate to supersede the prior surveys within the common area.

N. ITEM INVESTIGATIONS

AWOIS item 52184 and five additional items found during the survey were investigated and have been adequately addressed by the hydrographer.

O. COMPARISON WITH CHART

Survey H-10608 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
18431	3rd	July 31, 1993	1:25,000	NAD83

a. Hydrography

Charted hydrography originates with the above mentioned prior surveys and miscellaneous sources and requires no further discussion.

The adequacy of the side scan sonar and echo sounding coverages accomplished during this survey has resulted in the recommended supersession of the presently charted wire drag information and deletion of the charted wire-drag green tint within the common area.

Survey H-10608 is adequate to supersede charted hydrography within the common area.

b. Dangers to Navigation

The hydrographer reported no danger to navigation during survey operations. Three dangers to navigation were identified and reported during office processing and the correspondence is attached.

P. ADEQUACY OF SURVEY

Hydrography contained on survey H-10608 is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the required depth curves;
- b. reveal there are no significant discrepancies or anomalies requiring further investigation; and
- c. show the survey was properly controlled and soundings are correctly plotted.

Adequate side scan sonar (SSS) coverage was accomplished during this survey to supplement the echo sounding information.

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines and the Field Procedure Manual, April 1994 Edition.

Survey H-10608 adequately complies with the project instructions.

Q. AIDS TO NAVIGATION

There two fixed and two privately maintained aids to navigation. These aids were adequately located during survey operations and serve their intended purpose. There are no floating aids to navigation or landmarks within the survey area.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS

Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during survey processing.

T. RECOMMENDATIONS

This is a good hydrographic survey and no additional work is recommended.

U. REFERRAL TO REPORTS

Referral to reports is discussed in the hydrographer's report.

Leonardo T. Deodato
Leonardo T. Deodato
Cartographer

APPROVAL SHEET
H-10608

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Bruce A. Olmstead Date: 6/24/96
Bruce A. Olmstead
Senior Cartographer, Cartographic Section
Pacific Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Kathy Simmons, CDL NOAA Date: 6/28/96
Kathy Simmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Andrew A. Armstrong III Date: Aug 22, 1996
Andrew A. Armstrong III
Captain, NOAA
Chief, Hydrographic Surveys Division

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10608

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
18431	5/22/96	Jermack T. Dunlop	Full Part Before After Marine Center Approval Signed Via <i>Full applications of</i> Drawing No. <i>sounding & features from smooth sheet,</i>
18424	1-28-97	<i>The J. F. L.</i>	Full Part Before After Marine Center Approval Signed Via <i>H-Drawing BR-159221</i> Drawing No. <i>28</i>
18421	1-28-97	<i>The J. F. L.</i>	Full Part Before After Marine Center Approval Signed Via <i>Chart 18424 Dwg. #28</i> Drawing No. <i>39</i>
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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